ASIAN DEVELOPMENT BANK **PPA: INO 22048**

PROJECT PERFORMANCE AUDIT REPORT

ON THE

SECOND IKK WATER SUPPLY SECTOR PROJECT
(Loan 1069-INO)

IN

INDONESIA

November 2001

CURRENCY EQUIVALENTS

Currency Unit – Rupiah (Rp)

At Appraisal (September 1990)			At Project Completion (June 1996)	At Operations Evaluation (June 2001)
Rp1.00	=	$0.0005365	$0.0004272	$0.0000887
$1.00	=	Rp1,864	Rp2,341	Rp11,275

ABBREVIATIONS

ADB	–	Asian Development Bank
AR	–	appraisal report
BME		benefit monitoring and evaluation
BPAM	–	Baden Pengelolu Air Minum (transitional water supply management unit)
DGHS	–	Directorate General of Human Settlements
DGURD	–	Directorate General of Urban and Rural Development
EA	–	Executing Agency
FIRR	–	financial internal rate of return
GRDP	–	gross regional domestic product
IKK	–	Ibu Kota Kecamatan (subdistrict capital)
kabupaten	–	district
lpcd	–	liter per capita per day
l/s	–	liter per second
m	–	meter
m^3	–	cubic meter
O&M	–	operation and maintenance
OEM	–	Operations Evaluation Mission
PCR	–	project completion report
PDAM	–	Perusahaan Daerah Air Minum (local water supply enterprise)
PPAR	–	project performance audit report
PPMS	–	project performance management system
Repelita	–	Five-Year Development Plan
TA	–	technical assistance
UFW	–	unaccounted for water

NOTES

(i) The fiscal year (FY) of the Government ends on 31 December.
(ii) In this report, "$" refers to US dollars.

Operations Evaluation Department, PE-578

CONTENTS

BASIC DATA
Second IKK Water Supply Sector Project (Loan 1069-INO)

Project Preparation/Institution Building

Loan/TA No.	Loan/TA Name	Type	Person-Months	Amount ($)	Approval Date
Loan 731-INO	IKK Water Supply Sector Project[a]	OCR	—	350,000	17 Jan 1985
TA 1443-INO	Institutional Strengthening for Second IKK Water Supply Sector Project[b]	ADTA	30	290,000	18 Dec 1990

Key Project Data ($ million)

	As per ADB Loan Documents	Actual
Total Project Cost	52.0	52.3
Foreign Exchange Cost	31.2	30.7
Local Currency Cost	20.8	21.6
ADB Loan Amount/Utilization	39.0	37.4
Foreign Exchange Cost	31.2	30.7
Local Currency Cost	7.8	6.7
ADB Loan Amount /Cancellation		1.6

Key Dates

	Expected	Actual
Fact-Finding		7-19 June 1990
Appraisal		6-16 August 1990
Loan Negotiations		20-23 November 1990
Board Approval		18 December 1990
Loan Agreement		6 February 1991
Loan Effectiveness	7 May 1991	4 April 1991
First Disbursement		1 June 1991
Project Completion	31 December 1994	30 June 1996
Loan Closing	30 June 1995	21 February 1997
Months (effectiveness to completion)	45	63

— = not available, ADB = Asian Development Bank, ADTA = advisory technical assistance, OCR = ordinary capital resources, TA = technical assistance.

[a] The $350,000 feasibility study for the Second IKK Water Supply Sector Project was financed from proceeds of Loan 731-INO.

[b] Accompanying TA.

Key Performance Indicators (%)

	Appraisal	PCR	PPAR
Economic Internal Rate of Return	ne	ne	ne
Financial Internal Rate of Return	ne	5-6	3-5
IKK Kuala Kuru	ne	6.0	ne
IKK Sambilia	ne	5.5	ne
IKK Delanggu	ne	ne	5.4
IKK Musuk	ne	ne	3.1

Borrower Government of Indonesia

Executing Agency Directorate General of Urban and Rural Development[1]

Mission Data

Type of Mission	No. of Missions	No. of Person-Days
Project Processing		
Fact-Finding	1	26
Appraisal	1	44
Project Administration		
Review	8	83
Project Completion	1	22
Operations Evaluation[2]	1	20

PCR = project completion report, PPAR = project performance audit report, ne = not estimated.

[1] The original Executing Agency for the Project was the Directorate General of Human Settlements (Cipta Karya) before the government reorganization in 1997.

[2] K.E. Seetharam (Evaluation Specialist) led the Mission, assisted by T. Hashimoto (Staff Consultant) and Audelta Elviezon (Domestic Consultant).

EXECUTIVE SUMMARY

The Government of Indonesia, through two successive five-year national development plans (Repelitas IV and V, 1984/85-1988/89, and 1989/90-1993/94, respectively), accorded high priority to providing safe water to the population. It initiated a new program for accelerated provision of piped water supply in and around subdistrict capitals (*Ibu Kota Kecamatans* [IKKs]). Support from the Asian Development Bank (ADB) for this program started in 1985, through a sector lending approach,[1] which expanded the scope of water supply development to smaller towns. The support continued with the Second IKK Water Supply Sector Project (the Project), which intended to expand further the benefits of the program, in line with the Repelita V objective of providing water supply to underdeveloped areas and lower-income people.

The ultimate goal of the Project was to improve the health and sanitation of beneficiaries, which in turn would produce secondary socioeconomic benefits through enhanced productivity. Its purpose was to provide new piped water supply systems in about 150 IKKs in 39 *kabupatens* (districts) located in four provinces (Central Java, Lampung, South Sumatra, and Yogyakarta) of the first project and five additional provinces of West Nusa Tenggara, East Nusa Tenggara, East Timor,[2] South Kalimantan, and Central Kalimantan. At appraisal, the number of project beneficiaries was estimated at 800,000. In addition to provision of water supply facilities, the Project also aimed to strengthen the institutional capacity of the government organizations responsible for implementation and operation of project facilities. The total cost was estimated at $52.0 million. ADB approved Loan 1069-INO on 18 December 1990 for $39.0 million from its ordinary capital resources to finance the entire foreign exchange cost of $31.2 million and $7.8 million equivalent of local currency costs.

In addition to the physical implementation of subprojects, the Project provided for consulting services for project implementation and basic training for local personnel from transitional water supply management units (BPAMs) and local water supply enterprises (PDAMs), responsible for the operation and maintenance (O&M) of project facilities. An advisory technical assistance (TA) grant[3] accompanied the Project to help the Government in (i) institutional strengthening of BPAMs and PDAMs, (ii) establishing a training program in O&M for local personnel of water supply facilities, (iii) conducting project benefit monitoring and evaluation activities, (iv) establishing a management information system, and (v) implementing public campaigns on the need for community participation. The Directorate General of Urban and Rural Development was the Executing Agency for the Project (initially it was the Directorate General of Human Settlements). In each of the nine project provinces, the Executing Agency established a project implementation unit.

The Operations Evaluation Mission (OEM) visited Indonesia in June 2001 and assessed the attainment of the Project's benefits, i.e., effective and sustainable delivery of safe water supply in the project IKKs and improved institutional capacity of the project PDAMs. The OEM surveyed the new water supply facilities in 32 randomly selected IKKs in six provinces.

The Project was relevant to ADB's country operational strategy in Indonesia at the time of appraisal in that it covered several poorer areas throughout the country, and aimed to provide essential economic infrastructure, and improve the delivery of social services directly (basic

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[1] Loan 731-INO: *IKK Water Supply Sector Project*, for $40.21 million, approved on 17 January 1985.

[2] In 1999, East Timor separated from Indonesia. Since the Project was completed before this event, East Timor is treated here as a province of Indonesia, which it was during implementation.

[3] TA 1443-INO: *Institutional Strengthening for Second IKK Water Supply Sector*, for $290,000, approved on 18 December 1990.

water supply) and indirectly (improved health and sanitation). The Project reflected the experience and lessons of the first project that was still ongoing at the time of appraisal, and emphasized community participation in design, construction, and O&M of subprojects. It also reflected the Government's policy shift under Repelita V to the key objectives of poverty reduction and balanced regional development. The Project continues to be relevant to ADB's current country strategy and program, and is consistent with the Government's present priorities. The only reservation is that the poverty reduction concern was not reflected directly in the subproject selection criteria by targeting low-income beneficiaries within the subprojects.

The actual cost of the Project was only marginally above the appraisal estimate. It amounted to $52.3 million, consisting of $30.7 million in foreign exchange and $21.6 million in local currency. In line with ADB's policy for sector loans, the appraisal estimate did not provide for price or physical contingencies. Inflation and currency fluctuation caused an effective reduction of project funds in real terms. The project completion report recalculated the actual cost to be about $42.3 million equivalent in 1990 prices. The resultant shortage of project funds affected the installation of house connections and related tertiary distribution systems. Project implementation started two months behind appraisal schedule. Completion, in June 1996, was about 18 months behind the schedule, mainly because of delays in supplies for, and installation of, house connections, caused by the shortage of funds.

New water supply facilities were installed in 149 IKKs compared to 150 IKKs envisaged at appraisal. The facilities included 56 deep well-based subprojects, 46 spring-based subprojects, 46 river water-based subprojects, and 1 shallow well-based subproject. From the 32 randomly selected subprojects surveyed, the OEM confirmed the successful physical implementation of the Project as reported in the project completion report. House connections, which were below the appraisal target at project completion, have increased by 29 percent since then, to exceed the original targets in some IKKs, as PDAMs used their own funds and initiated innovative schemes. While public standpipes were installed as planned, users abandoned nearly 4 percent of them in favor of either house connections or conventional dug wells. They have maintained and used the latter even after connecting to the piped water supply systems installed under the Project. Other households have used the operational standpipes. The OEM has reestimated the total number of project beneficiaries at 530,000 at project completion. The number has increased to 661,000 at the time of evaluation, or 83 percent of the appraisal target of 800,000. The shortfall has been attributable to the abovementioned decrease of project funds in real terms.

The Project helped establish self-sustaining local water supply institutions. The transfer of responsibilities for O&M of project facilities from BPAMs, in the cases where they had been established initially, to PDAMs has also been successful. The Project and the accompanying TA provided basic training in day-to-day operation of water supply facilities for PDAM staff and improved their capabilities. More advanced training on such subjects as financial management, advanced techniques for operational improvements, and investment planning for service expansion would further strengthen the institutional capacity of PDAMs.

