

**ASIAN DEVELOPMENT BANK**

**PCR: PAK 22302**

**PROJECT COMPLETION REPORT**

**ON THE**

**URBAN WATER SUPPLY AND SANITATION PROJECT**  
**(Loan 1260-PAK [SF])**

**IN THE**

**ISLAMIC REPUBLIC OF PAKISTAN**

**November 2004**

## CURRENCY EQUIVALENTS

Currency Unit	–	Pakistan Rupee/s (PRs)	
		<b>At Appraisal</b> 30 June 1993	<b>At Project Completion</b> 30 September 2003
PRs1.00	=	\$0.0367	\$0.0174
\$1.00	=	PRs27.23	PRs57.625

## ABBREVIATIONS

ADB	–	Asian Development Bank
BME	–	benefit monitoring and evaluation
DCM	–	duplicate conductance main
EA	–	Executing Agency
ECM	–	existing conductance main
FIRR	–	financial internal rate of return
HUDPHED	–	Housing, Urban Development, and Public Health Engineering Department
m <sup>3</sup> /d	–	cubic meters per day
Mgal/d	–	million gallons per day
MIS	–	management information system
NGO	–	nongovernment organization
PCC	–	project coordination committee
PSC	–	project steering committee
PICC	–	project implementation coordination committee
PMU	–	project management unit
TRCM	–	Tomar-Rawalpindi conductance main
SDR	–	special drawing rights
SOE	–	statement of expenditure
RCB	–	Rawalpindi Cantonment Board
RDA	–	Rawalpindi Development Authority
RMC	–	Rawalpindi Municipal Corporation
RWASA	–	Rawalpindi Water and Sanitation Agency

## NOTES

- (i) The fiscal year (FY) of the Government of Pakistan and the government of Punjab ends on 30 June. "FY" before a calendar year denotes the year in which the fiscal year ends, e.g., FY2003 ends on 30 June 2003.
- (ii) In this report, "\$" refers to US dollars.
- (iii) "Government" refers to the Government of Pakistan.

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## BASIC DATA

### A. Loan Identification

1.	Country	Pakistan
2.	Loan Number	1260-PAK(SF)
3.	Project Title	Urban Water Supply and Sanitation Project
4.	Borrower	Islamic Republic of Pakistan
5.	Executing Agency	Rawalpindi Development Authority
6.	Amount of Loan	SDR 50.703 million (\$72.0 million)
7.	Project Completion Report Number	PAK 870

### B. Loan Data

1.	Appraisal	
	– Date Started	13 May 1993
	– Date Completed	30 May 1993
2.	Loan Negotiations	
	– Date Started	27 September 1993
	– Date Completed	1 October 1993
3.	Date of Board Approval	4 November 1993
4.	Date of Loan Agreement	17 May 1994
5.	Date of Loan Effectiveness	
	– In Loan Agreement	15 August 1994
	– Actual	13 October 1994
	– Number of Extensions	0
6.	Closing Date	
	– In Loan Agreement	30 September 1999
	– Actual	30 September 2003
	– Number of Extensions	3
7.	Terms of Loan	
	– Interest Rate (% per annum)	1
	– Maturity (number of years)	35
	– Grace Period (number of years)	10
8.	Terms of Relending	
	– Interest Rate (% per annum)	1
	– Maturity (number of years)	35
	– Grace Period (number of years)	10
	– Second-Step Borrower	Government of Punjab

## 9. Disbursements

## a. Dates

Initial Disbursement	Final Disbursement	Time Interval
1 March 1995	21 June 2004	9 years 3 months
Effective Date	Closing Date	Time Interval
13 October 1994	Original 30 September 1999 Actual 30 September 2003	9 years

## b. Amount (\$) (as of 30 June 2004)

Category or Subloan	Original Allocation	Last Revised Allocation	Amount Canceled	Net Amount Available	Amount Disbursed	Undisbursed Balance
01 – Civil Works	24,630,212	22,719,985	0	23,181,149	25,179,311	(1,998,162)
02 – Equipment, Vehicles and Materials	29,870,280	14,209,696	12,964,328	14,645,023	13,207,596	1,437,427
03 – Consulting Services	7,690,054	7,242,341	0	7,353,936	7,094,638	259,298
04 – Training	439,784	393,155	0	450,418	4,299	446,119
05 – Local Operational Cost for PMU	900,018	888,206	0	859,465	1,231,196	(371,731)
06 – Service Charge during Construction	1,699,923	1,545,675	0	1,621,332	1,416,905	204,427
07 – Unallocated	6,769,729	6,051,563	0	6,940,188	0	6,940,188
<b>Total</b>	<b>72,000,000</b>	<b>53,050,621</b>	<b>12,964,328</b>	<b>55,051,511</b>	<b>48,133,944</b>	<b>6,917,567</b>

PMU = project management unit.

Note: SDR6,071,268 (\$7,847,487 equivalent) was canceled on 22 February 2001, SDR3,972,000 (\$5,116,849 equivalent) on 4 September 2001, and SDR4,751,761 (\$6,917,566 equivalent) on 21 June 2004.

## 10. Local Costs (ADB Financed)

- Amount (\$ million)	22.58
- % of Local Costs	62.41
- % of Total Cost	36.57

## C. Project Data

## 1. Project Cost (\$ million)

Cost	Appraisal Estimate	Actual
Foreign Exchange Cost	46.64	25.56
Local Currency Cost	49.20	36.18
<b>Total</b>	<b>95.84</b>	<b>61.74</b>

## 2. Financing Plan (\$ million)

Cost	Appraisal Estimate	Actual
Implementation Costs		
Borrower-Financed	23.84	13.60
ADB-Financed	70.32	46.72
<b>Total</b>	<b>94.16</b>	<b>60.32</b>
IDC Costs		
Borrower-Financed	0.00	0.00
ADB-Financed	1.68	1.42
<b>Total</b>	<b>1.68</b>	<b>1.42</b>

ADB = Asian Development Bank, IDC = interest during construction.

## 3. Cost Breakdown by Project Components (\$ million)

<b>Component</b>	<b>Appraisal Estimate</b>	<b>Actual</b>
Part A: Surface Water Supply	8.70	17.54
Part B: Supply of Underground Water	2.35	1.23
Part C: Distribution System	33.72	9.41
Part D: Sewerage and Drainage	16.67	21.17
Part E: Institutional Strengthening	2.27	3.05
Part F: Consulting Services	7.43	7.09
Contingencies	15.05	0.83
Service Charge	1.68	1.42
Financed Interest (onlent)	7.97	0.00
<b>Total</b>	<b>95.84</b>	<b>61.74</b>

## 4. Project Schedule

<b>Item</b>	<b>Appraisal Estimate</b>	<b>Actual</b>
Date of Contract with Consultants		
Engineering Consultants	Jan 1994	Aug 1995
Financial Consultants	Jan 1994	Jan 1998
Completion of Engineering Designs	Mar 1999	Apr 2002
Civil Works Contract		
Date of Award	Mar 1994	Oct 1997
Completion of Work	Mar 1999	May 2004
Equipment and Supplies		
Dates		
First Procurement	Jun 1994	Jul 1995
Last Procurement	Mar 1999	Apr 2003
Completion of Equipment Installation	Mar 1999	Dec 2003
Start of Operations		
Completion of Tests and Commissioning	Mar 1996	Dec 2003
Beginning of Start-Up	Apr 1996	Dec 2003

## 5. Project Performance Report Ratings

<b>Implementation Period</b>	<b>Ratings</b>	
	<b>Development Objectives</b>	<b>Implementation Progress</b>
From 1 Jan 1997 to 31 Dec 1997	U	U
From 1 Jan 1998 to 30 Jun 1998	S	U
From 1 Jul 1998 to 31 Dec 1998	S	U
From 1 Jan 1999 to 31 Jun 1999	S	U
From 1 Jul 1999 to 31 Sep 1999	S	S
From 1 Oct 1999 to 31 Dec 1999	S	S
From 1 Jan 2000 to 31 Dec 2000	S	PS
From 1 Jan 2001 to 30 Jun 2001	S	PS
From 1 Jul 2001 to 31 Dec 2001	HS	PS
From 1 Jan 2002 to 30 Jun 2002	HS	PS
From 1 Jul 2002 to 30 Sep 2002	S	PS
From 1 Oct 2002 to 31 Dec 2002	S	PS
From 1 Jan 2003 to 30 Jun 2003	S	PS
From 1 Jul 2003 to 31 Dec 2003	S	PS
From 1 Jan 2004 to 31 May 2004	S	PS

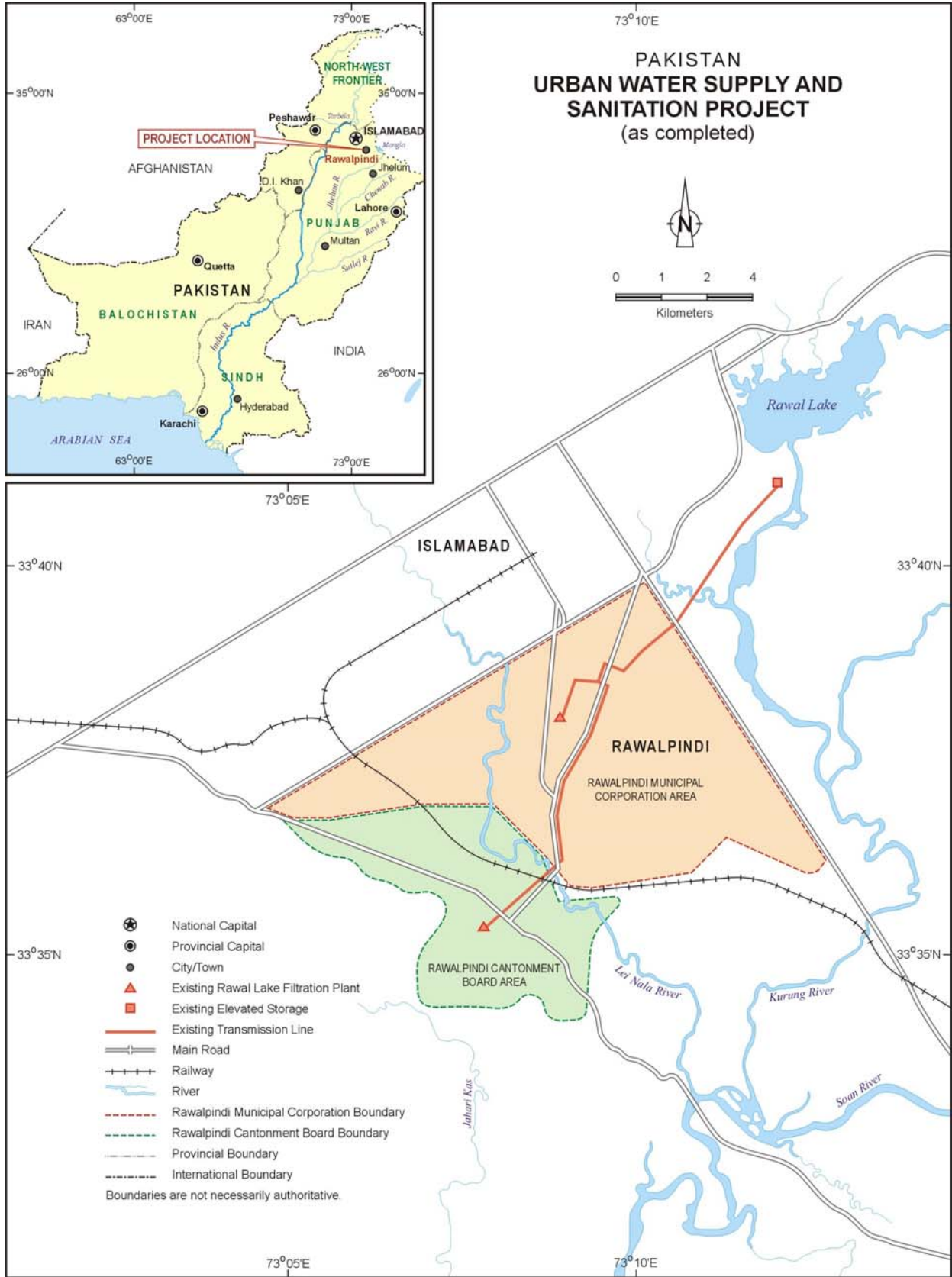
HS = Highly Satisfactory, PS = partly satisfactory, S = satisfactory, U = unsatisfactory.