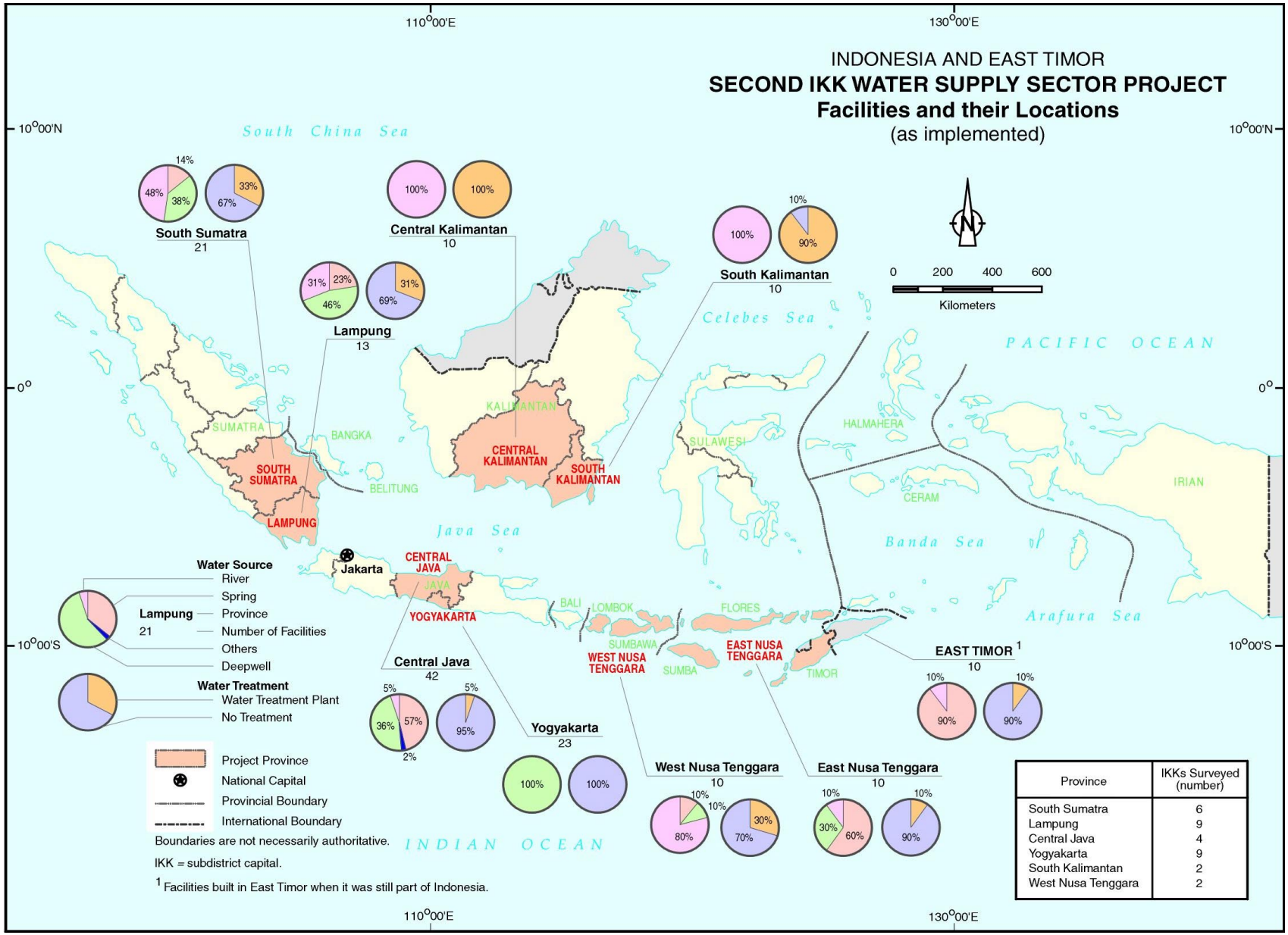
The cross-section analysis of 11 PDAMs in charge of the 32 subprojects surveyed and the financial reevaluation of the best and the worst cases indicate that the Project has generally contributed to improving the financial situation of PDAMs. Typically, the subprojects that have improved financial performance were those based on springs with ample and good quality water, and those serving peri-urban or urbanizing areas with higher water tariffs paid by people with higher incomes. In subprojects relying on rivers as water sources, the financial performance of PDAMs has varied widely, depending on the cost of operating the water

treatment plants. High power costs have adversely affected the financial viability of some pumped water supply schemes. In general, the spring-based subprojects were highly cost effective. In contrast, subprojects facing technical problems and those with a poor quality water source were less cost effective. The OEM also observed some subprojects with highly engineered water treatment and associated facilities. For IKK subprojects, which are socially oriented, other simpler and less expensive solutions could be considered.

Sustainability varies widely among subprojects, as a result of the extent of technical problems and level of community participation. The subprojects utilizing springs, accounting for 31 percent of the project facilities, are most sustainable, especially where beneficiary communities were involved in subproject design and implementation, and have participated in O&M. With the exception of those affected by high power costs, most deep well-based subprojects, accounting for 38 percent of the Project, are also financially sustainable. Nonetheless, some may be adversely affected in the future by depletion of groundwater reserves and degradation of water quality. The remaining subprojects based on river water are less sustainable due to high operating costs, particularly power costs, and, unless PDAMs make operational improvements, to technical problems with water treatment facilities.

The field visits and data provided by PDAMs confirm that the Project has generally improved the health and sanitation of beneficiaries, except for those users who abandoned the public standpipes in favor of dug wells providing water of dubious quality (approximately 9 percent of total beneficiaries). The OEM also received favorable responses from the beneficiaries in many IKKs, that the Project has achieved socioeconomic benefits by providing safe and adequate quantities of piped water. Although the Project covered IKKs of widely varying socioeconomic characteristics, about 80 percent of the project PDAMs serve above average-income households, confirming that the Project did not deliberately target poor households. The Project helped PDAMs in identifying potential opportunities for private sector involvement in IKK water supply, although there has been no such participation in subproject operation yet.

Overall, the Project is rated successful. The success of individual subprojects has been generally proportional to the degree of community participation. It has been the highest for relatively small and simple schemes, typically those based on springs. An important lesson learned is that for projects adopting a sector-lending approach under decentralization, proper information flow among the central Government and local governments is most crucial. Another important lesson is that community participation is essential for sustainability of socioeconomic benefits.



Province	IKKs Surveyed (number)
South Sumatra	6
Lampung	9
Central Java	4
Yogyakarta	9
South Kalimantan	2
West Nusa Tenggara	2

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I. BACKGROUND

A. Rationale

1. The Government of Indonesia, through two successive five-year national development plans (Repelitas), has accorded high priority to providing safe water to the population with increasing emphasis on smaller towns and poorer areas. During Repelita IV (1984/85-1988/89), the Government initiated a new program for accelerated provision of piped water supply in and around subdistrict capitals (*Ibu Kota Kecamatans* [IKKs]) with populations between 3,000 and 20,000.[1] Under Repelita V (1989/90-1993/94), the water supply sector policy was aligned with the Government's key objectives of poverty reduction and balanced regional development. The policy involved the expansion of public standpipes in preference to house connections for the poor and covered smaller population centers of 1,000-3,000 people. Repelita V also strengthened the government commitment to recover capital as well as operation and maintenance (O&M) costs of piped water supplies.

2. Support from the Asian Development Bank (ADB) for the Government's program started in 1985 with the first IKK Water Supply Sector Project.[2] A sector lending approach was adopted to provide water supply in smaller towns. Continuing its assistance for the program, ADB helped prepare the Second IKK Water Supply Sector Project[3] (the Project) to further expand the benefits of the program to low-income people, in line with the Government's policy shift under Repelita V.

B. Formulation

3. The Project was based on a feasibility study carried out under the first project.[4] At appraisal, in August 1990, the Project was found to meet ADB's criteria for sector loans. Project formulation also reflected experiences and lessons of the first project with regard to designing project facilities in a cost effective manner, strengthening institutional capacities, encouraging community participation, and discontinuing the use of water flow restrictors.[5]

C. Purpose and Outputs

4. The ultimate goal of the Project was to improve the health and sanitation of beneficiaries, which in turn would produce secondary socioeconomic benefits through enhanced productivity. The purpose of the Project was to provide new piped water supply systems in

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[1] The 1980 census estimated that only 41 percent of the urban population and 22 percent of the rural population had access to safe potable water. During Repelita IV, the Government targeted increasing access to 75 percent and 55 percent, respectively. At about 65 percent and 30 percent respectively by the end of Repelita IV, the targets were not quite reached. Repelita V aimed at further increasing access to 80 percent and 60 percent, respectively.

[2] Loan 731-INO: *IKK Water Supply Sector Project*, for $40.21 million, approved on 17 January 1985. The project completion report (PCR) did not rate the project performance. No project performance audit report was prepared.

[3] Loan 1069-INO: *Second IKK Water Supply Sector Project*, for $39.0 million, approved on 18 December 1990.

[4] The project formulation reports were submitted to the Government and ADB in November 1989 and discussed in a meeting with the Government in January 1990. This was followed by fact-finding in June 1990.

[5] Flow restrictors aimed to eliminate daily peak flows and distribute water at a constant rate to all consumers. It was a mechanical device that restricted the flow of water through a service connection, which discharged the low flow into a 300-liter tank provided at each house. The design flow for house connections was 50 liters per hour, over a 12-hour period, based on the design criteria of 60 liters per capita per day and 10 persons per household (600 liters per day per connection). The consumers take water from the tank as required. The restrictors were a new approach introduced in the first project and were thought to be more economical than conventional metering. However, consumers removed them, as they did not like the trickle flow.

about 150 IKKs in 39 *kabupatens* (districts) covering the four provinces of the first Project (Central Java, Lampung, South Sumatra, and Yogyakarta) and five additional provinces of West Nusa Tenggara, East Nusa Tenggara, East Timor,[6] South Kalimantan, and Central Kalimantan. At appraisal, the number of project beneficiaries was expected to be 800,000.[7] In addition to provision of water supply facilities, the Project also aimed to strengthen the institutional capacity of the government organizations responsible for the implementation and operation of the project facilities.

5. The Project followed the sector loan approach and subprojects were to be selected in accordance with agreed criteria (appraisal report [AR],[8] para. 38, and Loan Agreement, schedule 5, para. 5), which specified that each IKK should have a population of 1,000 to 10,000, reliable water sources, a serious water service deficit, and health problems related to poor water quality. In communities with a population of between 1,000 and 5,000, water supply was to be provided entirely through standpipes, and in communities with a population of between 5,000 and 10,000, through a mix of house connections and standpipes at a ratio of approximately 60:40 in terms of number of beneficiaries served.

6. The subprojects that were envisaged included:

(i) deep and shallow wells (in 58 IKKs), river intakes or spring captures (in 55 IKKs), pumping and water treatment facilities (in 33 IKKs);
(ii) transmission mains and distribution pipes (1,922 km), service lines, public standpipes/hydrants, house connections, and communal storage tanks (95 units);
(iii) water trucks and utility vehicles; and
(iv) office accommodation (in 154 IKKs), supplies, O&M equipment, and storage facilities (133 units).

7. The loan was also to finance consulting services to assist in implementation, including subproject appraisal, detailed engineering design, and construction supervision; and basic training, primarily for local personnel from transitional water supply management units (BPAMs) and local water supply enterprises (PDAMs), responsible for O&M of project facilities. An advisory technical assistance (TA) grant[9] accompanied the Project to further assist the Government in (i) institutional strengthening of BPAMs and PDAMs, (ii) establishing a training program in O&M for local personnel of water supply facilities, (iii) conducting project benefit monitoring and evaluation (BME) activities, (iv) establishing a management information system, and (v) undertaking public campaigns on the need for community participation.

D. Cost, Financing, and Executing Arrangements

8. The total cost of the Project was estimated at $52.0 million at appraisal, consisting of $31.2 million in foreign exchange and $20.8 million in local currency. The appraisal estimate was calculated by multiplying a unit cost per person of $65 in 1990 prices (derived from the actual cost of $61 per person in the first project) by the targeted 800,000 beneficiaries. ADB's loan of $39.0 million from the ordinary capital resources was to finance the entire foreign exchange cost and $7.8 million equivalent in local currency costs.

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[6] In 1999, East Timor separated from Indonesia. Since the Project was completed before this event, East Timor is treated here as a province of Indonesia, which was during implementation.
[7] The AR did not provide a breakdown of the total population covered either by province or type of facilities.
[8] LAP: INO 22048: *Appraisal of the Second IKK Water Supply Sector Project*, November 1990.
[9] TA 1443-INO: *Institutional Strengthening for Second IKK Water Supply Sector*, for $290,000, approved on 18 December 1990. The TA was funded from ADB's TA Special Fund.

9. The Directorate General of Human Settlements (DGHS), was the original Executing Agency (EA) for the Project.[10] In each of the nine project provinces, a project implementation unit was established, headed by the Project Manager of the DGHS Water Supply Project Office.

E. Completion and Self-Evaluation

10. The original closing date of ADB loan was extended twice, because of delays in house connections. The loan was closed on 21 February 1997, about 20 months behind schedule. The project completion report (PCR)[11] was generally well prepared. It recorded that the physical components of the Project were completed smoothly and as appraised, except for underachievement of the targets for, and delays in the installation of, house connections. The PCR estimated that the Project served 576,000 people, or 72 percent of the appraisal target. The PCR claimed that, had there been more funds to offset the price escalation during implementation (para. 19), the Project would have reached about 90 percent of the targeted beneficiaries with house connections. The PCR rated both the Project and the accompanying TA generally successful.

F. Operations Evaluation

11. This project performance audit report (PPAR) assesses the relevance, efficacy, efficiency, sustainability, and institutional development and other impacts of the Project, and identifies lessons and follow-up actions for ADB's ongoing and future operations at the project and sector levels. The focus of the evaluation is on the attainment of the Project's benefits, namely, effective and sustainable delivery of water supply through the new facilities and improved institutional capacity of the relevant organizations. Among the specific issues analyzed are (i) the increase in house connections and beneficiaries; (ii) the extent of financial self-sufficiency of PDAMs; (iii) the degree of community participation in design, implementation, and O&M of subprojects; and (iv) the effectiveness of project management and coordination for implementing ADB's sector loans under decentralized government organization.

12. The Operations Evaluation Mission (OEM) visited Indonesia during 4-14 June 2001, and held discussions with officials and experts involved with the Project as well as staff of ADB's Indonesia Resident Mission. The PPAR is based on findings of the OEM, analysis of data collected on 32 randomly selected subprojects (covering 32 IKKs in 11 *kabupatens* located in six provinces) during the field visits, discussion with ADB staff, as well as a review of ADB documents. The logical framework given in the PCR is reconstructed and updated in Appendix 1. Copies of the draft PPAR were provided to the Government, EA, and concerned ADB staff for review and comments. Comments received were taken into consideration in finalizing the PPAR.

II. PLANNING AND IMPLEMENTATION PERFORMANCE

A. Formulation and Design

13. ADB's country operational strategy for Indonesia at the time of appraisal in 1990 supported, among others, meeting basic needs and developing human resources, optimizing

[10] After the Government's reorganization in 1997, responsibility for rural and urban infrastructure projects was assigned to the Directorate General of Urban and Rural Development (DGURD).
[11] PCR: INO 22048: *Second IKK Water Supply Sector Project*, November 1997.

domestic resource utilization in the public and private sectors in different regions, and generating employment opportunities. Under this strategy, ADB's involvement in infrastructure development was intended to promote more balanced regional development, enhance economies of scale, and improve access to, and delivery of, social services. The Project was relevant to the country operational strategy in that it covered several poorer areas throughout the country, and aimed to provide essential economic infrastructure, and improve the delivery of social services directly (basic water supply) and indirectly (improved health and sanitation).[12]

14. Under Repelita V, the Government gave increased emphasis in the water supply sector to underdeveloped areas and lower-income people, and expanded the population coverage, in line with its key objectives of poverty reduction and balanced regional development. The Project reflected ADB's response to this policy shift. The Project aimed to benefit the poorer sections of the community to achieve a wider distribution of water through public standpipe services (AR, para. 34). However, this poverty reduction concern was only reflected indirectly in the subproject selection criteria (AR, para. 38), and there was no deliberate targeting on low-income beneficiaries within the selected subprojects.

15. Formulation of the Project reflected the experience and lessons of the first project that was still ongoing at the time of appraisal. While IKK water supply systems were designed to take full advantage of standardized designs and construction practices, the Project also allowed flexibility based on technical and socioeconomic conditions at each location.[13] It emphasized community participation in design, construction, and O&M of subprojects. The Project discontinued the use of flow restrictors, which were unsuccessful in the first project. It also comprised a training program for local personnel to be responsible for O&M of the project facilities, and an advisory TA to strengthen institutional capacities of related organizations. The Project continues to be relevant to ADB's current country strategy and program in Indonesia and is consistent with the Government's priorities.

B. Achievement of Outputs

16. The Project covered a total of 149 IKKs located in 49 *kabupatens* in nine provinces with an equal number of subprojects, as compared with 150 IKKs envisaged at appraisal. The OEM surveyed 32 randomly selected subprojects located in 11 *kabupatens* in six provinces and confirmed the generally successful physical implementation of the Project as reported in the PCR. The summary is presented in Table 1 (for details, see Appendix 2).

[12] The Project complemented ADB's first IKK water supply sector project (Loan 731-INO) and covered the four provinces in this project. It included another five provinces in the Eastern Islands region, which were poorer areas and were accorded priority under Repelita V.

[13] Standard designs were prominent for the deep well schemes.

Table 1: Status of Operation of Project Facilities

Item	Appraisal Target	Status at Completion (PCR 1997)	Status at Completion (Revised by OEM)	OEM Field Survey (2001)
1. IKKs Covered	150	154	149	32
PDAMs/*Kabupatens* Covered	39	64	49	11
Provinces Covered	9	9	9	6
2. Water Production Facilities				
a. Deep well	57	56	56	19
b. River	—	—	46	6
c. Spring	55	52	46	6
d. Shallow well	1	1	1	1
3. Water Treatment Plants	33	26	37	—
4. Storage Tanks	95	98	—	—
5. Transmission and Distribution Mains (km)	1,922	1,820	—	—
6. O&M Facilities	154	121	—	—
7. Storage Buildings/Repair Shops	133	74	—	—
8. House Connections[a]	—	—	11,665	15,001
9. Standpipes[a]	—	—	259	249
10. Persons Served[a]	133,180[b]	95,890[b]	88,169	110,110
11. Total Persons Served	800,000	576,000	530,000[c]	661,000[c]
12. Service Coverage (% of target population)	100	72	66	83

— = not available, IKK = subdistrict capital, km = kilometer, O&M = operation and maintenance, OEM = Operations Evaluation Mission, PCR = project completion report, PDAM = local water supply enterprise.

[a] For the surveyed subprojects only.

[b] OEM reestimate using the PCR's assumptions of six persons for each house connection, 100 persons for each standpipe, and 72 percent service coverage.

[c] OEM reestimate after accounting for the abandonment and poor use of standpipes as observed in the surveyed IKKs. PDAMs installed public standpipes and water terminals for both communal and individual household uses. While IKK user groups generally managed and used these public standpipes, users in some peri-urban or urbanizing areas have abandoned public standpipes in favor of house connections. Moreover, some users of public standpipes have also turned back to conventional dug wells, which they have been maintaining and using even after connecting to the piped water supply systems.

Source: Operations Evaluation Mission Survey, 2001.

17. At the time of the PCR, all physical facilities included in each IKK were completed essentially as planned, except for house connections and related tertiary distribution systems. Nonetheless, the number of house connections continued to increase after project completion with PDAMs' own efforts, and exceeded the original appraisal targets for many PDAMs. Some PDAMs offered credit schemes to encourage house connections.[14] Overall, the OEM estimates that 661,000 people have benefited from the project (83 percent of the appraisal target).

18. The Project and the associated TA 1443-INO provided basic training to local personnel of IKKs and PDAMs, and strengthened financial and project management capabilities of PDAMs. Most PDAMs submitted to the OEM well-prepared operational data and audited financial statements. The OEM generally concurs with the PCR assessment of TA 1443-INO and its successful rating.[15]

[14] PDAM Klaten allows households to pay the Rp200,000 connection fee in installments at the rate of Rp10,000 per month up to a two-year period, including interest payments.

[15] Nevertheless, the OEM could not assess the TA's effects systematically, as organizational changes after project completion caused significant redistribution of service personnel.

C. Cost and Scheduling

19. The actual cost of the Project was $52.3 million, consisting of $30.7 million in foreign exchange and $21.6 million in local currency, only marginally higher than the appraisal estimate of $52.0 million. In line with ADB's policy for sector loans, the appraisal estimate did not provide for separate price or physical contingencies. Inflation and currency fluctuation during implementation caused effective reduction of project funding in real terms, amounting to 19 percent of appraisal cost. The PCR recalculated the actual cost in real terms in 1990 prices at about $42.3 million equivalent. The decrease in project funds in real terms affected the installation of house connections and related tertiary distribution systems. This explains the underachievement in the number of beneficiaries (para. 17). The actual cost of the training charged under the Project was $130,000, only 21.7 percent of the original allocation. This decrease was due primarily to the fact that a major part of the basic training was moved to the later part of implementation to ensure its effectiveness; it was handled mostly by BPAMs, PDAMs, and the EA using their own funds. Project implementation started two months behind the original schedule. The completion, in June 1996, was about 18 months behind the appraisal schedule, mainly because of delays in supplies for, and installation of, house connections.

D. Consultant Performance, Procurement, and Construction

20. The EA procured civil works, materials, and equipment for the Project in accordance with ADB's *Guidelines for Procurement*. The OEM noted a tendency, as reported in the PCR, for local governments to utilize project funds at their discretion for many small contract packages for civil works. While on one hand this encouraged the use of local contractors, on the other hand, it undermined efficiency in project implementation in some cases. The quality of construction was generally satisfactory, and no major problems were observed. The procurement of mechanical and electrical equipment, and materials and equipment for water treatment facilities through international competitive bidding or international shopping proceeded smoothly, as the EA was experienced with ADB's procurement procedures. The suppliers of these materials and equipment performed well and bore responsibility for the installation, testing, and commissioning of the equipment and facilities. There were no technical problems in their operation other than the difficulty in obtaining spare parts and chemicals for water treatment facilities, which were beyond the responsibility of the suppliers.

E. Organization and Management

21. The original EA, DGHS, performed generally well with strong capability in organizing and managing the Project. The PCR noted that the effectiveness of DGHS responses to the recommendations and action plans outlined by periodic ADB reviews was affected by the reorganization of DGHS toward the end of implementation, which established directorates by region (PCR, para. 10). The OEM concurs with this PCR finding and the recommendation that a central focal point for implementation should have been maintained to facilitate (i) exchange and dissemination of information among all concerned, (ii) implementation of project-wide remedial actions, and (iii) assessment of effectiveness of the Project as a whole upon completion (PCR, para. 45). Moreover, information exchange among local governments and PDAMs would help the latter take effective remedial measures for the common problems observed during

operation, such as the high pumping costs of deep well schemes and the variable performance of water treatment facilities,[16] as well as the poor quality of source water.

22. The BME or project performance management system (PPMS)[17] that had been covenanted in the loan was not implemented.[18] The PCR indicated difficulty for ADB review missions in monitoring follow-up actions because of the geographic spread of the project IKKs (PCR, para. 44). The other covenants have been complied with (Appendix 3).

III. ACHIEVEMENT OF PROJECT PURPOSE

A. Operational Performance

23. New water supply facilities were installed for 149 IKKs out of 150 envisaged at appraisal. Most of the 32 facilities surveyed by the OEM were performing well, except 2 that suffered from poor water quality. In the surveyed IKKs, the total number of house connections has increased by a significant 29 percent after project completion, serving nearly 77 percent of the beneficiaries and thereby exceeding the appraisal target of 60 percent (para. 5). While public standpipes were installed as planned, users abandoned about 4 percent of them in favor of either house connections or conventional dug wells, and each operational standpipe served an average of approximately 70 persons, less than the 100 assumed in the PCR. Consequently, the OEM reestimated the overall service coverage (household connections plus standpipes) at project completion at 66 percent, compared with the PCR's 72 percent estimate. However, the coverage increased to 83 percent at the time of evaluation. Similarly, the OEM reestimated the total number of project beneficiaries at project completion at 530,000, less than the 576,000 reported in the PCR, but the number increased to 661,000 at the time of evaluation. This was still below the appraisal target of 800,000 for reasons discussed in para. 19.

24. The Project successfully established financially self-sustaining water supply institutions. The Project has contributed to improving the financial position of many PDAMs through expanding service coverage and including higher-income and urbanizing areas although the latter could partly have been at the expense of the targeted lower-income groups. Despite the economic crisis that started in 1997, several PDAMs have managed to raise the water tariff and improved their financial performance. In those cases where the responsibility for the O&M of project facilities was initially with BPAMs, the subsequent transfer of such responsibilities to PDAMs has also been successful.

25. The associated TA 1443-INO has generally achieved the envisaged institutional strengthening of PDAMs. The TA provided basic training relating to day-to-day operation of water supply facilities for PDAM staff, and improved their capabilities. More advanced training on such subjects as financial management, advanced techniques for operational improvements, and investment planning for service expansion would further strengthen the institutional capacity of PDAMs.

26. The field visits and data provided by PDAMs on the 32 subprojects reveal that the successful provision of safe water by piped water supply systems has generally improved the

[16] Many PDAMs were not involved in choosing the water treatment package. The treatment method, based on a standard definition of raw water, was not suitable to the specific conditions in some IKKs.
[17] The PPMS comprises an integrated approach to project implementation and development results monitoring.
[18] According to the PCR, the EA prepared a BME report in June 1995. The report monitored only physical outputs and not the impacts.

health and sanitation conditions of beneficiaries, the envisaged ultimate goal of the Project.[19] This achievement has been impaired for those who abandoned the public standpipes in favor of dug wells providing water of dubious quality (approximately 9 percent of total beneficiaries).