**D. Data on Asian Development Bank Missions**

<b>Name of Mission</b>	<b>Date</b>	<b>No. of Persons</b>	<b>No. of Person-Days</b>	<b>Specialization of Members<sup>a</sup></b>
Fact-finding	29 Oct 1992	3	48	a,k,m,n
Appraisal	13 May 1993	5	90	a,k,m,o,p
Inception	2 Feb 1994	1	5	b
Special Loan Administration 1	16 Apr 1994	1	5	k
Review 1	27 Apr 1995	2	8	k,l
Review 2	24 Oct 1996	2	4	d,e
Review 3	25 Mar 1996	1	7	d
Review 4	26 Jul 1996	1	4	a
Brief follow-up	23 Nov 1996	2	4	a,g
Review 5	2 Jun 1997	3	21	a,b,c
Mid-term Review	7 Dec 1997	3	17	a,c,e
Review 6	1 Apr 1998	3	15	a,g,c
Review 7	23 Sep 1998	2	18	a,f
Review 8	10 Mar 1999	2	10	a,c
Review 9	18 Oct 1999	2	10	a,c
Review 10	25 Apr 2000	2	8	c,h
Review 11	10 Nov 2000	2	6	c,h
Review 12	21 May 2001	2	16	c,h
Review 13	7 Aug 2001	1	2	c
Review 14	28 May 2002	2	10	c,h
Review 15	20 Jan 2003	3	38	i,h
Project Completion Review <sup>b</sup>	1 Jun 2004	2	32	i, j

<sup>a</sup> a – project engineer, b – urban development specialist, c – senior project implementation officer, d – senior project specialist, e – project administration assistant, f – financial analyst, g – advisor, h – project analyst, i – project implementation officer, j – staff consultant/economist, k – senior financial analyst, l – project economist, m – programs officer, n – secretary, o – council, p – consultant/sociologist.

<sup>b</sup> The project completion report was prepared by Raza M. Farrukh, project implementation officer, Pakistan Resident Mission.





## I. PROJECT DESCRIPTION

1. Inadequate access to safe drinking water and environmental sanitation facilities has constrained Pakistan's economic and social development. Rapid urbanization is straining existing urban infrastructure services, particularly in the provision of adequate and reliable supply of potable water, and collection and hygienic disposal of excreta and wastewater. To address these problems in Rawalpindi, the third-largest city in Pakistan, the Government requested the Asian Development Bank's (ADB's) assistance for an urban water supply and sanitation project.<sup>1</sup> The request was in line with the Government's policy objective for the development of human resources, which recognizes that malnourished and unskilled people living in hunger and poverty make little contribution to economic progress and national output. Rawalpindi was given priority because of its size, large and rapidly growing population, and acute shortage of water and sanitation facilities. In response, ADB assisted the Government in the formulation of the Urban Water Supply and Sanitation Project. The Project was the first phase of a longer-term program for the development of water supply and sanitation facilities in Rawalpindi.

2. The objectives of the Project were to (i) provide safe and reliable water supply, improved sanitation, sewerage and drainage facilities in Rawalpindi; (ii) help the Government implement selected policy reforms to achieve long-term sustainability of water supply services at the local level; and (iii) provide the required institutional and management support to the newly established Rawalpindi Water and Sanitation Agency (RWASA) to enable it to be more self-disciplined in financial, managerial, and technical aspects.

3. The Project consisted of six parts. Part A—Surface Water Supply, consisted of rehabilitating and expanding the water treatment facilities, to increase the volume of water production by about 32,000 cubic meters per day (m<sup>3</sup>/d) to meet the increasing demand for water in Rawalpindi; Part B—Supply of Underground Water, entailed overhauling the mechanical, electrical, and control equipment of the existing 100 tubewells and drilling 20 new tubewells to augment supply from this source by 25,000 m<sup>3</sup>/d; Part C—Distribution System, included rehabilitating the existing system, reducing leakages, and improving supply pressure, constructing new mains to reinforce supply to existing consumers, extending the mains to connect new consumers, and installing water meters to all consumers; Part D—Sewerage and Drainage Improvement, comprised cleaning existing sewers and drains and carrying out urgent repairs; Part E—Institutional Strengthening consisted of providing buildings, equipment, service vehicles, and training to RWASA and the project management unit (PMU); and Part F—Consulting Services, was to assist PMU and RWASA in project implementation and institutional strengthening.

## II. EVALUATION OF DESIGN AND IMPLEMENTATION

### A. Relevance of Design and Formulation

4. ADB's strategy for the water supply and sanitation sector has been specifically influenced by lessons from previous ADB projects and sector constraints that need to be addressed. ADB's objectives focus on the conservation and efficient use of water resources, the provision of a 24-hour safe and reliable water supply to all people, and application of user

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<sup>1</sup> ADB. 1993. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Islamic Republic of Pakistan for the Urban Water Supply and Sanitation Project*. Manila.

charges sufficient to recover costs and allow the sustained operation of the water supply systems. In practice, this translates into upgrading and extending piped water supplies to effect improved coverage and service, imposing tariffs that will enhance the financial resources of water supply entities and discourage excessive water use by consumers, improving billing and collection efficiency, and reducing nonrevenue water. ADB also places particular emphasis on environmental improvement and the role of women in development, and supports projects with a potential to satisfy basic human needs, reducing poverty, improving the environment, and relieving women and children of the task of collecting water. ADB believes that a well-managed, financially viable water supply institution is the key to good water supply and sanitation services and the efficient use of scarce water resources. Therefore, it places considerable emphasis on the establishment of independent and autonomous water supply and sanitation agencies that both have the authority and mandate necessary to determine water tariffs, and have the facilities to train and retain qualified staff to maintain facilities.

5. The Government of Pakistan in its seventh five-year plans recognized that inadequate access to safe drinking water and adequate sanitation facilities constrain the country's economic and social development, particularly in urban areas. In its Seventh Five-Year Plan (FY1988 to FY1993), the Government had set an ambitious target of 95% urban water supply coverage and 70% sewerage and drainage coverage, which implied reaching an additional 13 million people for each service during the 5 years. To achieve these targets, the Government allocated PRs15.9 billion (\$611 million).

6. The Project was designed to provide a safe and reliable water supply, improved sanitation, and sewerage and drainage facilities to about 650,000 people living in the Rawalpindi Municipal Corporation (RMC) area (now covered by RWASA) as well as to provide adequately treated bulk water supply to about 540,000 people living in the Rawalpindi Cantonment Board (RCB) area. Secondary objectives were to (i) assist the Government to implement selected policy reforms to achieve long-term sustainability of water supply services at the local level, and (ii) provide the necessary institutional and management support to enable the then newly established RWASA to operate efficiently and maintain a financially viable water supply, sanitation, and sewerage system in Rawalpindi. The Project's strategic objective was human resource development with reduction in poverty being an additional objective.

7. The Project was consistent with ADB's country strategy and program and its development objectives. It also supported the Government's plans to provide safe drinking water and improve hygiene through sewerage and drainage sanitation facilities.

## **B. Project Outputs**

8. The outputs of surface water supply, distribution system, and sewerage and drainage components are more than envisaged at appraisal. The construction of Tomar-Rawalpindi Conductance Main (TRCM) from Tomar reservoir and allied distribution mains have ensured additional supplies from Khanpur dam. Lai *nallah* (a local major drain) drainage works including widening, canalization, and reconstruction of three bridges have increased its capacity to accommodate once in 25-year floods. Installation of water meters under distribution system component reached only about 10% of the number envisaged. Supply of underground water component achieved the envisaged outputs. Institutional strengthening component partially achieved the outputs envisaged at appraisal. The Project outputs, as anticipated during appraisal and the extent to which they were achieved, are as follows.

## 1. Part A—Surface Water Supply

9. This comprised (i) rehabilitation and expansion of existing filtration works that treat water from Rawal lake, (ii) construction of a new transmission main (duplicate conductance main or DCM) to convey the filtered water to RMC and RCB areas, and (iii) rehabilitation of an existing booster pumping station and associated transmission main (the existing conductance main or ECM). Items to be rehabilitated included inlet channels, slow sand filters, and mechanical, electrical, and control equipment in the existing filtration plant; buildings; and a chlorination plant. New works included construction of intake works, flash mixer, clarifier, rapid gravity sand filters, chemical dosing equipment, and buildings to increase filtration capacity of the plant by a minimum of about 7 Mgal/d (32,000 m<sup>3</sup>/d), together with the construction of a 1,400-millimeter (mm) diameter DCM about 10 kilometers (km) long, and rehabilitation of ECM.

10. Rawal lake filtration plant has been rehabilitated and its capacity of 21 Mgal/d increased by 7 Mgal/d (32,000 m<sup>3</sup>/d). The rehabilitation works completed include repairs and/or replacement of inlet channels; mechanical, electrical, and control equipment; two flash mixers with new aeration system; three existing clarifiers; 12 rapid gravity sand filters; alum dosing equipment; the existing collection well; and buildings. The rehabilitation of the booster pumping station was not required because the system is operating on gravity flow and the pumping station is of no use. Slow sand filter beds, located upstream of the filtration plant and connected to ECM downstream, were not rehabilitated. Their rehabilitation was not required because water from the filters was treated only for sediment exclusion, and its mixing with chemically and biologically treated water from the filtration plant was not advisable. Therefore, the slow sand filters have been abandoned. The existing chlorinator was replaced with a new one.

11. New works completed at the filtration plant include construction of one intake channel of 7 Mgal/d capacity (the existing intake capacity was 21 Mgal/d); one clarifier; four rapid gravity sand filters; flow separation chamber; wash balancing tank; chemical dosing equipment comprising one chlorinator, and lime and alum dosing facilities; and buildings. A DCM of 21 Mgal/d capacity was also constructed. The length of DCM is 10.6 km and its diameter is 1,400 mm. Partial rehabilitation of ECM (21 Mgal/d) was done under the Project, but this was inadequate for stopping huge water losses (approximately 3.5 Mgal/d) due to leakages. After commissioning of DCM in July 2002, the water supply through ECM was stopped. As a result, the additional 7 Mgal/d water available from the extended filtration plant was not being supplied to consumers. RWASA has repaired the leakages and started transmitting 12 Mgal/d through ECM for bulk supply to military engineering services and 13 Mgal/d to Rawalpindi city through DCM in September 2004.

12. Rawalpindi is allocated 14.6 Mgal/d water from Tomar reservoir, which was constructed under Khanpur-Tomar Project and stores water (10 million gallons) coming from Khanpur dam through Sangjani treatment plant. The construction of a conductance main to Rawalpindi was envisaged under a follow-on project after 1999 considering the Project would complete as scheduled. However, the Project got delayed and Khanpur-Tomar project, which was also under implementation surpassed the Project and was completed in 1999. This made available the water allocated for Rawalpindi from Tomar reservoir. To bring that water to Rawalpindi construction of the TRCM was approved by ADB in July 1999 at the Government's request, as a change in the scope of the Project.<sup>2</sup> A 19.5 km long pipeline was laid, with diameters ranging from 300 to 1,400 mm; three overhead storage reservoirs were constructed (located at

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<sup>2</sup> Water supply from TRCM to RMC and RCB, starting from 1996/97, had been accounted for in the financial analysis carried out at appraisal.