27. Standard water treatment packages have generally been adopted for the subprojects requiring such treatment. However, the treatment performance has not been always satisfactory, especially for those subprojects that depend on small treatment facilities as distinct from water treatment plants. For example, many deep well-based subprojects in Yogyakarta and Central Java suffer from high iron and manganese contents in groundwater, which cannot be removed by simple water treatment. Similarly, the river water-based subprojects in Kalimantan suffer from pollution by mining operations. Some other subprojects suffer more directly from pollution by wastewater from nearby towns, paddy fields, and leaching by local industries, although none of the effects has been reported to be serious enough to undermine project performance.

B. Performance of the Operating Entity

28. The analysis of the audited financial statements submitted by 11 PDAMs surveyed revealed that most of them have the financial capability to properly operate and maintain the project facilities. PDAMs serving a greater proportion of large water users could further improve in cost recovery by rationalizing the water tariff.[20] However, PDAMs relying mostly on rivers as a water source and serving dominantly low-income households are less likely to attain financial self-sufficiency.[21] Three out of four PDAMs, which have mostly deep well-based schemes, would also be unable to maintain financial self-sufficiency, as they reported that many subprojects faced decreased yields of groundwater after less than 10 years of operation, a problem not unique to IKK schemes. Also, the quality of groundwater has degraded rapidly for these PDAMs over the years.[22] In addition, more PDAMs could attain financial self-sufficiency and cover also depreciation if they were not required to transfer funds to the respective local governments.

29. Socioeconomic profiles of the project *kabupatens* are given in Appendix 4. In *kabupatens* with per capita gross regional domestic product (GRDP) levels of Rp2.2-3.2 million, the average household water consumption was generally price sensitive implying that (i) much of the water supplied by PDAMs was largely not for essential needs, and (ii) users could afford to pay for piped water.[23] A cross-section analysis by consumption indicates that PDAMs with

[19] The benefits have likely been realized also in the other IKKs as the project facilities are generally operated properly.

[20] Under the National Standard Water Rate Structure, introduced in 1984, PDAMs are allowed to set variable tariffs to achieve a degree of internal cross-subsidy between rich and poor users (AR, Appendix 4), and standpipes are not metered. At Rp100,000, the lowest connection fee is in Central Java. This is still high when compared with the estimated average tariff paid by each household of Rp780/m^3. The base tariff in Central Java is a low Rp250/m^3 (only 0.06 percent of average monthly income for low-income group households). For example, PDAMs could reduce the connection fee to Rp50,000 and raise the base tariff to Rp750/m^3. This would allow lower-income people to connect to the system, thus increasing service coverage and raising additional revenue. The connection fee is higher in other places, e.g., Rp300,000 in PDAM Musibanyasin, and Rp500,000 in PDAM Boyolali. With such high connection fees, only middle-income households can afford to have individual house connections.

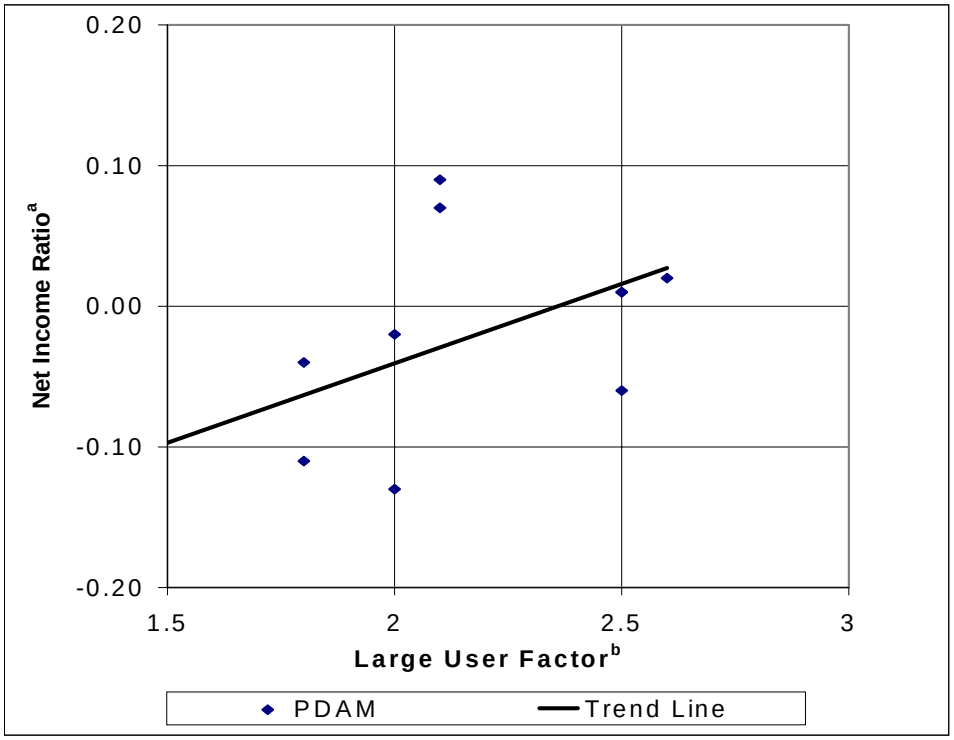
[21] In general, IKK water supply systems based on river water incur high costs of operating water treatment facilities due to technical difficulties, such as a varying quality of source water due to pollutants (para. 27), shortage of chemicals, and lack of spare parts for pumps.

[22] Alternative sources of water need to be identified to sustain those socially oriented IKK water supply schemes serving dominantly low-income households, as they generate significant external economic benefits.

[23] Average household consumption varied widely from less than 380 l/day to over 860 l/day. The average monthly bill paid by a household was 1.5 percent of the average household income, still below the acceptable limit of 2 percent.

proportionately more large users tend, as expected, to be in a financially stronger position (Figure 1). The analysis also highlights that financially troubled PDAMs serving a higher proportion of large users could improve their financial performance by raising tariffs. By subsequently reducing the connection fee, house connections could be provided to poor and low-income households, as 80 percent of the project PDAMs currently serve households in the above average-income groups.

Figure 1: Financial Performance of Selected PDAMs



PDAM = local water supply enterprise.
[a] Operational revenues less operational expenses, divided by operational revenues.
[b] Total annual revenue divided by a product of base tariff and total annual water consumption.

30. Many subprojects have contributed to improving the financial performance of the respective PDAMs. Of the subprojects surveyed, 36 percent have attained financial surplus after depreciation, and most have covered at least O&M costs.[24] Typically, subprojects based on springs with ample and good quality water had lower costs, while those serving peri-urban or urbanizing areas have benefited from higher revenues due to higher water tariffs paid by the large users. By contrast, power costs adversely affected the financial viability of some pumped water supply schemes. For example, the power cost in IKK Guwosari relying on electricity from the Perusahaan Listrik Negara (State Electricity Enterprise) accounted for over 40 percent of the O&M cost; for other IKKs in Yogyakarta and Central Java with own generating sets the power costs were up to 25 percent of the O&M cost.

[24] PDAMs provided details on O&M costs for 25 subprojects.

31. The OEM recalculated the financial internal rates of return (FIRRs) of two extreme cases of IKK water supply systems in Central Java to see the levels of financial performance of typical subprojects for a 25-year useful life (Appendix 5).[25] The subproject in IKK Delanggu, with ample and good quality water from springs, is one of the best. The other subproject in IKK Musuk, using springs and surface water, is an example of one facing serious problems with water treatment facilities. The OEM used actual data provided by PDAMs on the production, house connections, total revenue, and the construction and O&M costs for the years 1997 to 2000. For IKK Delanggu, the FIRR was 5.4 percent; for IKK Musuk, it was 3.1 percent. Both were above the average cost of capital.[26]

C. Economic Reevaluation

32. The OEM concurs with the PCR that the Project has generated significant economic benefits through incremental quantities of water provided by the piped water supply systems as well as other indirect benefits.[27] The main benefits are the cost savings, from avoiding purchasing these additional quantities of water from water vendors in the without-project scenario.[28] As mentioned earlier, users can afford to pay for the piped water, as the PDAM tariffs are much lower than the price of water from vendors. Aside from the limited number of users who continue to use the water from the dug wells, abandoning the public standpipes, many households with individual connections use alternative sources of water in combination with piped water.[29]

D. Sustainability

33. In the OEM's view, the project facilities surveyed are less likely to be sustained unless several factors, relating to financial, technical, and institutional aspects, are dealt with. The following measures would improve the medium- and long-term sustainability of IKK water supply systems:[30]

(i) Tariff rationalization could improve the medium-term financial performance of many PDAMs. For example, those PDAMs already serving a high proportion of large water users could reduce the house connection fees (which would allow more low-income users to connect and increase service coverage), while raising the base tariff rates (which would increase the total revenue from a larger number of households). The tariff rates for additional quantities of consumption should be maintained at the present levels (or even reduced) so that large users do not significantly reduce consumption.

[25] FIRRs were not estimated in the AR. The PCR reported FIRRs for two representative IKK water supply systems: a large system (10 l/second capacity), and a small system (5 l/second capacity). The FIRRs were 6.0 percent and 5.5 percent, respectively.

[26] Although the Government provided financing for the Project on a grant basis to the PDAMs, the average cost of capital of 2.5 percent has been estimated from the average cost of capital for local governments of 11.5 percent, adjusted to real terms using the domestic inflation rate of 9.0 percent.

[27] The AR and PCR did not quantify the economic benefits. During the field visits, the OEM observed that all users generally consumed piped water for various purposes. The OEM received no reports of any problems of public health in the IKKs visited and concurs with respective PCR statements (PCR, Appendix 11). The OEM did not attempt a detailed economic reevaluation as the AR and PCR did not estimate economic internal rates of return.

[28] The price of water from vendors is Rp5,000/m^3, compared with the average household tariff for piped water of Rp780/m^3.

[29] For example, many households prefer the water from dug wells for drinking and cooking purposes, as they do not like the smell of chlorine in the piped water.

[30] These factors are generally relevant to water supply schemes in developing member countries with good annual rainfall, particularly in rural areas.

(ii) More PDAMs could attain financial self-sufficiency and cover depreciation, if the Government abolished the fund transfer from PDAMs to local governments.

(iii) Further training of PDAM staff to deal with technical and managerial problems would enhance the sustainability of the Project. In particular, the National Association of PDAMs or its regional branches could conduct various training programs and encourage information exchange/sharing among PDAMs for effective remedial measures for common problems.

(iv) For socially oriented water supply schemes serving predominantly low-income households, the Government could develop alternative solutions (including targeted subsidies) that ensure the financial sustainability of schemes facing technical problems or physical constraints and thus excessively high costs of rehabilitation and operation, beyond the affordability of beneficiaries.

(v) The most important factor to ensure long-term sustainability of IKK water supply would be for ADB and the Government to include sanitation and pollution control as integral parts of water supply. In particular, shallow groundwater should be protected and its quality assured through proper sanitation and pollution control to safeguard this most accessible source of water for sustainable use.

IV. ACHIEVEMENT OF OTHER DEVELOPMENT IMPACTS

A. Socioeconomic Impacts

34. The Project covered IKKs of widely varying socioeconomic characteristics. The *kabupaten* statistics on the surveyed IKKs indicate that the average population density varies from much less than 1 per hectare (ha) to well over 20 per ha, the urbanization ratio ranges widely between 10 percent and 50 percent, and the per capita GRDP range is Rp2.2-6.4 million. However, there is no significant variance in the average household size among the project IKKs although the size tends to be larger for poorer households. The majority of the project beneficiaries reported above average-income levels.[31] In other words, most project PDAMs have served lesser number of low-income households than envisaged, as the Project did not deliberately target them.

35. The OEM received favorable responses in the IKKs visited that there had been no serious health and sanitation problems after the improvement of the water supply facilities under the Project. The Project thus facilitated the deployment of social service personnel to more isolated, less urbanized, and poorer areas. In some subprojects, community participation has successfully achieved other socioeconomic benefits, such as employment for local people and additional local income generated by the use of multipurpose ponds (para. 40).

B. Environmental Impact

36. The Project's environmental impact has been generally positive. The Project provided protection for springs and shallow wells for some schemes, which generally benefited all users. The local people used multipurpose ponds created by spring protection works for washing,

[31] The average monthly income was Rp183,000 per capita, compared with the national average of Rp100,000 per capita for low-income group households (*Kabupaten Statistics*, Dalam Angka, 1998).

bathing, and other purposes. The protection works have also reduced the risk from storm water during heavy rains.

37. As a result of the Project, environmental monitoring has become a common practice for many PDAM systems. The PDAMs regularly monitor the quality of source water, although frequencies and indices used for monitoring the quality of distribution vary among PDAMs. The OEM learned from PDAMs that potable water-quality test kits are expensive and allow only tests of limited parameters. Many PDAMs also maintain customers' complaint systems for the quality of water supply services, with varying levels of response.

C. Impact on Institutions and Policy

38. During project implementation, the Government substantially introduced its decentralization policy into the water supply sector. In keeping with the policy, the EA encouraged local governments to employ local contractors and implement many small and geographically dispersed subprojects. The policy also encouraged more alliances between local governments and PDAMs to identify cost-effective water supply and sanitation systems, operational improvements, and joint training programs. In some limited cases, due to the poor information flow between the central Government and local governments, and limited information exchange among local governments, effective remedial measures were not taken in the subprojects to solve common problems.

39. While there is no private sector participation in the operation of subprojects, the OEM noted some positive developments that indicate that the Project has expanded possible opportunities for private sector involvement in IKK water supply. PDAM Sleman, for instance, plans to invite the private sector to improve the operation of facilities installed under the Project and to produce drinking water. PDAM Klaten has completed a feasibility study of commercial production of bottled drinking water with private sector participation. In PDAM Boyolali, private water vendors compete to distribute water from springs to areas not covered by the Project, charging Rp50,000 per 4 m^3 container, much higher than the tariff charged by the project scheme.

40. The Project encouraged community participation, which has definitely contributed to the success of relatively small and simple schemes. As stated in the PCR, communities determined the locations of standpipes in IKKs in South Sumatra and coordinated among them the O&M arrangements (PCR, paras. 23 and 36). Consequently, these facilities have been well used and maintained. In the spring-based subprojects, the local communities expressed a sense of ownership for protected springs and associated facilities. For example, in IKK Delanggu in Central Java, the local community participated in the construction of spring protection works, and the PDAM provided a multipurpose pond to compensate for the vested water rights transferred by the community.

V. OVERALL ASSESSMENT

A. Relevance

41. The Project is rated relevant for the following reasons. At appraisal, the Project (i) was consistent with the renewed emphasis of Repelita V on underdeveloped areas and lower-income people; and (ii) was in line with one of the strategic objectives of ADB’s country operational strategy. The Project continues to be fully consistent with the present priorities of the Government in the water supply sector and ADB’s overarching goal of poverty reduction. The

OEM's only reservation is that project formulation and implementation did not directly reflect the poverty-reduction goal in the subproject selection criteria.

B. Efficacy

42. The Project successfully implemented new water supply systems in 149 IKKs and met the physical targets envisaged at appraisal. The number of house connections has increased by 29 percent since project completion, to exceed, in many IKKs, the 60 percent beneficiary coverage targeted at appraisal (para. 5), as PDAMs used their own funds and launched innovative schemes. The improved financial performance of the majority of project PDAMs and adequate O&M of subprojects surveyed demonstrate that the Project has also achieved the other objective of strengthening institutional capacity of public organizations responsible for the implementation and operation of water supply facilities. The Project contributed positively to the ultimate goal of improving health and sanitation of beneficiaries. At the time of evaluation, the total number of beneficiaries had increased to 661,000 compared with 530,000 at project completion, although still below the appraisal target of 800,000. Overall, the Project is rated efficacious.

C. Efficiency

43. The Project has generated significant economic benefits through incremental quantities of water provided through piped water supply systems, as well as other indirect benefits. A cross-section analysis of project PDAMs and financial reevaluation of the best and worst cases of subprojects indicate that the Project contributed to improving the financial sustainability of PDAMs. The FIRRs for the spring-based subprojects confirm their cost effectiveness. The subprojects facing technical problems and those with a poor quality of source water are less cost effective. The OEM also observed a few subprojects with highly engineered water treatment and associated facilities. For IKK water supply schemes, which are socially oriented, other simpler and less expensive solutions could have been considered. Overall, the Project is rated efficient.

D. Sustainability

44. Sustainability varies widely among subprojects, depending mainly on water sources and the level of community participation. The subprojects utilizing springs, accounting for 31 percent of the Project, with ample and good quality water, are most sustainable, especially when beneficiary communities were involved in subproject design and implementation and participate in O&M. With the exception of those affected by high power costs, many deep well-based subprojects, accounting for 38 percent of the Project, are financially sustainable. Nonetheless, some may be adversely affected in the future due to depletion of groundwater reserves and degradation of water quality. The remaining subprojects based on river water would be less sustainable due to high operating costs, particularly power costs, and, unless PDAMs make operational improvements, technical problems involved in water treatment facilities. Users have abandoned about 4 percent of the public standpipes provided. Overall, the Project is rated less sustainable.

E. Institutional Development and Other Impacts

45. The Project and the associated TA 1443-INO were successful in the strengthening of PDAMs. The Project also positively contributed to improving the health and sanitation of the beneficiaries and the overall environment in the IKKs. Environmental monitoring has become a

common practice in many PDAMs. The Project also assisted the Government in introducing the decentralization policy into the water supply sector, one of the important social sectors. The Project's institutional development impact is rated satisfactory and TA 1443-INO is rated successful.

F. Overall Project Rating

46. Overall, the Project is rated successful, based on the ratings for the abovementioned five performance evaluation criteria.

G. Assessment of ADB and Borrower Performance

47. ADB's performance in project implementation is rated satisfactory. ADB review missions provided substantial input, and closely monitored the achievement of physical targets for the new water supply systems. However, the review missions during the later stages of the Project could have guided the EA to avoid delays in house connections and improve PPMS activities. Although the effectiveness of the Government's responses to periodic ADB recommendations was affected by the reorganization of the former DGHS toward the end of project implementation, the performance of the Government and the EA in organizing and managing the Project is also rated satisfactory. The Project involved numerous PDAMs in geographically dispersed locations, and the Government and the EA provided significant inputs and effective central coordination, although there was room for improvement. For example, the EA could have established a Project-wide standardized monitoring system to compare levels of achievement among the subprojects and take effective remedial measures for common problems.

VI. ISSUES, LESSONS, AND FOLLOW-UP ACTIONS

A. Key Issues for the Future

48. **Strengthening of Institutional Capacities of PDAMs.** PDAM staff require more advanced training in such subjects as operational improvements, comprehensive water quality monitoring, financial management, and investment planning. The reasons are as follows: (i) the training program under the Project covered mostly basic subjects relating to day-to-day operation of water supply systems; (ii) some subprojects face technical problems, especially with the water treatment facilities, which in turn affects the financial performance of PDAMs; (iii) most PDAMs monitor the quality of source water regularly but not necessarily in a comprehensive manner; (iv) many PDAMs suffering from poor financial performance lack skills for rationalizing water tariffs; and (v) other PDAMs lack skills required for improving their financial management to allow continued expansion of service coverage and improvement of service quality.

49. **Social Concerns vis-à-vis Financial Viability of Water Supply.** Many subprojects have contributed to improving the financial performance of the respective PDAMs. However, 2 out of 11 PDAMs surveyed are unable to recover the costs of operating the subprojects. These PDAMs continue to operate the subprojects because they typically serve predominantly low-income households in rural areas. Such socially oriented subprojects, which serve the envisaged poor beneficiaries, need to be distinguished from subprojects serving peri-urban or urbanizing areas, and simpler and less expensive solutions need to be considered. Moreover, when implementing such subprojects in the future, local governments could avoid the typical time-consuming implementation procedure, applicable to major economic infrastructure

projects; the subprojects should be planned and implemented with community participation within less than one year. In limited cases that face technical problems or physical constraints, and consequently, excessively high costs of rehabilitation and operation that are beyond the affordability of low-income beneficiaries, government subsidies may be necessary to ensure sustainability.[32]

50. **Degree of Community Participation and Alternative Water Sources.** The success of individual subprojects has been generally proportional to the degree of community participation. It has been the highest for relatively small and simple schemes, typically those based on springs. For some highly engineered subprojects relying on modular systems, community participation was not important for solving operational problems, as the problems were mostly technical ones, such as breakdown of pumps and lack of spare parts. Deep well-based and river water-based schemes with complicated water treatment facilities fall into this category. Nevertheless, even in these cases, community consultation would be essential in other matters, such as determining the service coverage, level of services, location of key facilities, and O&M arrangements.

51. Some users, including those who are now connected to a piped water supply, continue to use dug wells. In some IKKs, users have abandoned some public standpipes and returned to dug wells. As identified in earlier operation evaluations, the most important factor in IKK water supply is to include sanitation and pollution control as integral parts of water supply and thereby protect shallow groundwater to ensure good quality water in wells, the most accessible source.

B. Lessons Identified

52. The OEM identified three major lessons:

(i) For projects adopting a sector-lending approach under decentralization, proper information flows between the central Government and local governments and adequate information exchange/sharing among local governments are crucial. The success of a sector-type project depends on the efficient control and coordination of project implementation; the ability of local governments (or implementing agencies) to take remedial measures (using shared knowledge) in the subprojects to solve common problems; and regular assessment of subproject performance.

(ii) To deliberately target the poor or specific income groups, it is important to first design a PPMS and generate basic socioeconomic data, through limited surveys during project preparation. Project review activities should utilize the baseline data generated by the surveys and monitor performance with respect to beneficiaries by income distribution and other effects. Without preparing annual benefit monitoring reports for a few years after project completion, it is not possible to effectively monitor the achievement of the project purpose and goal.

(iii) Community participation is a key factor to ensure that anticipated socioeconomic benefits are realized from the delivery of water supply services through the proper operation of physical facilities.

[32] Through focused socioeconomic surveys, the external economic benefits could be quantified to confirm whether the subsidies are consistent with *Bank Criteria for Subsidies*, IN.226-96, 1996.

C. Follow-Up Actions

53. A number of recommendations were made in the PCRs for the first and second IKK water supply projects. As indicated in Appendix 6, satisfactory actions have been taken by the agencies concerned. Based on this evaluation, the OEM recommends four additional follow-up actions:

(i) DGURD should review, during 2002-2004, the operational performance of all subprojects and take remedial actions as follows:

(a) **Deep Well-Based Subprojects.** Identify those facing declining yields and degrading quality of groundwater and formulate alternative supply schemes. Rationalize water use and reduce nonrevenue water.

(b) **Subprojects with Abandoned Public Standpipes.** Conduct marketing campaigns, supported by tariff revision or credit schemes to increase house connections. Conduct public awareness programs on hygiene and sanitation to discourage the use of dug wells with dubious water quality. Periodically examine the quality of water in the wells.

(c) **River Water-Based Schemes with Poor Financial Performance.** Review operation of water treatment facilities, and take remedial measures such as provision of spare parts and chemicals, installation/replacement of diesel-generators, and training of technical staff.

(ii) ADB's Social Sectors Division in the Southeast Asian Department should prepare a TA by 2004 for advanced training of staff from DGURD and PDAMs.

(iii) ADB's Operations Evaluation Department, with the support of the Indonesia Resident Mission, should prepare a TA by 2004 to develop a monitoring and evaluation system for IKK water supply schemes, in line with ADB's PPMS.[33]

(iv) ADB's Operations Evaluation Department should undertake in 2002 an impact evaluation study in the water supply and sanitation sector in different developing member countries.[34] The purpose of the study would be to assess the impact of water investments and tariff policies on availability of safe water supply to beneficiaries, particularly the poor. Reflecting on lessons from project evaluation, the study could also develop a framework for an integrated approach to water supply and sanitation in future ADB-assisted projects, including the role of the private sector in their construction and O&M.