Pirwadhai, Shamsabad, and Public Park), each with a capacity of 0.25 million gallons; and the line was connected with the distribution networks of the city and cantonment board (RCB) areas. TRCM has a capacity of 34 Mgal/d (1,400 mm diameter) up to 2.3 km from Tomar reservoir. A 1,200 mm diameter (19.4 Mgal/d) line offtakes from that point to supply water to the RCB area and a 1,000 mm (14.6 Mgal/d) 3.9 km long line to the Rawalpindi city area. Six feeding mains have been constructed for connecting that line to distribution networks in different parts of the city. The combined capacity of the main lines is 14.6 Mgal/d, total length is 13.3 km, and the diameter varies from 300 mm to 900 mm. Water supply from TRCM to Rawalpindi city, since its commissioning in May 2002, has increased from 1 Mgal/d to 6 Mgal/d. A lesser supply is attributable to insufficient water available from Khanpur dam due to a prolonged drought. RWASA does not expect maximum water supply for Rawalpindi city from this source to exceed 8 Mgal/d in the foreseeable future.

13. Total water available for Rawalpindi city area at present is estimated at 35.5 Mgal/d,<sup>3</sup> including 13 Mgal/d from Rawal lake, 6 Mgal/d from Khanpur dam, and 16.5 Mgal/d from tubewells. In addition RWASA is supplying 12 Mgal/d from Rawal lake filtration plant to Military Engineering Services (MES) for RCB area through ECM.

## **2. Part B—Supply of Underground Water**

14. Part B consisted of overhauling the mechanical, electrical, and control equipment in about 100 existing tubewell installations, and construction of 20 new tubewells to augment supply from the underground aquifers of Rawalpindi by 25,000 m<sup>3</sup>/d (5.5 Mgal/d). The rehabilitation of the tubewells included pump tests to ascertain pump and motor efficiency; overhauling pumps, motors, drives, electrical switchgear and control equipment, flow meters, valves, and buildings; and installing additional water level draw-down measuring facilities as required and flow meters. The Project was to provide about 20 new tubewells including drilling the wells; logging; installing casing and screens, pumping equipment, and flow meters; and constructing buildings. Cleaning and repairing balancing reservoirs and control valves, including construction of new elevated storage as required, was also included.

15. Twenty new tubewells were installed as envisaged to supply an additional 1.7 Mgal/d of water. Rehabilitation of 91 existing tubewells was completed including civil, mechanical, and electrical works. Fourteen submersible pumps and 8 motors were replaced, 62 motors and 2 submersible pumps were repaired along with repair/replacement of electrical and mechanical accessories/devices, and 20 buildings were repaired. The works envisaged for rehabilitation but not undertaken include pumping tests, cleaning and repairing balancing reservoirs, and installation of additional water level draw-down measuring facilities. Flow meters were installed on most of the tubewells but no system of recording the meter readings has been established. The total number of operational tubewells at present is 193, with an estimated operational efficiency of 49% and estimated combined discharge of 16.5 Mgal/d.<sup>4</sup>

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<sup>3</sup> The source of reported water volumes is RWASA, but these could not be verified as there is no system of recording water flows and the meters installed on DCM and TRCM are not functioning. RWASA reported that the type of meters installed on DCM and TRCM is not appropriate. The meters installed on tubewells are not recorded.

<sup>4</sup> The Project Completion Review Mission conducted a sample survey of 27 tubewells and estimated the average flow per tubewell at 0.085 Mgal/d.

### 3. Part C—Distribution System

16. Part C consisted of rehabilitating the existing distribution system to reduce leakage and improve supply pressure; constructing new mains to reinforce the supply to existing consumers; extending the mains to connect new consumers; and fitting water meters to all connections. Rehabilitation included overhauling booster pumps and associated equipment, repairing or replacing inoperative valves and eliminating leaks on water mains from 75 mm to 600 mm in diameter, eliminating leaks at reservoirs, and checking existing meters serving about 2,000 connections. New construction included distribution mains and installation of about 80,000 water meters on domestic, industrial, and commercial connections.

17. Under rehabilitation, 143 km of tertiary lines (out of approximately 720 km existing) of 80 mm to 150 mm diameter were replaced, 10 booster pumps were refurbished and 6 were replaced with higher capacity pumps, inoperative valves were replaced/repared, and leaks in 17 existing reservoirs were eliminated. Works not undertaken included eliminating leaks in water mains and checking existing meters serving about 2,000 connections.

18. New works completed included laying 193 km of tertiary and secondary lines of 80 mm to 1,000 mm diameter. Lengths of distribution lines for rehabilitation, replacement, and extension were worked out at detail engineering design stage. A total of 19,675 water meters were procured (comprising 19,000 domestic, 400 commercial, and 275 bulk water supply) against 80,000 envisaged at appraisal. Out of these only 8,000 domestic and 239 bulk water supply meters have been installed, while the remaining are stored at RWASA's office. The total cost of water meters was PRs44.72 million (procurement of PRs31.62 million and installation of PRs13.1 million), equivalent to approximately \$0.8 million. PMU believed that people were not interested in having water meters installed at their connections. Installation of water meters should have been done at the time of rehabilitation/extension of the distribution system. Billing of metered connections is still being made at fixed rates.<sup>5</sup> Water tariffs for metered connections were notified by the government of Punjab in June 1998, and were later revised in December 1999, September 2000, and July 2003.<sup>6</sup> The water flows are not being recorded<sup>7</sup>. The entire water supply system is un-gauged and there is no mechanism for measuring the volume of water flowing through the system, except for releases from Rawal lake filtration plant.

### 4. Part D—Sewerage and Drainage

19. Part D consisted of cleaning existing sewers and drains; disconnecting storm water entry to sewers; fitting covers and grating to prevent ingress of solid waste, silt, and debris; clearing discharge outlets; and removing obstructions in the Lai *Nallah* which receives most of Rawalpindi's drainage.

20. The cleaning of existing sewers was done as envisaged with the help of equipment procured under the Project. Some additional works were also completed, including construction of a new trunk sewer (2.4 km, 1,070 mm to 1,220 mm diameter) in central district, an outfall

<sup>5</sup> RWASA still operates under a fixed tariff regime, under which a household connection is charged a fixed rate set according to the area covered by the unit and a commercial connection is charged according to the type of activity that the unit is engaged in.

<sup>6</sup> Currently, the metered tariff rates, though not implemented at all, range from PRs15 to PRs35 per 1,000 gallons, increasing on an incremental basis for higher consumption slabs.

<sup>7</sup> The water meters for tubewells are appropriately installed but RWASA has yet to begin recording the flows. For surface water flows, RWASA is of the view that only after installing appropriate type of flow meters at appropriate locations, flow recording can be started.

sewer (1.8 km, 1220 mm to 1520 mm diameter), and a pumping station. One contract for construction of trunk sewer, awarded to an international firm, was abandoned in December 2001 due to security reasons.

21. Drainage works completed under the Project include construction of one 5.3 km interceptor drain with a discharge capacity of 30.6 cubic meters per second (m<sup>3</sup>/s), channeling and diversion of 2.7 km existing drain (Kassi West) with a discharge capacity of 10.6 m<sup>3</sup>/s, widening and channeling of Lai *Nallah* (11.5 km) with a discharge capacity ranging from 760 to 1,070 m<sup>3</sup>/s, and reconstruction of three bridges obstructing Lai *Nallah* flows. Removing obstructions in Lai *Nallah* was included in the original scope for drainage works. The estimated cost of drainage works was \$2.93 million, whereas actual cost of completing Lai *Nallah* drainage works amounted to about \$12.7 million. An ADB review mission in August 2001 gave approval of these works. The works resulted in involuntary displacement of about 1,271 households (about 9,500 people). The ADB policy on resettlement was not implemented but land acquisition was carried out in an organized manner and there were no significant complaints from the affectees. The government of Punjab paid PRs479.42 million as compensation, for land and demolished structures, to 1,079 legal owners, but paid no compensation for 192 houses illegally constructed on state land.

22. The list of contracts awarded for civil works and procurement of equipment is given in Appendix 1.

## **5. Part E—Institutional Strengthening**

23. Part E comprised provision of equipment, buildings, training, and service vehicles to RWASA and PMU for establishing their technical operation, maintenance, and accounting services at an early stage of development. The operational costs of PMU during implementation were included, on a declining basis.

24. Equipment and service vehicles were procured as envisaged. RWASA headquarter and four suboffice buildings were constructed. A training program was developed by the consultants but was not completely implemented. Trainings were given mostly to tubewell operators and technicians. Few of the RWASA and PMU management/professional staff received training. A management information system (MIS) was developed including computerized billing, payroll, inventory, and accounting modules. RWASA does not have appropriately qualified staff for using the MIS efficiently. There is a need to immediately recruit such staff for the MIS to make it fully operational. The PMU staff for key positions was mostly recruited on contract basis, which lacked relevant experience. There was not enough coordination between Rawalpindi Development Authority (RDA—the EA), RWASA, and PMU. At present, many professional staff positions are vacant in RWASA. Additional charges of few key positions of directors and deputy directors have been given to less-qualified staff.

## **6. Part F—Consulting Services**

25. Part F consisted of technical and financial management consulting services associated with designing and supervising construction of new works, planning rehabilitation works, and establishing RWASA office procedures in data collection and recording, financial management, and revenue collection. The technical services included a consultancy for (i) designing the major works and carrying out necessary hydrogeological studies, (ii) a catchment study of Rawal lake and preparation of a sewerage master plan for the project area, and (iii) prioritizing the next stage of development. Financial management services were to be provided for a computerized

water billing system and monitoring financial performance and accounting practices as well as staff training.

26. Consulting services were procured under two packages: engineering, and financial and management. The engineering consultants carried out planning, design, construction supervision, and contracts management, and various studies as envisaged including hydrogeological, Rawal lake catchment, sewerage master plan, and plan for the follow-on phase. The financial and management consultants prepared computerized billing, accounting, and financial performance monitoring systems, developed a training program, and completed various studies included in their terms of reference. No international training consultant was recruited.

27. Input of engineering consultants estimated at appraisal was 2,096 person-months, including 112 person-months of international and 1,984 person-months of domestic staff. Actual person-months were 3,848 (184% of estimated), including 82 person-months (73% of estimated) of international and 3,766 person-months (190% of estimated) of domestic staff. Estimated input of financial and management consultants was 24 person-months—12 international and 12 domestic. Actual person-months were 149 (621% of estimated), including 15 (125% of estimated) of international and 134 (1,117% of estimated) of domestic staff. The consultants' inputs were substantially increased due to extension of the Project by 4 years as well as additional works like TRCM and Lai *Nallah* drainage. A comparison of estimated and actual person-months of the consultants is provided in Appendix 2.

### **C. Project Costs**

28. The total cost of the Project at appraisal was estimated at \$95.8 million, including taxes and duties, of which \$46.6 million or about 49% was the foreign exchange cost, including a service charge of \$1.7 million on the ADB loan during construction (Appendix 3). Local currency costs were estimated at \$49.2 million equivalent or about 51%. ADB financed 100% of the foreign exchange cost and 51.6% of the local currency cost (\$25.4 million equivalent). The government of Punjab's share was \$23.8 million equivalent, or 48.4% of the local currency cost.

29. The actual project cost amounted to \$61.74 million equivalent, or about 64% of the estimated cost, including \$25.56 million in foreign exchange and \$36.18 million in local currency costs. Of the \$72.0 million equivalent ADB loan, \$46.72 million was utilized. After adding interest during construction of \$1.42 million, the actual ADB share came to \$48.13 million, or about 67% of the approved loan amount. Of the \$23.84 million government of Punjab share, \$13.60 million—about 57%—was utilized. Loan savings of \$7.85 million (SDR 6.07 million) and \$5.18 million (SDR 3.97 million) were canceled by ADB on 22 February 2001 and 4 September 2001. A further loan saving of \$6.92 million (SDR 4.75 million) was achieved after the final disbursement. The total loan savings amount to \$19.88 million (SDR 14.80 million). Although there was a cost underrun in dollars of about \$34 million, or 36%, which can be explained to a large extent by the Pakistan rupee's depreciation against the dollar,<sup>8</sup> the cost of the Project increased by about 29% in terms of local currency from PRs2,650 million to PRs3,432 million. Two major contributing factors were the additional works of Lai *Nallah* (PRs750.0 million) and TRCM (PRs359.0 million).