[33] The PPMS uses the logical framework to generate regular results-oriented performance reports on individual projects.

[34] An impact evaluation study on *Bank Assistance to the Water Supply and Sanitation Sector in Indonesia* was completed in October 1997.

APPENDIXES

LOGICAL FRAMEWORK AT EVALUATION[a]

Design Summary	Appraisal Targets (As stated in the PCR)	Project Achievements (PCR 1997 and OEM 2001)	Issues, Lessons, and Recommendations (OEM 2001)
Goal			
• To support improvements in public health and living standards through provision of safe water supply	• Incidence of waterborne diseases reduced	• Improvement in the infant and mortality rates in the project provinces by 14-30 percent during 1990 (before Project) and 1995 (after Project), (PCR, National Health Survey, 1995). • The Project also improved environmental conditions. The incremental benefits have been reduced by continued use of conventional dug wells in combination with piped water. In cases where public standpipes were abandoned in favor of dug wells that provide water of dubious quality, the Project has failed to improve the health and sanitation conditions of those using dug wells (OEM). • The Project facilitated deployment of social service personnel to more isolated, less urbanized, and poorer areas where they conducted health and sanitation campaigns. (OEM)	• Project benefit monitoring and evaluation (BME) was limited to physical infrastructure. A community-oriented self-monitoring of living conditions should be initiated for selected subprojects. • The best way to improve environmental conditions in subdistrict capitals (IKKs) is to consider sanitation and pollution control as integral parts of water supply. In particular, the protection and enhancement of shallow groundwater through proper sanitation and pollution control are recommended.
Purpose			
1. To provide a safe, affordable, and accessible water supply	a. Piped water supply provided to 800,000 persons (appraisal report) and 90 percent of the population by 2000 (PCR)	• At project completion, the Project covered 149 IKKs serving 576,000 people (72 percent of Appraisal target). OEM estimates show that the number of Project beneficiaries was slightly lower at around 530,000. • Service population has increased to over 661,000 to date (OEM). • Most IKKs are expected to achieve service coverage of 90 percent between 2000 and 2002 (PCR).	• The Project covered limited numbers of poor households. While poverty was one of the subproject selection criteria indirectly, project formulation and implementation attempted no deliberate targeting of low-income beneficiaries. • With tariff rationalization, PDAMs (local water supply enterprises) could further expand service coverage. The Asian Development Bank is advised to provide technical assistance for advanced training to PDAM staff.
	b. Safe drinking water provided in about 150 IKKs in nine provinces	• The quality of source water has been regularly monitored, although frequencies and quality indices used vary among PDAMs. Customers' complaint systems for the quality of water supply services are also operational in varying degrees (OEM).	• Potable water-quality test kits are expensive and only allow tests of limited parameters.

OEM = Operations Evaluation Mission, PCR = project completion report, PDAM = local water supply enterprise.

[a] The PCR included a logical framework. Only purpose targets were mentioned in the appraisal report. Other targets at appraisal are as stated in the PCR. The OEM reconstructed the goal, purpose, and output sections and updated project achievements.

Design Summary	Appraisal Targets (As stated in the PCR)	Project Achievements (PCR 1997 and OEM 2001)	Issues, Lessons, and Recommendations (OEM 2001)
	c. Cost of water will be less than 3 percent of the household income	• Representative IKKs from Central Java, Central Kalimantan, and West Nusa Tenggara showed affordability of 2.0-7.5 percent (PCR). • Tariffs charged are appropriate in comparison with both national standard rate and affordable to users (OEM).	• Many PDAMs may further rationalize tariffs and improve financial performance without exceeding users' affordability. • For socially oriented subprojects, the Directorate General of Urban and Rural Development may consider simpler and less expensive schemes and approaches.
2. To establish financially self-sustaining water supply institutions	a. Project facilities transferred to PDAMs after the transitional water supply management unit (BPAM) operations reach financial sustainability	• All Project facilities have been transferred to their respective PDAMs. Many PDAMs have expanded services areas to cover peri-urban or urbanizing areas with higher household incomes (OEM). • Subprojects based on springs with ample and good quality water are most sustainable. Many deep well-based subprojects may be adversely affected in the future by the depletion of groundwater reserves and degradation of water quality. Subprojects based on river water are less sustainable (OEM).	• PDAMs can attain financial self-sufficiency covering depreciation as well, if profit transfer to local governments is abolished and PDAMs become autonomous.
	b. Tariff sufficient to meet all operation and maintenance (O&M) costs	• Some PDAMs raised tariffs after the economic crisis in 1998 (OEM).	• Base tariff rates may be raised in PDAMs serving a higher proportion of large water users, and house connection fees may be reduced.
	c. Target level of unaccounted for water (UFW) (Repelita VII target is 35 percent)	• The OEM confirmed PCR findings that UFW is less than 25 percent (usually about 10 percent) for new piped systems (OEM).	
	d. Borrower grant assistance to supplement O&M cost to help BPAMs/PDAMs become financially sustaining.	• The Government provided grant assistance to help BPAMs/PDAMs become financially sustainable (PCR).	• In cases where subprojects face technical problems or physical constraints and thus excessively high costs beyond the affordability of low-income beneficiaries, government subsidies would be justified.

OEM = Operations Evaluation Mission, PCR = project completion report, PDAM = local water supply enterprise.

Design Summary	Appraisal Targets (As stated in the PCR)	Project Achievements (PCR 1997 and OEM 2001)	Issues, Lessons, and Recommendations (OEM 2001)
Outputs:			
1. Approximately 150 IKK water supply systems located in about 39 districts installed	a. Water supply sources developed (i.e., deep wells, shallow wells, river intake or spring capture by gravity/pumping) and provision of pumping and water treatment facilities	• The project installed 149 IKK water supply systems comprising 56 deep well, 46 river, 46 springs and one shallow well. The OEM survey of selected subprojects revealed 56 percent with good performance, 37 percent with technical problems, and 7 percent with poor water quality (OEM).	• Some project PDAMs have plans to tap new water sources to expand service areas. Some other PDAMs are considering improvement of supply systems installed by the Project. • The Directorate General of Urban and Rural Development is advised to review as soon as possible the operational performance of subprojects and take remedial action.
	b. Transmission, distribution and service lines [1,922,872 meters] laid, and public standpipes (40 percent)/house connections (60 percent) and water terminals provided	• Transmission and distribution pipelines completed [1,819,566 meters] (PCR). • House connections within the Project increased steadily after the Project completion, exceeding the original targets for some IKKs, due to marketing and public campaigns for safe water, and offering of credit schemes (OEM). • Most public standpipes installed in subprojects serving peri-urban and urbanizing areas have been either converted to house connections or just abandoned. Even for operational standpipes, the number of users is smaller (usually up to 15 households or 70 people) than envisaged (100 people). Users of standpipes organize themselves into groups, and their representatives collect user fees (usually at a flat rate) (OEM).	• In subprojects with abandoned public standpipes, marketing and public campaigns need to be conducted to discourage use of dug wells with water of dubious quality.
	c. Water tank trucks, tugboats and utility vehicles provided	—	
	d. Office accommodation [154], supplies, O&M equipment storage facilities [95], and repair shops [133].	• 98 storage completed (PCR). • 121 offices completed (PCR). • 74 storage and repair shops completed (PCR).	

— = not available.
[ ] = Planned in the subproject appraisals. Except for the number of IKKs, none of these was mentioned in the appraisal.
OEM = Operations Evaluation Mission, PCR = project completion report, PDAM = local water supply enterprise.

Design Summary	Appraisal Targets (As stated in the PCR)	Project Achievements (PCR 1997 and OEM 2001)	Issues, Lessons, and Recommendations (OEM 2001)
2. Accompanying technical assistance to establish/ improve managerial and administrative capacity within BPAMs/PDAMs	a. Training program for local personnel in O&M of water supply facilities established	• Institutional development and training program proved useful. Program focused on technical aspects of O&M helped staff build a skills base, on which further managerial skills could be developed as a next step (PCR). • The training program was revised to cover mostly basic subjects related to day-to-day operation of water supply systems, and some subprojects face technical problems especially with water treatment facilities, which affect in turn the financial performance of respective PDAMs. Source water quality is monitored regularly but not necessarily comprehensively (OEM).	• Information exchange/sharing for effective remedial measures for common problems should be encouraged by mobilizing the National Association of PDAMs or its regional branches for various training programs. • A framework should be developed for an integrated approach to water and sanitation in future ADB-assisted projects. Institutional arrangements to allow alliances of local governments and PDAMs for implementing and operating such an integrated water supply and sanitation system may also be part of the framework. • Further training should be provided for the Executing Agency (EA) and PDAM staff on the project performance management system (PPMS), financial management, investment planning, operational improvements, and comprehensive water quality monitoring.
	b. Project BME activities carried out	• Data were collected through the Water Enterprise Information System (SIMPAM) and compiled and analyzed in the final BME report prepared in June 1995 (PCR).	• Benefit monitoring focusing on impacts and project performance management needs to be operationalized.
	c. Management information system established	• A base program for an operations monitoring and management information system was established (PCR).	• It is important to generate basic socioeconomic data through limited surveys during project preparation if targeting on the poor or specific income groups is to be purposefully carried out. Baseline data generated by the surveys should be utilized for performance monitoring of any project with respect to income redistribution and other effects.

OEM = Operations Evaluation Mission, PCR = project completion report, PDAM = local water supply enterprise.

Design Summary	Appraisal Targets (As stated in the PCR)	Project Achievements (PCR 1997 and OEM 2001)	Issues, Lessons, and Recommendations (OEM 2001)
	d. Community participation encouraged	• The locations of standpipes were determined by the communities concerned and the O&M arrangements coordinated among them; these facilities in South Sumatra have been well used and maintained (PCR). In Delanggu IKK in Central Java, the local community also participated in the construction of spring protection works, and PDAM provided a multipurpose pond to compensate for the vested water rights transferred by the community. In spring-based subprojects in Central Java, local communities expressed a sense of ownership for protected springs and associated facilities. (OEM)	• The success of subprojects is generally proportional to the degree of community participation for relatively small and simple schemes, typically those based on springs. For highly engineered subprojects, community consultation would be essential in determining the service coverage, level of services, location of key facilities, and O&M arrangements.

OEM = Operations Evaluation Mission, PCR = project completion report, PDAM = local water supply enterprise.

STATUS OF OPERATION OF PROJECT FACILITIES

Table A2.1: Project Achievements by Province

Item	South Sumatra	Lampung	Central Java	Yogyakarta	Central Kalimantan	South Kalimantan	West Nusa Tenggara	East Nusa Tenggara	East Timor[a]	Total
1. IKKs Covered (number)	21	13	42	23	10	10	10	10	10	149
PDAMs Covered (number)	7	3	11	2	5	5	4	6	6	49
2. IKKs Surveyed (number)	6	9	4	9	0	2	2	0	0	32
PDAMs surveyed (number)	2	2	2	2	0	2	1	0	0	11
3. Water Production Facilities (number)										
• Deep Well	8	6	15	23	0	0	1	3	0	56
• River	10	4	2	0	10	10	8	1	1	46
• Spring	3	3	24	0	0	0	1	6	9	46
• Others (shallow well)	0	0	1	0	0	0	0	0	0	1
4. Water Treatment Plants (number)	7	4	2	0	10	9	3	1	1	37
5. Level of Service[b] (% of population)	32	14	25	17	N	18	—	N	N	—
6. Physical Performance of IKKs[b] (percentage of surveyed subprojects)	G (20) T (70) P (10)	G (67) T (33) P (0)	G (50) T (50) P (0)	G (83) T (0) P (17)	N	G (60) T (40) P (0)	—	N	N	G (56) T (37) P (7)

— = not available, IKK = subdistrict capital, PDAM = local water supply enterprise.

[a] In 1999, the province of East Timor separated from Indonesia. Since the Project closed before this event, East Timor is treated here as a province of Indonesia, which it was during project implementation.