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<sup>8</sup> The Project was estimated at appraisal in June 1993 prices at PRs27.23/\$.

#### **D. Disbursements**

30. The total disbursement was \$48.13 million (including \$1.42 million interest during construction), which was about 67% of the ADB loan, and 87% of the net loan amount (\$55.03 million) at loan closing (Appendix 4). The ratio of cumulative disbursement to the net ADB loan varied from 8% to 86% between 1998 and 2003. The imprest account was maintained to facilitate timely payments for small contracts and direct payments were made to the consultants and for larger contracts.

#### **E. Project Schedule**

31. The Project was to be implemented over 5.5 years from October 1993 to March 1999. The loan was approved on 4 November 1993, the Loan Agreement was signed on 17 May 1994, and it was declared effective on 13 October 1994, about 2 months later than the target date of 15 August 1994. Late approval and subsequent signing and effectiveness of loan resulted in a change in schedule provided in the report and recommendation of the President. The original loan closing date was changed to 30 September 1999. However, the Project could not be completed by the original loan closing date, and was extended three times at the request of the Government. The first extension of 2 years (ending 30 September 2001), attributed to construction of TRCM, was approved by ADB in July 1999; the second extension of 18 months (ending 31 March 2003) for *Lai Nallah* works was approved by ADB in August 2001; and the third extension of 6 months (ending 30 September 2003) for completing the ongoing contracts was approved by ADB in May 2003.

32. The Project was not completed by the extended loan closing date of 30 September 2003. The works on 17 civil works contracts, out of total 46 awarded, were ongoing, and were completed by June 2004. The primary reason for substantial delays in implementation was delayed decisions and lack of action on the part of PMU throughout the implementation period. Recruitment of engineering consultants was delayed by 19 months and of financial management consultants by 3 years. Completion of engineering design was delayed by 3 years as well, award of civil works contracts by more than 3 years, and completion of civil works by more than 5 years. Procurement of equipment took 8 years as compared to an estimated time of about 5 years. Completion of tests and commissioning of completed works was delayed by more than 7 years. Other reasons for slow progress included unnecessary delays in payments to contractors and consultants, random deductions by the project director in interim payment certificates submitted by the engineering consultants for payments to contractors, and frequent oral changes in works by the project director contrary to the approved design. The project implementation schedule is provided in Appendix 5.

#### **F. Implementation Arrangements**

33. As per appraisal, the Executing Agency for all components of the Project was RDA. To assist RDA in implementing the Project, a PMU headed by an appropriately qualified full-time director was to be established within RDA prior to the loan effectiveness. PMU was to be involved in the operational coordination and management of all project activities, including preparation; programs, budgeting, and financial planning; detailed engineering design; tendering and construction supervision; design and implementation of benefit monitoring and evaluation (BME) activities; socioeconomic surveys; environmental assessment and protection; and community and nongovernment organization (NGO) participation activities. The staffing of PMU was to include expertise in engineering, accounting, economics, management, and sociology. PMU was to be supported in its role by international and domestic consultants.



34. RDA implemented the Project by establishing a PMU in July 1994, prior to loan effectiveness, headed by a Project Director responsible for coordinating and implementing all project activities. Appointment of a project director having more relevant experience would have improved the implementation and management of the Project. Appointment of some of the existing engineering and administrative staff of RDA, RWASA, and the Housing, Urban Development, and Public Health Engineering Department (HUDPHED) in PMU has resulted in enhanced capacity of RWASA and RDA in managing the project facilities. Some of the staff hired on contract basis for key positions such as Director Sewerage and Drainage was not appropriately qualified. Appointment of contract staff in PMU also did not contribute to the institutional strengthening of RWASA and RDA as they left after project completion and experience gained during implementation could not be retained. International and domestic engineering, financial, and management consultants supported PMU in implementing the Project.

35. The Government had agreed to set up two committees, prior to loan effectiveness, to assist PMU in ensuring timely and smooth implementation of the Project. The Planning and Development Department of the government of Punjab was to establish a project steering committee (PSC), under the chairperson of the Punjab Planning and Development Board, comprising senior members of the various provincial departments and government ministries including representatives from the Environment and Urban Affairs Department, Rawalpindi Development Authority, Public Health Engineering Department, Capital Development Authority, and Water and Power Development Authority, to provide guidance to the project coordination committee (PCC), help clear any bottlenecks, and serve as a forum for discussion on and review of project impact on regional development. The PSC was to meet regularly to monitor project progress. To oversee and coordinate all project activities, including ensuring appropriate liaison among the agencies involved in implementation, RDA was to establish a PCC chaired by the director general of RDA, prior to loan effectiveness. Its members were to include representatives from the provincial and local departments, authorities, and agencies involved in project implementation including representatives of RDA, WASA, RMC, and RCB. The PCC was to meet when required, but at least once a quarter.

36. The PCR mission could not find any evidence of the PSC and PCC having established or met. No notification or minutes of meetings were available at HUDPHED, RDA, RWASA, or PMU.

## **G. Conditions and Covenants**

37. Out of 32 loan covenants, 14 were complied with, 10 were partly complied with, and 8 were not complied with. The overall rating was partly satisfactory with sector and environmental covenants being satisfactory and the social, financial, and other covenants partly satisfactory. The status of compliance with loan covenants is provided in Appendix 6.

38. Among sector covenants, three related to developing RWASA into a commercially autonomous entity within RDA, completing long-term business plans, and delegation of authority to RDA and RWASA were partly complied with. Financial covenants related to RWASA achieving financial targets by reducing nonrevenue water and accounts receivables, and maintaining the ratio of operating expenses to operating revenue at less than 80% to become financially self-sufficient, were not complied with. Two financial covenants were not complied with: one pertained to the preparation of annual reports on the status of RWASA's compliance with the financial targets; and the other to reducing nonrevenue water to less than 45% by 31

December 1995 and 35% by 1997, and keeping accounts receivables to equivalent or less than 3 months billing. In other covenants, one related to carrying BME was not complied with and another on submitting BME and annual performance reports to ADB was partly complied with.

#### **H. Consultants' Recruitment and Procurement**

39. ADB guidelines were generally followed for recruiting consultants. A consortium of five firms was recruited as engineering consultants in August 1995. Recruitment was delayed by 19 months. The contract agreement was not duly signed and the date of contract was not printed. The consortium utilized 82 person-months of international and 3,766 person-months of domestic consultants, compared with provisions for 112 and 1,984 person-months, respectively. Five variations in the original contract and two adjustments in the variation orders were approved, increasing the cost of services from PRs100.9 million and £1.13 million to PRs217.2 million and £1.44 million. Recruitment of a financial and management consulting firm was completed in January 1998 after a delay of 4 years. The firm utilized 15 person-months of international consultants against the provision of 12 person-months, and 134 person-months of domestic consultants against provision of 12 person-months. Eight variations in their contract were approved and subsequently a revised lump sum contract was signed in September 2000, which was not based on person-months input. The cost of financial and management consulting services increased from PRs5.26 million to PRs23.9 million and from \$0.134 million to \$0.175 million. An international training consultant was not recruited against the provision of 3 months. The delays in recruitment of consultants are attributed to procedural formalities and delayed decisions on part of the government of Punjab's consultant selection committee.

40. ADB's guidelines were followed for procurement of services and goods. However, first procurement was delayed by almost a year and the last by more than 4 years compared with the appraisal estimates.

#### **I. Performance of Consultants, Contractors, and Suppliers**

41. The consortium of firms recruited for engineering services delivered the outputs envisaged in their contract, but a review of the reports submitted by the consultants and discussions with the Executing Agency showed that the quality of outputs was poor. A total of 271 variations in 40 out of 46 civil works contracts were approved. Such a large number of variations is attributed partly to weak performance of the consultants (apart from frequent amendments by the project director in engineering designs). The consultants could not handle such interference in a professional manner. The quality of some of the consulting staff was not up to the mark. The flow meters procured for recording bulk water supplies on consultant's recommendation are considered inappropriate by RWASA. The design of some of the components, such as use of asbestos cement pipes, was not up to international standards.

42. The financial and management consultants also delivered the outputs envisaged in their contract. Review of the reports and computer software for the MIS prepared by them revealed their satisfactory performance.

43. The completion of civil works undertaken by 27 domestic and international contractors was delayed by more than 5 years. The performance of the contractors was mixed. The slow progress of civil works is attributed to variations in the design and scope of works, deductions in interim payment certificates, delays in payments and weak performance of some of the contractors. One contract for construction of a trunk sewer awarded to a contractor from the

People's Republic of China (PRC) was abandoned after the contractor demobilized due to security concerns in December 2001. Performance of suppliers was generally satisfactory.

#### **J. Performance of the Borrower and the Executing Agency**

44. The Borrower provided the required funds, facilities, services, and other resources required for carrying out the Project. The PSC was not established, which was required prior to loan effectiveness to monitor project progress and provide guidance to the PCC. Also, the subsidiary loan agreement with RDA was not signed. Overall performance of the Borrower was partly satisfactory.

45. RDA, as the EA, established PMU for implementing the Project. PCC was not established to oversee and coordinate the project activities. PMU tended to act as a separate entity and did not coordinate with RDA or RWASA. The project director for the periods January–December 1998 and January 2000–December 2003 (5 years), who was also managing director of RWASA for 28 months during that period, was appointed on a contract basis and did not have adequate experience of managing such big water and sanitation sector projects. The Project faced management and coordination problems causing delays in implementation. It also affected the performance of consultants and contractors and the interest of RDA and RWASA in the Project. A more experienced project director would have been better for the Project. The consultants and contractors expressed their resentment on mishandling of their contracts on a number of occasions. ADB consistently communicated its concerns to PMU, RDA and government of Punjab for taking remedial measures. The extraordinary variations in contracts of consultants and contractors and delays in implementation could have been avoided with better management.

46. The BME system was not implemented. As a result, it is difficult to assess the project benefits at this stage. The water meters and flow meters were not installed completely and yet those installed are not used to meter water for billing purposes. The whole water supply system is un-gauged. There is no mechanism in place for measuring and recording inflows and outflows of the system. The flow meters installed at some of the main lines and tubewells are not being recorded. The only reliable flow information available is at the Rawal lake filtration plant. PMU did not take much interest in these issues despite numerous reminders from ADB. The MIS is not being fully utilized; only one module, the billing database, is being used out of six developed by the consultants.

47. The progress reports and maintenance of records of accounts, including the submission of audit reports, were satisfactory. A double-entry accounting system was developed but not implemented.

48. Despite delays and implementation problems, EA managed to overachieve the outputs envisaged at appraisal. The Lai *Nallah* drainage works was a commendable job and construction of TRCM was very timely otherwise water shortage would have still persisted. The overall performance of the EA was partly satisfactory.

#### **K. Performance of Asian Development Bank**

49. ADB was involved at all stages of implementation, and took part in regular supervision and monitoring. Between April 1994 and January 2003, ADB fielded 15 review missions, one special loan administration mission, and one midterm review mission. The review missions had

a total input of 376 person-days. The missions were fielded for reviewing progress and removing implementation bottlenecks. The Lai *Nallah* works were identified by the ADB mission after heavy floods in 2001. These works have solved a long-standing flood problem to a certain extent and provided great relief to the population. However, more consideration could have been given in social safeguards under the Lai *Nallah* works. ADB took timely action for including construction of TRCM in the Project's scope. Water from Khanpur dam was used for estimating financial viability of the Project at appraisal but construction of TRCM, for bringing Khanpur water to Rawalpindi, was not included in the original scope and was therefore approved as a change in scope in July 1999. ADB took timely action in canceling loan savings so that proceeds from the Asian Development Fund could be used on other projects.

50. The overall performance of ADB was generally satisfactory but could have been more effective given due attention to compliance of loan covenants.