[b] Data collected by Operations Evaluation Mission field visits: G = Good performance, T = Remediable technical problems such as lack of supplies for water treatment, nonavailability of spare parts for pumps, P = Poor water quality, N = Data not collected.

Sources: Project Completion Report, 1997 and Operations Evaluation Mission, 2001.

Table A2.2: Level of Service in the Surveyed IKKs: Capacity of Production Facilities (l/sec)

Project Province	PDAM/ Kabupaten	IKK	Deep Well	Spring	River	Others
C. Java	Boyolali	Musuk				5
	Klaten	Delanggu		10		
		Karang Anom and Klepu		15		
		Karangnongko and Kemalang		5		
DI Yogyakarta	Bantul	Bangunharjo	5			
		Bungunjiwo	10			
		Guwosari	10			
		Sumbermulyu	5			
	Sleman	Sidomoyo	5			
Lampung	Way Bumi/N. Lampung	Madukoro	5			
		Tanjung Raja	2.5			
	Way Irang/ C. Lampung	Pelindung Jaya		10		
		Bagungrejo			10	
		Margototo			10	
		Panggungraharjo		5		
		Rumbia	5			
		Simbar Waringin	5			
	Way Irang/Lampung Tengah	Kalirejo			10	
S. Sumatra	Ogan Komering Illir	Meranjat	10			
		Payaraman	2.5			
		Pagarayan	10			
		Seri Tanjung	5			
		Tanjungbato	5			
S. Kalimantan	Hulu Sungai Selatan	Kalumpang			5	
	Kotabaru	Sungai Danau			5	
		Total for All Surveyed IKKs (l/sec)[a]	**85**	**45**	**40**	**5**
		No. of Production Facilities	**14**	**5**	**5**	**1**

IKK = subdistric capital, l/sec = liter per second, PDAM = local water supply enterprise.

[a] Of the 32 IKKs surveyed by the Operations Evaluation Mission, performance data from seven IKKs showed inconsistencies and therefore are not included in the calculation. Summary: Number of provinces is 5; PDAMs/Kabupatens, 10; and IKKs, 27 (including Klepu and Kemalang).

Table A2.3: Level of Service in the Surveyed IKKs, 1997

Province	PDAM/ Kabupaten	IKK	Population	Population Served	Service Coverage (%)	House Connections	Stand-pipes
C. Java	Boyolali	Musuk	58,095	2,602	4	317	7
	Klaten	Delanggu	25,085	6,786	27	1,081	3
		Karang Anom and Klepu	30,519	20,622	68	2,937	30
		Karangnongko and Kemalang	14,390	3,616	25	336	16
DI Yogyakarta	Bantul	Bangunharjo	71,822	4,152	6	692	—
		Bungunjiwo	70,621	8,508	12	1,418	—
		Guwosari	28,622	2,994	10	499	—
		Sumbermulyu	40,910	606	1	101	—
	Sleman	Sidomoyo	22,100	10,888	49	1,248	34
Lampung	Way Bumi/N. Lampung	Madukoro	10,928	1,106	10	151	10
		Tanjung Raja	27,237	644	2	104	1
	Way Irang/C. Lampung	Pelindung Jaya	13,387	1,874	14	179	16
		Bagungrejo	22,220	2,432	11	272	16
		Margototo	14,780	908	6	118	4
		Panggungraharjo	6,810	2,554	38	309	14
		Rumbia	13,979	1,616	12	211	17
		Simbar Waringin	10,656	1,352	13	167	7
	Way Irang/Lampung Tengah	Kalirejo	24,220	3,312	14	412	18
S. Sumatra	Ogan Komering Illir	Meranjat	2,195	1,740	79	128	11
		Payaraman	3,470	1,455	42	131	10
		Pagarayan	2,400	1,150	48	110	6
		Seri Tanjung	3,120	2,565	82	183	16
		Tanjungbato	3,920	1,570	40	134	9
S. Kalimantan	Hulu Sungai Selatan	Kalumpang	8,531	566	7	91	1
	Kotabaru	Sungai Danau	11,475	2,551	22	336	13
		Total for All Surveyed IKKs[a]	**541,492**	**88,169**	**16**	**11,665**	**259**

— = not operational, IKK = subdistrict capital, PDAM = local water supply enterprise.

[a] Of the 32 IKKs surveyed by the Operations Evaluation Mission, performance data from seven IKKs showed inconsistencies and therefore are not included in the calculation. Summary: Number of provinces is 5; PDAMs/Kabupatens, 10; and IKKs, 27 (including Klepu and Kemalang).

Source: Operations Evaluation Mission Survey, 2001.

Table A2.4: Level of Service in the Surveyed IKKs, 2000

Project Province	PDAM/ Kabupaten	IKK	Population	Population Served	Service Coverage (%)	House Connections	Stand-pipes
C. Java	Boyolali	Musuk	58,958	2,426	4	321	5
	Klaten	Delanggu	26,801	13,828	52	2,188	7
		Karang Anom and Klepu	41,271	24,864	60	3,644	30
		Karangnongko and Kemalang	14,716	4,634	31	489	17
DI Yogyakarta	Bantul	Bangunharjo	74,005	5,112	7	852	—
		Bungunjiwo	73,050	8,604	12	1,434	—
		Guwosari	29,942	6,438	22	1,073	—
		Sumbermulyu	42,522	1,092	3	182	—
	Sleman	Sidomoyo	22,100	15,634	71	1,784	34
Lampung	Way Bumi/N. Lampung	Madukoro	10,928	1,014	9	139	9
		Tanjung Raja	27,237	644	2	104	1
	Way Irang/ C. Lampung	Pelindung Jaya	13,387	1,910	14	185	16
		Bagungrejo	22,314	2,432	11	272	16
		Margototo	14,869	932	6	122	4
		Panggungraharjo	6,835	2,584	38	314	14
		Rumbia	13,979	2,182	16	222	17
		Simbar Waringin	10,664	1,352	13	167	7
	Way Irang/Lampung Tengah	Kalirejo	24,377	3,612	15	452	18
S. Sumatra	Ogan Komering Illir	Meranjat	2,703	1,740	64	148	10
		Payaraman	3,115	1,820	58	131	8
		Pagarayan	2,650	960	36	92	5
		Seri Tanjung	3,250	2,645	81	189	17
		Tanjungbato	—	—	—	—	—
S. Kalimantan	Hulu Sungai Selatan	Kalumpang	6,036	812	13	132	1
	Kotabaru	Sungai Danau	12,600	2,839	23	365	13
		Total for All Surveyed IKKs [a]	**558,309**	**110,110**	**20**	**15,001**	**249**

— = not operational, IKK = subdistrict capital, PDAM = local water supply enterprise.

[a] Of the 32 IKKs surveyed by the Operations Evaluation Mission, performance data from seven IKKs showed inconsistencies and therefore are not included in the calculation. Summary: Number of provinces is 5; PDAMs/Kabupatens, 10; and IKKs, 27 (including Klepu and Kemalang).

Source: Operations Evaluation Mission Survey, 2001.

COMPLIANCE WITH LOAN COVENANTS[a]

Covenant Class/ Loan Covenant	Status of Compliance at Completion Review	Status of Compliance at Evaluation
Financial		
Loan Agreement (LA) Schedule 5, para. 14.c; Covenant No. 2: Local water enterprise (PDAM) charges sufficient to cover all operation and maintenance (O&M) costs and cross-subsidization of O&M costs from wealthy communities within a *kabupaten* (district).	Partly complied with. Some PDAMs register losses even after intra-agency cross-subsidization, but are constrained from raising tariffs to cover all expenditures as these are comparable to nationally observed standards and reasonable for affordability to the users.	Complied with. Many PDAMs have improved their financial performance by subprojects that have expanded service areas to cover peri-urban or urbanizing areas with higher household incomes. Many PDAMs even raised tariffs after the economic crisis in 1998.
LA Schedule 5, para. 14.e; Covenant No. 4: PDAM surplus funds to be used exclusively for maintenance, replacement, improvement, or expansion of the facilities.	Complied with. Most PDAMs have reserve capacities and maintenance needs are limited because facilities are new. Thus, surplus funds generated are being utilized mainly for expansion of distribution systems to improve service coverage.	Complied with. As most PDAMs have reserve capacity and maintenance costs remain small for newly installed systems under the Project, surplus funds have been used mainly to increase house connections and improve distribution systems.
Implementation		
LA Schedule 5, para. 8.b; Covenant No. 15: Encourage active community participation in planning, design and construction phases of each subproject.	Complied with. Public standpipes and communal water terminals have been well used and maintained where locations were determined by the communities concerned and the O&M arrangements similarly coordinated among themselves.	Partly complied with. In Central Java, local communities participated fully in the construction of spring protection works. Such participation was absent in deep well-based subprojects.
Institutional		
LA Schedule 5, para. 2.a; Covenant No. 21: Cipta Karya (DGHS) to implement the Project through the existing project management unit established to manage and coordinate implementation of the first IKK Water Supply Sector Project.	Complied with. Reorganization of DGHS toward the end of project implementation brought the Project under several regional directorates for implementation. Lack of a single authority responsible for project implementation constrained DGHS from taking effective action on matters that require coordination and action on a Project-wide basis, especially during June 1995 to June 1996 when assistance from implementation advisors was no longer available.	As a result of the reorganization, no more relevant.

[a] Unmet covenants (as observed by the Operations Evaluation Mission and/or according to project completion report statements) and covenants requiring continued compliance during operation were reviewed.

Covenant Class/ Loan Covenant	Status of Compliance at Completion Review	Status of Compliance at Evaluation
LA Schedule 5; para. 10.a; Covenant No. 24: DGHS will prepare, (in consultation with the Asian Development Bank [ADB]), a detailed training plan and submit such plan to ADB within 10 months of loan effectiveness.	Partly complied with. The training program was prepared under TA 1433-INO and the final report was submitted to ADB in January 1993, a delay of seven months from the covenanted deadline.	Complied with. The training program was revised to cover mostly basic subjects related to day-to-day operation of water supply systems; regular training for PDAMs followed.
LA Schedule 5, para. 10.c; Covenant No. 26: Training in the field of O&M begins (for each subproject) immediately after awarding relevant civil works contracts.	Partly complied with. During implementation, it was realized that to ensure effectiveness, training needed to be provided after the facilities became operational.	Complied with. Project-related training was followed up by regular training for PDAMs.
Operational		
LA Schedule 5, para. 12.c; Covenant No. 33: The O&M activities of a subproject initially under a transitional water supply management unit (BPAM) will be transferred to a PDAM after normally not more than three years and a maximum of five years of operation by the BPAM.	Being complied with. Project facilities have been transferred from BPAMs to PDAMs normally promptly after the completion of the two-year training for staff and the additional assistance in O&M, both provided by the Government according to the relevant standard requirements. In some cases, the transfer turned out to be premature for the IKK (subdistrict capital) operations to become fundamentally self-financing. Of 154 Project IKKs, 10 in East Timor and 8 in East Nusa Tenggara had not completed the transfer, although all are expected to be complete within the five-year maximum preparation period.	Complied with. All project facilities have been transferred to respective PDAMs. Most project facilities have been operated adequately. Financial performance of many PDAMs has improved after the Project. No data were available on facilities in East Timor and East Nusa Tenggara.
LA Schedule 5, para. 15; Covenant No. 35: DGHS to undertake project benefit monitoring and evaluation (BME) in accordance with a project BME system agreed upon between DGHS and ADB with data collection done through the Water Enterprise Information System (SIMPAM).	Complied with. Data were collected through SIMPAM and compiled and analyzed in the final BME report prepared in June 1995.	Partly complied with. Covenant not clear. Objective not fully achieved. Physical performance has been monitored and reported properly, but benefit monitoring focusing on impacts and project performance management needs to be operationalized.