### **III. EVALUATION OF PERFORMANCE**

#### **A. Relevance**

51. Overall, the project design was highly relevant to the Government's development strategy, as reflected in its seventh five-year plan, which sought to improve urban water supply and sanitation. The design was also relevant to ADB's strategy of supporting projects with the potential to satisfy basic human needs, reduce poverty, and improve the environment (paras. 4–7).

#### **B. Efficacy in Achievement of Purpose**

52. The Project was efficacious because most physical outcomes were achieved (paras. 8–21) and it is serving more than the targeted population. The volume of nonrevenue water has been reduced from 66% in 1998/99 to about 47% in 2003/04. The collection efficiency of RWASA ranged from 50% to about 70% during 1998/99–2003/04 (Appendix 7). It is likely that the Project outcomes will lead to the Project goals.

#### **C. Efficiency in Achievement of Outputs and Purpose**

53. The Project was less efficient. Efficiency of process was weak, in terms of organization and management of the Executing Agency, as was the effectiveness of project management (paras. 45, 46), and recruitment of consultants and other procurements (paras. 39, 40). The financial internal rate of the Project has been estimated at –4.66% as compared to 6.96% estimated at appraisal, using same assumptions as at appraisal except incremental volume of water sold (Appendix 7). The economic internal rate of return of the Project was not estimated at appraisal and completion because of the unavailability of data on project benefits.

#### **D. Preliminary Assessment of Sustainability**

54. The Project's sustainability is likely because of (i) availability of adequate and effective demand for project services; (ii) probability of availability of funds for continued operation, maintenance, and growth requirements; (iii) probable availability of skills to continue the Project; (iv) probable availability of appropriate technology and equipment to operate the Project; and

(v) probability of an enabling environment for the Project (subsidies, tariffs, price competitiveness, and political developments) being in place.

#### **E. Institutional Development and Other Impacts**

55. The institutional development and other impacts are moderate. The Project had some impact on institutional development. The institutional strengthening component was partially implemented (para. 24). The environmental impact of the Project is positive due to improved access to potable water, and improved drainage and disposal of wastewater through an upgraded sewerage and drainage system. BME was not implemented. The Project Completion Review Mission randomly interviewed 17 beneficiaries of the Project: 12 of those were satisfied with the quality of water supply and said that the environment in their neighborhood and hygiene had improved due to improved drainage and sanitation. They also said that there had been a modest reduction in the prevalence of waterborne diseases after the Project, thus resulting in savings on health expenditure.

### **IV. OVERALL ASSESSMENT AND RECOMMENDATIONS**

#### **A. Overall Assessment**

56. The Project is rated successful on the basis of ratings provided to various criteria used in the previous section, and applying OED's suggested weights to these ratings (Appendix 8) to calculate the overall rating.<sup>9</sup>

#### **B. Lessons Learned**

57. The management of a PMU should be appropriately qualified. Project design should ensure the appointment of appropriately qualified staff for key positions in a PMU.

58. Appointing regular EA staff in a PMU instead of contract staff will likely enhance institutional strengthening.

59. In this Project, RWASA was not autonomous in setting water tariffs to meet its financial needs or in engaging staff as necessary to operate and maintain the water supply and sanitation system to acceptable standards. Its dependence on budgetary support from the government of Punjab will remain unless it is delegated the authority for setting water tariffs and recruiting staff. Any future assistance to RWASA should be subject to these conditions.

#### **C. Recommendations**

##### **1. Project-Related**

60. **Future Management.** The Government should appoint, through a competitive selection process, a professional and competent managing director of RWASA, who also has relevant experience and qualifications. The RDA and RWASA should completely own the project facilities, fill all vacant positions in RWASA, and carry out the following tasks: (i) ensure full use of the MIS by recruiting appropriately qualified staff, (ii) carry project BME, and (iii) carry out water quality monitoring on a 6-monthly basis.

<sup>9</sup> ADB. 2000. *Guidelines for the Preparation of Project Performance Audit Reports*. September.

61. **Financial Sustainability.** The Project is generating insufficient revenue for ensuring financial sustainability of RWASA and operation and maintenance of the project facilities. In order to make the Project financially sustainable, one of the following three scenarios is recommended, with effect, from 2004/05:

- (i) collection efficiency increased to 80% and average tariff increased 13% annually;
- (ii) collection efficiency increased to 90% and average tariff increased 12.3% annually; or
- (iii) collection efficiency increased to 100% and average tariff increased 11.5% annually.

62. **Follow-up Actions.** Follow-up actions include the following:

- (i) RWASA should install flow meters at all inlet and outlet points of the water works;
- (ii) RWASA should install domestic and bulk water supply meters and start billing on metered water;
- (iii) RWASA should record water flows from meters installed at tubewells on a daily basis; and
- (iv) RWASA should update the consumers data base to bring the illegal connections in the regular consumer network

## **2. General**

63. The Project was the first phase of a longer-term program for the development of water supply and sanitation facilities in Rawalpindi. ADB is processing a loan for a phase II project. That should be made conditional on (i) full autonomy of RWASA in setting water tariffs and engaging staff, (ii) improved management of RWASA by appointing appropriately qualified professionals and filling all vacant positions, and (iii) completing actions recommended in paras. 60-62.

## LIST OF CONTRACTS AWARDED

S. No	Name of Contract	Description
<b>A. Surface Water</b>		
1.	CW/ICB/TRCM/01	Tomar–Rawalpindi Conductance Main
2.	CW/ICB/CM/01	Supply of Pipe and Construction of Duplicate Conductance Main
3.	EM/ICB/FP/01+02	Rawal Lake Filtration Plant Extension and Rehabilitation of Electrical, Mechanical, and Civil Work
<b>B. Ground Water</b>		
4.	CW/LCB/TW/01	Construction of New Tubewell
5.	EM/ICB/TW/02-A	Supply and Installation of New Tubewell Pumping Equipment
6.	EM/ICB/TW/02-B	Rehabilitation of Existing Tubewells
<b>C. Distribution System</b>		
7.	EM/IS/DS/01	Supply of Bulk and Domestic Water Meter
8.	CW/LCB/DS/02	Rehabilitation of Waterworks I and II—Civil Works
9.	CW/LCB/DS/03	Satellite Town Water Distribution System Extension
10.	CW/ICB/DS/04	Pir Wadhai Water Distribution System Extension
11.	CW/ICB/DS/05	Sadiqabad Water Distribution System Extension
12.	CW/LCB/DS/06 and 07	Muslim Town and Yousaf Colony Water Distribution System Extension
13.	CW/LCB/DS/08	Water Works Rehabilitation (E&M)
14.	CW/LCB/DS/09-A	Rehabilitation of Water, Distribution System Central Area (Northern Part), Rawalpindi City
15.	CW/LCB/DS/09-B	Providing Laying Distribution System in Central Area (Southern Part) Rawalpindi
16.	CW/LCB/DS/10	Tertiary Water Distribution System, Satellite Town
17.	CW/LCB/DS/11	Tertiary Water Distribution System
18.	CW/LCB/DS/12	Tertiary Water Distribution System, Sadiqabad
19.	CW/LCB/DS/13	Tertiary Water Distribution System, Muslim Town and Yousaf Colony
<b>D. Sewerage and Drainage Works</b>		
20.	CW/LCB/DW/01	Kassi West Drain Rehabilitation 7th Road to College Chowk
21.	CW/LCB/DW/02	Kassi West Drain Rehabilitation (Construction of S. W. Diversion Channel) College Chowk—Lai Nallah Satellite Town
22.	CW/LCB/DW/03C	Construction of Interceptor Drain—RCC Conduit
23.	CW/LCB/DW/03E	Construction of Outfall Drain
24.	EM/IS/SCE/01	Procurement of Sewer Cleaning Machinery
25.	EM/LS/SCE/02	Procurement of Sewer safety and Supporting Equipment
26.	CW/ICB/SCI/01	Sewer Cleaning, Inspection and Rehabilitation
27.	CW/ICB/SCI/01-A	Supply of 260 KVA Generator Set
28.	CW/ICB/SCI/01-B	S/A Penstock 3 Nos. and Leftover Works
29.	CW/LCB/SW/02	Trunk Sewer—Central District
30.	CW/LCB/SW/03	Outfall Sewer

Continued on next page

**List of Contracts Awarded—Continued**

<b>E. Postflood Projects</b>	
31.CW/LCB/DW/07-A	Reconstruction of Pir Wadhai Road Bridge
32.CW/LCB/DW/07-B	Reconstruction of Gawal Mandi Bridge
33.CW/LCB/DW/07-C	Reconstruction of Dhok Chiragh Din Bridge
34.CW/LCB/DW/08-A	Lai <i>Nallah</i> Improvement Work [Section-A]
35.CW/LCB/DW/08-B	Lai <i>Nallah</i> Improvement Work [Section-B]
36.CW/LCB/DW/08-C	Lai <i>Nallah</i> Improvement Work [Section-C]
37.CW/LCB/DW/08-D	Lai <i>Nallah</i> Improvement Work [Section-D]
38.CW/LCB/DW/08-E	Lai <i>Nallah</i> Improvement Work [Section-E]
39.CW/LCB/DW/08-F	Lai <i>Nallah</i> Improvement Work [Section-F]
40.CW/LCB/DW/08-G	Lai <i>Nallah</i> Improvement Work [Section-G]
41.CW/LCB/DW/08-H	Lai <i>Nallah</i> Improvement Work [Section-H]
42.CW/LCB/DW/08-J	Lai <i>Nallah</i> Improvement Work [Section-J]
<b>F. Institutional Strengthening</b>	
43.CW/LCB/WB/01	RWASA Building
44.CW/LCB/WB/01-A	Elevator
45.CW/LCB/WB/01-B	Furniture
46.CW/LCB/WB/01-C	Area Development
47.CW/LCB/WB/01-D	Vertical Blind Curtain
48.CW/LCB/WB/01-F	100 KVA Diesel Generator set
49.CW/LCB/WB/01-G	Road- and Landscaping
50.CW/LCB/WB/02	Construction of RWASA Subcenters
51.EM/LS/SBR/01	Trunk Mounted Water Bowsers 1,000 Gallons (9 nos.)

Source: Rawalpindi water and sanitation agency



### COMPARISON OF PLANNED AND ACTUAL CONSULTING SERVICES

Professional Discipline	Appraisal Estimate Person-Months			Actual Person-Months		
	Inter- national	Dome stic	Total	Inter- national	Dome stic	Total
<b>Package 1—Engineering Consultants</b>						
Project Manager	50	-	50	51	-	51
Assistant Project Manager	-	50	50	-	82	82
Sanitary/Environmental Engineering Specialists	30	-	30	14	-	14
Hydrogeological Experts	16	-	16	2	-	2
Sewerage Planning Experts	12	-	12	11	-	11
Catchment Management Experts	2	-	2	3	-	3
Financial Analyst	2	-	2	-	-	-
Sanitary, Chemical, Structural, Geotechnical, Civil, Mechanical and Electrical Engineers; Architects; Financial Analysts; Construction Planning Specialists; Records System Specialists; Surveyors; Draftsmen; Clerks and Other Support Staff	-	1,922	1,922	-	3,684	3,684
Sociologist (for PMU)	-	12	12	-	-	-
<b>Subtotal</b>	<b>112</b>	<b>1,984</b>	<b>2,096</b>	<b>82</b>	<b>3,766</b>	<b>3,848</b>
<b>Package 2—Financial and Management Consultants</b>						
Management Information Services Expert	12	-	12	15	-	15
Financial and Accounting Expert	-	12	12	-	78	78
Others (support staff)	-	-	-	-	56	56
<b>Subtotal</b>	<b>12</b>	<b>12</b>	<b>24</b>	<b>15</b>	<b>134</b>	<b>149</b>
<b>Package 3—Training</b>						
Training Specialist	3	-	3	-	-	-
<b>Subtotal</b>	<b>3</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total for Consulting Services</b>	<b>127</b>	<b>1,996</b>	<b>2,123</b>	<b>97</b>	<b>3,700</b>	<b>3,996</b>

Source: Rawalpindi water and sanitation agency

**FINANCING PLAN**  
(\$ million)

Project Component	Appraisal			Actual		
	FC	LC	Total	FC	LC	Total
<b>A. Surface Water Supply</b>						
1. Water Treatment	1.440	0.690	2.130	3.903	2.200	6.102
2. Conductance Main <sup>a</sup>	4.670	1.900	6.570	8.821	2.621	11.442
<b>Subtotal</b>	<b>6.110</b>	<b>2.590</b>	<b>8.700</b>	<b>12.724</b>	<b>4.821</b>	<b>17.544</b>
<b>B. Supply of Underground Water</b>						
1. New Tubewells	1.470	0.400	1.870	0.335	0.269	0.605
2. Rehabilitation	0.390	0.090	0.480	0.621	-	0.621
<b>Subtotal</b>	<b>1.860</b>	<b>0.490</b>	<b>2.350</b>	<b>0.956</b>	<b>0.269</b>	<b>1.226</b>
<b>C. Distribution System</b>						
1. Rehabilitation	0.890	0.520	1.410	0.885	0.719	1.604
2. Augmentation	19.720	7.150	26.870	2.320	4.863	7.183
3. Consumer Metering	3.880	1.560	5.440	0.387	0.237	0.624
<b>Subtotal</b>	<b>24.490</b>	<b>9.230</b>	<b>33.720</b>	<b>3.592</b>	<b>5.819</b>	<b>9.411</b>
<b>D. Sewerage and Drainage</b>						
1. Sewerage <sup>b</sup>	1.140	12.600	13.740	0.928	3.352	4.280
2. Drainage <sup>c</sup>	1.100	1.830	2.930	2.742	14.145	16.887
<b>Subtotal</b>	<b>2.240</b>	<b>14.430</b>	<b>16.670</b>	<b>3.670</b>	<b>17.497</b>	<b>21.167</b>
<b>E. Institutional Strengthening</b>						
1. Establishment of RWASA	1.070	0.730	1.800	0.720	1.096	1.816
2. Establishment of PMU	0.060	0.410	0.470	-	1.231	1.231
<b>Subtotal</b>	<b>1.130</b>	<b>1.140</b>	<b>2.270</b>	<b>0.720</b>	<b>2.327</b>	<b>3.047</b>
<b>F. Consulting Services</b>	<b>2.360</b>	<b>5.070</b>	<b>7.430</b>	<b>2.474</b>	<b>4.620</b>	<b>7.094</b>
<b>Total (Base Cost)</b>	<b>38.190</b>	<b>32.950</b>	<b>71.140</b>	<b>24.136</b>	<b>35.353</b>	<b>59.489</b>
<b>G. Contingencies</b>						
1. Physical	3.040	1.740	4.780	-	0.828	0.828
2. Price	3.730	6.540	10.270	-	-	-
<b>Subtotal</b>	<b>6.770</b>	<b>8.280</b>	<b>15.050</b>	<b>-</b>	<b>0.828</b>	<b>0.828</b>
<b>H. Service Charge on ADB Loan</b>	<b>1.680</b>	<b>-</b>	<b>1.680</b>	<b>1.417</b>	<b>-</b>	<b>1.417</b>
<b>I. Financed Interest Onlent<sup>d</sup></b>	<b>-</b>	<b>7.970</b>	<b>7.970</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total Project Cost</b>	<b>46.640</b>	<b>49.200</b>	<b>95.840</b>	<b>25.553</b>	<b>36.181</b>	<b>61.734</b>

ADB = Asian Development Bank, FC = foreign currency, Govt. = government of Punjab, LC = local currency, PMU = project management unit, RWASA = Rawalpindi water and sanitation agency

<sup>a</sup> Includes cost of Tomar-Rawalpindi conductance main contract in actual cost—not originally incorporated in the Project.

<sup>b</sup> Includes land acquisition cost for sewerage treatment plant.

<sup>c</sup> Includes land acquisition cost for Lai Nullah improvement works.

<sup>d</sup> Includes loan to be on lent by the government of Punjab to Rawalpindi Development Authority, on same terms and conditions with a maturity period of 25 years, including a grace period of 5 years at an interest rate of 7%, hence interest not included in the actual project cost.

Sources: Asian Development Bank, Report and Recommendation of the President; Loan Financial Information System.

**YEARLY CONTRACT AWARDS AND DISBURSEMENTS**  
(\$ million)

Year	Quarter	Contract Awards		Disbursements	
		Projected	Actual	Projected	Actual
1994	III	0.500		0.500	
	IV			0.500	
1995	I				2.000
	II				0.002
	III		0.074		0.074
	IV	4.000	6.650	0.500	0.057
1996	I			0.600	
	II	0.500	0.072	0.100	0.082
	III			0.100	0.406
	IV	0.500	0.088	0.100	0.645
1997	I	0.300		0.100	0.419
	II	1.500	0.070	0.100	0.236
	III	2.500		0.500	0.477
	IV	2.000	0.218	0.300	0.234
1998	I	3.000	2.462	0.200	0.170
	II		7.630	0.400	0.567
	III		0.734	0.400	0.874
	IV		0.931		5.491
1999	I	0.500	0.962	1.000	
	II	0.500	3.233	1.000	2.802
	III		1.973	2.000	0.973
	IV		0.937		1.942
2000	I	0.150		3.260	0.135
	II	6.970	6.073	3.040	1.478
	III		0.565	1.600	1.502
	IV	8.000	10.489	0.600	1.440
2001	I	1.510	1.672	2.700	1.174
	II			4.180	1.781
	III			4.500	2.626
	IV		0.361	4.720	4.383
2002	I	5.500		2.000	1.747
	II		1.893	2.500	2.522
	III			2.500	2.535
	IV			1.500	2.021
2003	I	4.000	0.529	5.000	0.437
	II		6.001	2.000	5.166
	III			3.000	0.316
	IV				0.414
2004	I		0.475	0.500	0.486
	II				0.524
<b>Total</b>		<b>41.930</b>	<b>54.092</b>	<b>52.000</b>	<b>48.134</b>

Source: Asian Development Bank, Loan Financial Information System.

### PROJECT IMPLEMENTATION SCHEDULE

PROJECT COMPONENTS	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<b>Part A - Surface Water Supply</b>											
a) Rawal Lake Filtration Plant											
b) Conductance Main											
c) Tomar Conductance Main											
<b>Part B - Supply of Underground Water</b>											
a) 20 New Tubewells											
b) Rehabilitation of Existing Tubewells											
<b>Part C - Distribution System</b>											
a) Rehabilitation of Existing System											
b) Augmentation & Extension of Existing System											
c) Installation of Water Meters											
<b>Part D - Sewerage &amp; Drainage</b>											
a) Rehabilitation of Existing Sewers											
b) Rehabilitation of Existing Drains											
c) Lai Nullah Works											
<b>Part E - Institutional Strengthening</b>											
a) Water Supply & Sanitation Agency (WASA)											
b) Project Management Unit (PMU)											
c) WASA Staff Training											
<b>Part F - Consulting Services</b>											
a) Engineering											
b) Financial & Management											
c) Training Program Development											

Source: Rawalpindi Water Supply & Sanitation Agency (RWASA)

**LEGEND**

Planned	
Achieved	

## STATUS OF COMPLIANCE WITH LOAN COVENANTS

	Covenant	Reference in Loan/Project Agreement	Status of Compliance
1	Prior to the effective date, the Planning and Development Department (PDD) of Punjab shall establish a project steering committee (PSC) under the chairmanship of the chairperson of the Punjab Planning and Development Board to provide guidance to the PCC, to facilitate the successful execution of the Project, to overcome interdepartmental and interagency bottlenecks, and to serve as a forum for discussion on and review of project impact on regional development. The PSC shall meet at least semiannually but shall be convened for special meetings as the need arises. The PSC shall consist of senior members of the various agencies and departments of the Borrower and Punjab which are involved, either directly or indirectly, in project implementation including representatives from the Environment and Urban Affairs Division (EUAD) of the Ministry of Housing and Works of the Borrower, Rawalpindi Development Authority (RDA), the Public Health and Engineering Department (PHED) of Punjab, the Capital Development Authority (CDA) and the Water and Power Development Authority (WAPDA).	Schedule 6, Para 3	Not complied with. There was no evidence of PSC being established; EA could not give the reasons
2	To oversee and coordinate all project activities including ensuring appropriate liaison among the agencies involved in project implementation, RDA shall, prior to the effective date, establish a project coordination committee (PCC) chaired by the director general of RDA. The members shall comprise representatives from the various provincial and local departments, authorities and agencies involved in project implementation including representatives of RDA, Rawalpindi Water Supply & Sanitation Agency (RWASA), Rawalpindi Municipal Corporation (RMC), and Rawalpindi Cantonment Board (RCB). The PCC shall meet if and when required, but in any event at least once every 3 months. The Borrower shall cause Punjab to furnish to ADB the minutes of the meetings of the PCC for information.	Schedule 6, Para 4	Not complied with. There was no evidence of PCC being established; EA could not give the reasons
3	Punjab and RDA shall ensure that RWASA be developed into a commercially autonomous entity within RDA and that its full operationalization be achieved accordance with the action plan agreed upon between ADB and Punjab laid down in the schedule.	Schedule 6, Para 5	Partly complied with. RWASA is not autonomous in setting tariffs or recruitment of staff.
4	Punjab shall ensure that the orderly and complete takeover of the water and sanitation facilities in the project area by RDA, through RWASA, from RMC shall continue to be carried out by the task force (TF) already established by Punjab and in accordance with the action plan. The TF shall continue to be headed by the managing director of RWASA and shall include representatives from RDA, RWASA, RMC and, if appropriate RCB (elsewhere abbreviated as "MES").	Schedule 6, Para 6	Complied with
5	To meet the needs of RWASA in view of its functions and to enhance the technical and management capabilities of its staff, a comprehensive training program shall be carried out under Part E-1 of the Project. Within 6 months of the effective date, RDA shall submit to ADB for approval of an appropriate training program, including selection criteria, duration and proposed location of the training courses to be undertaken. Such program should be reviewed annually and the individual candidates shall be determined by agreement between RDA and ADB. The Borrower and Punjab shall cause RDA to ensure that the recipients of the training shall, on their return, serve in suitable positions relating to the Project for a period of not less than 2 years.	Schedule 6, Para 7	Partly complied with. Training program was developed but not fully implemented. EA could not give the reasons

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**Status of Compliance with Loan Covenants—Continued**

6	The Borrower and Punjab shall ensure that all land required for the Project, except for the land required for tubewells and the sewage treatment plant, shall have been made available to RDA within 6 months of the effective date. The land required for the tubewells have to be acquired at least 3 months prior to the drilling of the tubewells and the land required for the sewage treatment plant by 31 December 1994. Punjab shall ensure that ADB is kept informed about the status of land acquisition for the Project.	Schedule 6, Para 8	Complied with late
7	To ensure the sustainability of the surface water source (Rawal lake) as well as of the groundwater source, Punjab shall formulate, in accordance with the Pakistan Environmental Quality Standards (NEQ) approved in April 1993, a catchment management plan and groundwater monitoring program by 31st December 1995.	Schedule 6, Para 9	Complied with late
8	Punjab shall ensure that, as part of the ongoing water quality monitoring, the contamination of water transmission mains due to low water pressure, is closely monitored.	Schedule 6, Para 10	Complied with late
9	a) To educate the general public on the proper use of water, the health aspects of water use, water conservation, and the importance of the prompt payment of water bills in contributing towards a higher level of customer service, Punjab and RDA, through RWASA, shall undertake a public information program which will provide information to the public regarding the Project, its progress and particularly the role of the Project in providing improved services to the consumers.  b) RDA, through RWASA shall in the design phase of the project consult with the customers and seek their views on the project design and impact.	Schedule 6, Para 11	Partly complied with. Public information campaigns were carried but beneficiaries were not consulted for seeking their views on project design and impact
10	Except as ADB may otherwise agree, Punjab and RDA will take such measures as shall be required to enable RWASA to achieve financial targets set forth in covenants 11-13. Such measures shall include implementation and adjustments of water tariffs and accounts receivable and reduction of non-revenue water referred to in covenant 17.	Schedule 6, Para 12	Complied with
11	Except as ADB may otherwise agree, RWASA with the assistance of Punjab and RDA, shall generate funds from internal sources sufficient to finance not less than 20% of its 3-year average capital expenditures for each fiscal year commencing from fiscal year 1998/99.	Schedule 6, Para 13	Partly complied with. Funds generation improved but was insufficient
12	Except as ADB and RDA shall otherwise agree, RWASA, with the assistance of Punjab and RDA, shall maintain its net revenues at a level which, for each fiscal year, will produce internally generated funds equal to at least 1.2 times the debt service requirements for such fiscal year commencing from fiscal year 1998/99.	Schedule 6, Para 14	Partly complied with. Revenue collection improved but was insufficient
13	RWASA shall maintain for each of its fiscal years starting from fiscal year 1995/96, a ratio of total operating expenses to total operating revenue not higher than 80%.	Schedule 6, Para 15	Partly complied with. Ratio fluctuates yearly and is mostly above limit

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**Status of Compliance with Loan Covenants—Continued**

14	Punjab and RDA, through RWASA, shall review, within 6 months after the end of each fiscal year and on the basis of forecasts prepared by RWASA and satisfactory to ADB, the status of RWASA's compliance with the financial targets set forth in paragraph 13-15 of the Loan Agreement, Schedule 6, in respect of the fiscal year immediately preceding the 6 monthly review period as well as the immediately succeeding fiscal year. Punjab and RDA shall furnish to ADB the results of such review upon its completion. If any such review shows that RWASA has failed to comply or is not likely to comply with above-mentioned financial targets, RDA, through RWASA and with the assistance of Punjab shall promptly take necessary measures, including adjustments in the structure or level of its tariffs or other equivalent efficiency improvement measures, in order to meet said targets.	Schedule 6, Para 16	Not complied with. EA could not give the reasons
15	Punjab and RDA shall cause RWASA to regularly review its tariff structure and level and make the necessary adjustments to comply with financial targets.	Schedule 6, Para 17	Partly complied with. Tariffs revised but not sufficient to meet targets
16	Punjab shall take all necessary measures to ensure that tariff increases are authorized to enable RWASA to achieve the financial targets referred to in covenants 11-13.	Schedule 6, Para 18	Partly complied with
17	To meet the financial targets, RDA shall: <ul style="list-style-type: none"> <li>(i) ensure the accounts receivable of RWASA are equivalent of less than 3 months billing; and</li> <li>(ii) ensure the nonrevenue water management of RWASA to reduce an overall average nonrevenue water to not higher than 45% by 31st December 1995 and 35% by 1997.</li> </ul>	Schedule 6, Para 19	Not complied with. Needs improved management
18	The Borrower, through Punjab, shall review its current policy on free distribution of water to schools, mosques, bazaars and buildings used by departments and agencies of the Borrower or Punjab and submit to ADB by 31 December 1994 a study thereon for discussion. The study shall contain appropriate recommendations for overcoming the financial losses of RWASA caused by the current policy, including budgetary appropriations to the institutions concerned, particularly the departments and agencies of the Borrower concerned.	Schedule 6, Para 20	Not complied with. EA could not give the reasons
19	RDA shall continuously monitor, assess and report on physical, financial and social aspects of Project implementation and these activities shall be reviewed by ADB. A specific BME system shall be developed for RWASA by the consultants for engineering with the assistance of RDA, RWASA and PMU, and in accordance with the provisions of ADB's Handbook on Benefit Monitoring and Evaluation. The implementation of the BME system shall be subject to approval of ADB. Prior to the introduction of the new BME system, RDA, through RWASA, shall adopt an interim BME system, which shall be developed on the basis of the available data and the socioeconomic survey, which has been carried out during the preparation of the Project.	Schedule 6, Para 21	Not complied with. EA did not give due consideration
20	RDA shall evaluate the benefits of the Project after the Project has been completed in accordance with a schedule and terms of reference to be mutually agreed upon with ADB.	Schedule 6, Para 22	Not complied with
21	Upon completion of the design phase and commencement of implementation of major contracts, ADB shall carry out a comprehensive mid-term review of Project implementation and its benefits including its environmental and social impacts.	Schedule 6, Para 23	Complied with

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### Status of Compliance with Loan Covenants—Continued

22	RDA shall furnish to ADB promptly, not later than 9 months after the close of the fiscal year to which they relate, certified copies of such audited accounts and financial statements and the reports of the auditors all in English Language.	Section 3.08a	Complied with
23	Except as ADB may otherwise agree, Punjab shall onlend the proceeds of the loan under the subsidiary loan agreement, and make available other funds required for the Project, to RDA on terms and conditions satisfactory to ADB. Except as ADB may otherwise agree, the terms for onlending the proceeds of the loan to RDA under the subsidiary loan agreement shall include interest at the rate of 7% per annum, inclusive of a foreign exchange risk fee; and a repayment period of 25 years including a grace period of 5 years.	PA, Section 2.03a	Not complied with. Borrower and EA did not sign subsidiary loan agreement for reasons not known
24	RDA, shall commencing with fiscal year 1995/96, furnish to ADB annual performance reports on the operations of RWASA and on benefit monitoring and evaluation (BME) of the project. Such reports shall be submitted in such form and detail as ADB shall reasonably request within 6 months of the end of the fiscal year to which they relate.	PA Section 4.12d	Partly complied with. Performance reports were submitted but BME was not carried out.
25	Punjab and RDA shall continue to provide adequate budgetary allocations to RWASA including the funds for the operation and capital requirements to cover the period up to the time RWASA becomes financially self-sufficient and viable.	Schedule, Para 1	Complied with
26	RDA, through RWASA, shall prepare a detailed action plan based on Chapter 2, Table 2.4 of the Consultants' Report, 1744-PAK (the Consultants' Report) for takeover of the Rawal treatment plant and transmission mains as well as other water supply and distribution facilities by RWASA, shall discuss and agree with RMC and RCB on charges for bulk supplies from the Rawal treatment plant.	PA, Schedule, Para 2	Complied with
27	RDA, through RWASA, shall complete the takeover of the Rawal Treatment Plant and other water supply and distribution facilities from PHED by 30 <sup>th</sup> June 1995.	PA, Schedule, Para 3	Complied with late
28	RDA, through RWASA, shall prepare and complete the organizational structure, detailed human resources plans, departmental operational procedures, and procedures for internal delegation of powers for RWASA by 30th June 1994.	PA, Schedule, Para 5	Complied with late
29	RDA through RWASA shall prepare and complete long-term business and corporate plans as recommended in Chapter 6 of the Consultants' Report by 31 <sup>st</sup> October 1994.	PA, Schedule, Para 6	Complied with
30	Punjab shall arrange for further delegation of authority from Punjab to RDA in respect of approvals and from RDA to RWASA in respect of staffing and capital scheme approvals based on the advice in Chapter 1 of the Consultants' Report by 31 <sup>st</sup> December 1994.	PA, Schedule, Para 7	Partly complied with. Staffing authority not delegated
31	RDA through RWASA shall negotiate and reach an agreement with concerned agencies the rights to use Faisalabad billing system for initial RWASA computerized billing system by 30th September 1994.	PA, Schedule, Para 8	Complied with late
32	Punjab and RDA, through RWASA shall, commencing from January 1994, conduct a comprehensive public information campaign and dialogue.	Schedule, Para 12	Complied with late

ADB = Asian Development Bank, BME = Benefit Monitoring & Evaluation, PA = Project Agreement, PCC = Project Coordination Committee, PSC = Project Steering Committee, PHED = Public Health Engineering Department, RWASA = Rawalpindi Water and Sanitation Agency, RDA = Rawalpindi Development Authority

Source: Project Completion Review Mission



## FINANCIAL ANALYSIS

### A. Financial Internal Rate of Return

1. The financial internal rate of return (FIRR) was calculated by taking into account the incremental net cash inflows in nominal terms. The FIRR of the project is negative i.e., -4.66%, as its net cash inflow (benefits stream) is less than its net cash outflow (costs stream). A negative FIRR is explained as follows:

- a) at the time of appraisal, it was assumed that by 1998/99 the volume of water sales by Rawalpindi Water and Sanitation Agency (RWASA) would be increased by 69.72 million cubic meters (or 42 million gallons per day). However, the actual volume of water available from the three sources (i.e., Rawal lake, Khanpur reservoir, and tubewells) is expected to increase only by 37.85 million cubic meters (or 22.8 million gallons per day) from 2004/05;
- b) tariff rates were not increased as was envisaged in the project design. The increase in nominal tariff rates per connection of 17% annually from 1998/99 to 2003/04 was offset by increased volume of water available to consumers. As a result, the effective tariff rate per cubic meter of water consumed increased only by 1% annually during the same period;
- c) collection efficiency of RWASA (defined as revenues in a given period as a percentage of the amount billed for the respective period) remained very low, ranging between 50% and 70% during the period from 1998/99 to 2003/04. The arrears of RWASA have not been recovered and have accumulated during the same period; and
- d) the number of domestic and commercial water connections did not increase as projected at the time of appraisal. The number of domestic connections increased only by 0.4% annually and the number of commercial connections remained at the same level during the period from 1998/99 to 2003/04.

### B. Basic Assumptions

2. All revenues and costs are expressed at constant 1992 prices on an incremental basis.
3. Incremental volume sold was calculated by subtracting the estimated existing volume sold from the projected annual volume sold.
4. Average unit/selling price includes water and sewer charges and was adopted from the projected income statements de-escalated to 1992 prices and projected to have a real increase of 2% annually after fiscal year 2002/03.
5. Project investment during the construction period (1994–2004) was taken on an actual basis. Interest and service charges were not included.
6. Project investment after the construction period represents replacement/rehabilitation costs and was calculated based on useful lives of proposed facilities. Residual value based on remaining lives of new/rehabilitated facilities after the cash-flow period was treated as cash inflow.

7 Incremental operating costs were calculated by subtracting the existing system's operating costs from the de-escalated projected operating costs.

### C. Notes on Financial Internal Rate of Return Calculation

8 The incremental revenues were calculated as:

$$y = a + t \cdot v$$

where,

y = incremental revenues

a = incremental revenues from urban immovable property tax, which is collected by the government of Punjab and is transferred to RWASA.

t = water and sewer tariff rate (calculated on a yearly basis, as the weighted average of tariff rates applicable to domestic, commercial, and bulk consumers (i.e., Rawalpindi Cantonment Board (RCB), National Institute of Health (NIH), and National Agriculture Research Center (NARC)).

Tariff rates for the period 1998/99 to 2003/04 were taken from the gazette notifications of tariff rates issued by the government of Punjab in June 1998, December 1999, September 2000, and July 2003. These were projected for future and past years using a (least square) linear regression model.

Weighted average tariffs were calculated using the consumption of water in a given year by respective category (i.e., domestic, commercial, MES, NARC, NIH) as weights.

v = volume of water sold, estimated on a yearly basis, was calculated as:

$$v = V_s - (V_w + V_{np})$$

where,

$V_s$  = volume of water supplied by the three sources: i.e., Rawal lake, Khanpur dam, and groundwater. Volume of water supplied was calculated as the sum total of volume supplied by (i) Rawal lake, (ii) Tomar-Khanpur dam, and (iii) tubewells. The estimates were taken on the basis of a sample study of 18 (new and rehabilitated) tubewells of various capacities and from estimates provided by RWASA for Rawal dam and Tomar-Khanpur dam.

$V_w$  = volume of water estimated to be wasted by the distribution system, calculated as the difference between the volume of water supplied and the estimated volume of water consumed by all users (i.e., domestic, commercial, MES, NIH, and NARC).

Water consumed was taken as the sum total of water consumed by (i) domestic, (ii) commercial, (iii) MES, (iv) NARC, and (v) NIH.

Water consumption for domestic and commercial categories was estimated by multiplying the average consumption per domestic connection (estimated as 1,030 liters per day) and average consumption per commercial connection (estimated as 4,000 liters per day) with their respective number of connections. Water consumption for MES was based on estimates provided by RWASA and water consumption for NARC and NIH has been estimated by dividing the

amounts billed by their respective tariff rates in a given year (i.e., backward working). The number of connections were calculated based on actual for the period 1998/99 to 2003/04. For preceding years, the number of water connections was calculated by decreasing these at an annual rate of 1%. For following years, the number of domestic and commercial connections was increased at 2% annually from 2004/05 to 2019/20, and at 1% annually from 2020/21 to 2039/40.

Vnp = volume of water not-paid-for by the consumers, calculated as the difference of volume of water consumed and water paid-for. (Water paid-for was obtained by multiplying the volume of total water consumed [by all consumers] in a given year by the RWASA collection rate/tariff collection efficiency in the respective year.)

9. Project investments were taken on actual basis from 1994/95 to 2003/04. The replacement of groundwater facilities was projected every 10 years, and the replacement/rehabilitation of distribution system (less consumer metering) was projected every 20 years. Working life of the surface water supply facilities (i.e., water treatment plant, conductance main-Rawal and conductance main-Tomar) was assumed to be 40 years—expiring in the year 2039/40.

10. Operation and maintenance costs of the different facilities were taken on actual basis from RWASA records (i.e., director revenue) for the period 1998/99 to 2003/04 and were projected backwards and forwards using a (least square) linear regression method.

#### **D. Sensitivity Analysis**

11. **Scenario 1.** An analysis was undertaken to move two significant variables—i.e., the rate of change in tariff rate (at current prices) and the collection efficiency of RWASA—to arrive at the FIRR of 6.96%, as calculated at appraisal. If the collection efficiency of RWASA becomes 80% from 2004/05 onwards, and all other factors move in the same manner as calculated in the base case analyses, the tariff rate will need to be increased at the rate of 13% annually, to arrive at the FIRR of 6.96%.

12. **Scenario 2.** If RWASA maintains its collection efficiency at 90% from 2003/04 onwards, and all other factors move in the same manner as calculated in the base case analyses, tariff rate will need to be increased at the rate of 12.3% annually, to arrive at the FIRR of 6.96%.

13. **Scenario 3.** If the collection efficiency of RWASA is increased to 100% from 2004/05 onwards, and all other factors move in the same manner as calculated in the base case analyses, tariff rate will need to be increased at the rate of 11.5% annually, to arrive at the FIRR of 6.96%.

**Table 7.1: Project Financial Internal Rate of Return**

<b>Year</b>	<b>Incremental Volume Sold</b> (million cu m)	<b>Average Unit Price</b> (PRs/cu m)	<b>Incremental Revenue</b> (PRs million)	<b>Incremental UIP Income</b> (PRs million)	<b>Project Investment</b> (PRs million)	<b>Incremental Operating Costs</b> (PRs million)	<b>Net Inflow</b> (PRs million)
1994/95	-	1.99	-	-	59.67	0.74	(60.41)
1995/96	-	2.18	-	-	6.82	2.43	(9.25)
1996/97	-	2.35	-	-	60.26	2.83	(63.08)
1997/98	-	2.51	-	-	55.93	3.62	(59.55)
1998/99	0.63	2.39	1.51	3.22	379.61	(9.94)	(364.93)
1999/00	3.02	2.44	7.36	15.68	196.13	(4.21)	(168.88)
2000/01	1.86	2.58	4.81	(3.52)	267.23	21.14	(287.09)
2001/02	5.42	2.36	12.78	33.48	514.19	67.71	(535.64)
2002/03	11.56	1.99	23.03	0.03	442.00	94.83	(513.77)
2003/04	12.82	2.09	26.77	33.92	50.61	65.09	(55.02)
2004/05	16.83	2.08	35.02	34.34	-	62.79	6.57
2005/06	19.13	2.12	40.56	34.74	-	64.16	11.14
2006/07	20.76	2.15	44.72	35.14	-	65.49	14.37
2007/08	22.31	2.18	48.71	35.53	-	66.78	17.45
2008/09	23.04	2.21	50.89	35.90	-	68.03	18.76
2009/10	23.41	2.23	52.23	36.26	0.74	69.25	18.50
2010/11	23.80	2.25	53.51	36.62	-	70.43	19.70
2011/12	24.20	2.27	54.95	36.96	-	71.58	20.33
2012/13	24.61	2.28	56.15	37.29	-	72.69	20.75
2013/14	25.02	2.29	57.30	37.61	-	73.77	21.14
2014/15	25.45	2.30	58.40	37.93	-	74.82	21.51
2015/16	25.88	2.30	59.47	38.23	-	75.84	21.86
2016/17	26.32	2.30	60.49	38.53	-	76.83	22.19
2017/18	26.78	2.30	61.48	38.81	-	77.79	22.50
2018/19	27.24	2.29	62.42	39.09	-	78.72	22.79
2019/20	27.72	2.28	63.33	39.36	0.55	79.62	22.52
2020/21	27.96	2.28	63.75	39.62	-	80.50	22.87
2021/22	28.20	2.27	64.12	39.88	-	81.36	22.64
2022/23	28.45	2.27	64.45	40.12	12.34	82.18	10.05
2023/24	28.70	2.26	64.73	40.36	-	82.99	22.11
2024/25	28.96	2.24	64.97	40.60	-	83.77	21.80
2025/26	29.23	2.24	65.35	40.82	-	84.53	21.65
2026/27	29.49	2.22	65.51	41.04	-	85.26	21.30
2027/28	29.75	2.21	65.64	41.26	-	85.98	20.92
2028/29	30.02	2.19	65.73	41.46	-	86.67	20.52
2029/30	30.29	2.17	65.79	41.66	0.41	87.34	19.70
2030/31	30.57	2.15	65.81	41.86	-	88.00	19.67
2031/32	30.84	2.13	65.80	42.05	-	88.63	19.22
2032/33	31.12	2.11	65.77	42.23	-	89.25	18.76
2033/34	31.41	2.09	65.71	42.41	-	89.85	18.27
2034/35	31.70	2.07	65.62	42.58	-	90.43	17.77
2035/36	31.99	2.05	65.50	42.75	-	90.99	17.26

*Continued on next page*

Project Financial Internal Rate of Return—*Continued*

Year	Incremental Volume Sold (million cu m)	Average Unit Price (PRs/cu m)	Incremental Revenue (PRs million)	Incremental UIP Income (PRs million)	Project Investment (PRs million)	Incremental Operating Costs (PRs million)	Net Inflow (PRs million)
2036/37	32.28	2.02	65.36	42.92	-	91.54	16.74
2037/38	32.58	2.00	65.20	43.08	-	92.07	16.20
2038/39	32.88	1.98	65.01	43.23	-	92.59	15.66
2039/40	33.18	1.95	64.80	43.38	-	93.09	15.10

FIRR = financial internal rate of return, O&M = operation and maintenance, PRs = Pakistani rupees, cu m = cubic meters, UIP = Urban Immovable Property Tax)

**FIRR = -4.66%**

**Notes:**

Price level = constant 1992.

Project life = 46 years (project investment started in 1994/95, but most major facilities were set up and started operating in 2001/02. Therefore, the last year for analysis has been taken as 2039/40, when most of the project facilities are expected to complete their working lives.)

Source: Project Completion Review Mission

## ASSESSMENT OF PROJECT PERFORMANCE

### A. Relevance

<b>Subcriteria</b>		
•	Relevance of project preparation to project output at the time of approval	Yes
•	Relevance of project output to achieve the project goals and purposes at the time of approval	Yes
•	Priority in the context of DMC's development strategy for the DMC at the time of approval	Yes
•	Priority in the context of ADB's development strategy for the DMC at the time of approval	Yes
•	Priority in the context of DMC's development strategy at the time of evaluation	Yes
•	Priority in the context of ADB's development strategy for the DMC at the time of evaluation	Yes
•	Priority in the context of one or more of ADB's strategic objectives at the time of evaluation	Yes
•	Appropriate changes made at mid-term review/other reviews to make project more relevant	Yes
Percent of Subcriteria that Met Assessment		100.0
Equivalent Rating		3

### B. Efficacy

<b>Subcriteria</b>		
•	Achievement of most project physical outcomes	Yes
•	Achievement of most project intangible outcomes (reducing non-revenue water, improving collection efficiency, enabling RWASA to operate without Government subsidy)	No
•	The likelihood of project outcomes leading to project goals	Yes
Percent of Subcriteria that Met Assessment		66.7
Equivalent Rating		2

## C. Efficiency

Subcriteria	
1. Efficiency of investment	
• EIRR > 12 percent (where recalculated at evaluation)	N/A
• FIRR > weighted average cost of capital (where recalculated at evaluation)	No
• Cost effectiveness in generating the project outputs	Yes
2. Efficiency of process	
• Manners of ADB's internal processing of the project	Yes
• Organization and management of executing and implementing agencies	No
• Effectiveness of project management	No
• Efficiency in recruitment of consultants and other procurement	No
• Timely and adequate availability of counterpart funding	Yes
Percent of Subcriteria that Met Assessment	42.8
Equivalent Rating	1

## D. Sustainability

Subcriteria	
• Availability of adequate and effective demand for project services or products	Yes
• Probable operating and financial performance of the operating entity and the ability to recover costs	No
• Probability of the existence of appropriate maintenance policy and procedures	No
• Probability of funds availability (cash flow) for continued operations, maintenance, and growth requirement	Yes
• Probable availability of skills to continue project	Yes
• Probable availability of appropriate technology and equipment to operate the project	Yes
• Probable availability of the enabling environment (subsidies, tariffs, price competitiveness, and political developments) in which the project is operating at the time of evaluation	Yes
• Government ownership and commitment to the project	No
• The extent to which the operation affects the environment and renewable or nonrenewable resources	N/A
• The extent to which community participation and beneficiary incentives are adequate to maintain project benefits	No
Percent of Subcriteria that Met Assessment	55.5
Equivalent Rating	2

**E. Institutional Development and Other Impacts**

<b>Subcriteria</b>	
1. Institutional development impacts	
• Country's formal laws, regulations, and procedures	N/A
• The people's informal norms and practices	N/A
• Institutional or organizational strengthening	No
• Institutional skill levels and capacities	No
• Participatory attitudes of the society	Yes
• Macroeconomic or sector policy framework	N/A
2. Other development impacts	
• Impact on poverty	N/A
• Impact on the environment	Yes
• Impact on social organization	No
• Impact on political developments	N/A
Percent of Subcriteria that Met Assessment	40.0
Equivalent Rating	1

**F. Assessment of Overall Project Performance**

<b>Criterion</b>	<b>Assessment</b>	<b>Rating (0-3)</b>	<b>Weight (%)</b>	<b>Weighted Average</b>
Relevance	Highly Relevant	3	20	0.6
Efficacy	Efficacious	2	25	0.5
Efficiency	Less Efficient	1	20	0.2
Sustainability	Likely	2	20	0.4
Institutional Development and Other Impacts	Moderate	1	15	0.15
<b>Overall Rating</b>	<b>Successful</b>		<b>100</b>	<b>1.85</b>

Highly Successful (HS): Overall Weighted Average (OWA) is  $> 2.5$  and none of the 5 criteria has a score of less than 2; otherwise the rating would be downgraded by one level.

Successful (S): OWA is between  $1.6 \leq S \leq 2.5$  and none of the 5 criteria has a score of less than 1; otherwise the rating would be downgraded by one level.

Partly Successful (PS): OWA is between  $0.6 \leq PS \leq 1.6$  and number of criteria receiving a rating of less than 1 should not exceed 2; otherwise the lowest rating would be given.

Unsuccessful (U):  $OWS \leq 0.6$