ANALYSIS OF PROJECT PDAMs

Table A4.1: Summary of Characteristics of Project *Kabupatens*, PDAMs, and IKKs

Item	Unit	Minimum	Maximum	Average
A. *Kabupatens*[a]				
Population	1,000 persons	194	1,234	686
Urbanization Ratio	%	10	46	27
Average Household Size	Number	4.0	4.6	4.3
Water Supply Coverage	%	1	21	9
Average Household Consumption	l/day	389	862	550
Per Capita GRDP	Rp million	2.16	6.38	3.26
Annual GRDP Growth (1998)	%	-12.7	7.8	-5.1
B. PDAMs[a]				
Service Coverage	%	2	13	7.3
No. of Employees/1,000 Customers	Number	6	27	14
Raw Water Quantity	l/sec	103	342	198.7
Water Treatment Capacity	l/sec	20	265	104.5
Water Loss	%	14	54	32.3
Average Household Consumption	l/day	389	862	533.6
Base Tariff	Rp/m^3	250	700	412.2
Large User Factor	Ratio	1.2	2.6	1.9
Net Income Ratio[b]	Ratio	-0.3	0.8	0.0
C. IKKs[c]				
Population Served	Number	2,650	74,005	23,313
Service Coverage	%	2.4	81.4	27.7
NRW[d]	%	3.4	52.1	28.6
Average Tariff Paid by Household[e]	Rp/m^3	147.5	2,387.3	782.8

GRDP = gross regional domestic product, IKK = subdistrict capital, l/sec = liters per second, m^3 = cubic meter, NRW = nonrevenue water, PDAM = local water supply enterprise, Rp/m^3 = rupiah per cubic meter.

[a] 49 PDAMs/*kabupatens* were covered under the Project; 11 were surveyed by the OEM.

[b] Net Income Ratio = $\frac{\text{Operational Revenues} - \text{Operational Expenses}}{\text{Operational Revenues}}$

[c] 149 IKKs were covered under the Project; 32 were surveyed by the OEM.

[d] Excludes technical losses in some cases as production capacity is not metered.

[e] For both house connections and standpipes. Standpipes are not metered and users pay a low flat monthly fee, usually Rp1,000 per household. In some IKKs, for example Musuk, the local government pays the fee to the PDAM and users are not charged.

Table A4.2: Socioeconomic Characteristics of Selected Project Kabupatens

Province		Central Java		Yogyakarta		South Sumatra					South Kalimantan		
Item \ Kabupaten	Unit	Boyolali[a]	Klaten[a]	Sleman[a]	Bantul[a]	Lematong	Musi Banyasin[a]	Bangka	Ogan Komering Ulu	Ogan Komering Ilir[a]	Banjar	Hulu Sungai Selatan[a]	Kotabaru[a]
Total Population	no.	902,265	1,234,113	828,960	769,663	692,429	1,058,506	552,866	1,072,304	919,150	516,761	193,924	384,744
Urbanization Ratio	%	26	10	—	—	31	46	19	15	—	23	44	25
Population Density	no./ha	8.9	18.8	15.7	15.1	0.7	0.4	0.5	0.8	0.4	1.0	1.1	0.3
Average Household Size	no.	4.3	4.6	4.2	4.2	—	—	—	—	4.6	4.3	4.0	4.1
Pupils to Teacher Ratio		16.8	15.4	15.1	16.9	25.0	28.0	22.2	26.5	26.5	18.7	—	20.8
Pupils/Population	%	10.5	10.1	9.2	9.5	16.4	16.3	16.0	15.3	14.9	7.1	—	13.9
Population/Physician	1,000	12.2	9.6	—	9.3	10.2	19.6	10.8	16.5	15.1	—	—	11.0
Water Supply Coverage	%	9	9	11	7	9	1	10	5	3	11	21	9
Average Household Water Consumption	l/day	598	644	389	424	—	732	489	505	485	510	413	862
Per Capita GRDP[b]	Rp million	2.3	2.2	3.2	2.3	4.8	3.0	4.7	2.4	2.5	3.0	2.4	6.4
GRDP Growth 1995-97	% p.a.	4.3	4.9	5.9	4.9	5.5	4.5	9.8	4.6	7.6	6.2	4.9	8.3
1998	% p.a.	-9.5	-11.4	-8.0	-12.7	-0.2	-3.2	-5.5	-6.4	-2.5	-4.6	-4.7	7.2

GRDP = gross regional domestic product, /ha = per hectare, l = liter, — = not available, no. = number, p.a. = per annum, PDAM = local water supply enterprise.

[a] Covered by the Operations Evaluation Mission survey, 2001.

[b] Without oil and gas.

Sources: *Kabupaten* Statistics (Dalam Angka), 1998 and 1999.

Table A4.3: Characteristics of Selected Project PDAMs

Province			Central Java		Yogyakarta		South Sumatra				
Item / PDAM		Unit	Boyolali[a]	Klaten[a]	Sleman[a]	Bantul[a]	Lematong Enim	Musi Banyusin[a]	Bangka	Ogan Komering Ulu	Ogan Komering Ilir[a]
Average Household Consumption		l/day	598	644	389	424	296	732	489	505	485
No. Employed/ 1,000 Customers		no.	8	6	14	13	12	26	13	15	15
Service Coverage[b]		%	9	9	11	7	9	1	10	5	3
Raw Water		l/sec	135	253	262	342	238	1,000	203	178	153
Sources	river	%	67	0	0	6	83	96	10	92	54
	springs	%	26	70	12	7	4	0	90	0	0
	deep wells	%	7	30	88	87	13	0	0	3	46
	lakes	%	0	0	0	0	0	4	0	6	0
WTP		no.	1	1	23	6	14	9	9	15	15
		l/sec		20	265	60	197	75	202	200	83
Water Loss Ratio		%	18	14	29	40	36	22	17	27	36
Base Tariff		Rp/m^3	400	250	300	450	490	350	400	350	450
Large User Factor[c]		Ratio	2.0	2.0	2.6	1.8	2.1	1.3	1.8	2.5	1.4
Net Income Ratio[d]		Ratio	-0.13	-0.02	0.02	-0.04	0.09	-0.12	-0.11	-0.06	-0.34

l/sec = liter per second, PDAMs = local water supply enterprises, Rp/m^3 = rupiah per cubic meter, WTP = water treatment plant.

[a] Covered by the Operations Evaluation Mission survey.

[b] Includes distribution in urban and other areas.

[c] For the purpose of this analysis, the proportion of large users is defined as follows:

$$\text{Large User Factor (LUF)} = \frac{\text{Total annual revenue}}{\text{Base tariff x Total annual water consumption}}$$

LUF measures the comparative importance, in the total revenue, of larger consumers who pay higher water tariffs. LUF greater than 1.5 implies that the PDAM serves predominantly middle-income groups.

[d] $$\frac{\text{Operational Revenues - Operational Expenses}}{\text{Operational Revenues}}$$

Table A4.3: Characteristics of Selected Project PDAMs (continued)

Province			South Kalimantan				
Item \ PDAM		Unit	Banjar	Hulu Sungai Selatan[a]	Kotabaru[a]	Tapin	Hulu Sungai Tengah
Average Household Consumption		l/day	510	413	862	486	452
No. Employed/1,000 Customers		no.	8	8	9	8	16
Service Coverage[b]		%	11	21	9	29	12
Raw Water		l/sec	390	10,000	135	105	78
Sources	river	%	90	100		95	99
	springs		0	0	0	0	0
	deep wells		10	0	0	0	0
	lakes		0	0	0	5	0
WTP		no.	4	9	6	8	8
		l/sec	120	125	110	105	77
Water Loss Ratio		%	46	19	23	15	29
Base Tariff		Rp/m^3	350	375	250	300	370
Large User Factor[c]		Ratio	2.6	2.5	2.5	2.9	1.8
Net Income Ratio[d]		Ratio	0.28	0.01	0.01	-0.40	-0.41

l/sec = liter per second, Rp/m^3 = cubic meter, PDAM = local water supply enterprise, WTP = water treatment plant.

[a] Covered by the Operations Evaluation Mission survey.

[b] Includes distribution in urban and other areas.

[c] For the purpose of this analysis, the proportion of large users is defined as follows:

$$\text{Large User Factor (LUF)} = \frac{\text{Total annual revenue}}{\text{Base tariff x Total annual water consumption}}$$

LUF measures the comparative importance, in the total revenue, of larger consumers who pay higher water tariffs. LUF greater than 1.5 implies that the PDAM serves predominantly middle-income groups.

[d] $$\frac{\text{Operational Revenues - Operational Expenses}}{\text{Operational Revenues}}$$

Table A4.3: Characteristics of Selected Project PDAMs (continued)

Province / Item	PDAM	Unit	West Nusa Tenggara				Lampung		
			Sumbawa[a]	Lombok Barat	Lombok Tengah	Lombok Timur	Lampung Tengah[a]	Lampung Utara[a]	Lampung Selatan
Average Household Water Consumption		l/day	427	819	800	694	456	517	498
No. Employed/1,000 Customers			19	6	16	11	16	27	18
Service Coverage[b]		%	13	18	4	5	3	2	1
Raw Water		l/sec	225	1,660	120	10	180	103	111
Sources	river	%	71	0.01	0	100	26	28	1
	springs		14	99.9	100	0	37	16	74
	deep wells		14	0	0	0	37	55	24
	lakes		0	0	0	0		0	0
WTP		no.	3	0	0	1	7	12	1
		l/sec	75	0	120	10	120	103	50
Water Loss Ratio		%	42	32	28	52	35	54	40
Base Tariff		Rp/m^3	350	350	350	310	560	700	300
Large User Factor[c]		Ratio	2.1	3.1	1.5	1.6	1.3	1.2	2.1
Net Income Ratio[d]		Ratio	0.07	0.96	-1.39	0.36	-0.15	0.82	-0.35

l/sec = liter per second, Rp/m^3 = rupiah per cubic meter, PDAM = local water supply enterprise, WTP = water treatment plant.

[a] Covered by the Operations Evaluation Mission survey.

[b] Includes distribution in urban and other areas.

[c] For the purpose of this analysis, the proportion of large users is defined as follows:

$$\text{Large User Factor (LUF)} = \frac{\text{Total annual revenue}}{\text{Base tariff x Total annual water consumption}}$$

LUF measures the comparative importance, in the total revenue, of larger consumers who pay higher water tariffs. LUF greater than 1.5 implies that the PDAM serves predominantly middle-income groups.

[d] $\frac{\text{Operational Revenues - Operational Expenses}}{\text{Operational Revenues}}$

FINANCIAL REEVALUATION

1. Financial internal rates of return (FIRRs) were not estimated in the appraisal report. The project completion report (PCR) reported FIRRs for two representative IKK (subdistrict capital) water supply systems: a large system (10 liters per second [l/s] capacity) and a small system (5 l/s capacity). The FIRRs were 6 percent and 5.5 percent, respectively. The PCR used a cost of borrowing of 4.5 percent (PCR, para. 28) as the benchmark for financial efficiency. The Operations Evaluation Mission (OEM) recalculated the FIRRs of two extreme cases of IKK water supply systems in Central Java to see the levels of financial performance of typical subprojects for a 25-year useful life. The PPAR uses actual data provided by PDAMs (local water supply enterprises) on the production, distribution, house connections, total revenue, and the construction and operation and maintenance (O&M) costs for the years 1997 to 2000 (Tables A5.1-A5.3). The analysis has been made in 2001 constant prices. Although the Government provided financing for the Project on a grant basis to the PDAMs, the average cost of capital of 2.5 percent was estimated from the average cost of capital for local governments, 11.5 percent, adjusted to real terms using the local inflation rate of 9 percent.

2. **Delanggu.** This subproject, with ample and good quality water from springs, is one of the best. The operational data are as in Table A5.1 and the relationships between production, house connections, total revenue, and O&M costs in future years are based on actual data for 1997-2000. In the absence of actual data for individual subprojects, conservative assumptions have been made. The construction cost is derived as Rp2,340 million, which is $65 average project cost per capita of service population in 1990 prices (as calculated in the PCR) times the targeted service population of 18,000, which would be clearly an overestimation for this simple springs-based subproject. The O&M costs are Rp230/m^3 in 1990 prices of water produced, which is also an overestimation. The base tariff was Rp325/m^3, in 2000. The average tariff increases by about 7.5 percent/year, equivalent to 26 percent every three years, which is a modest assumption, as this is not an increase in the base tariff. The increase is mostly due to an increasing number of larger users paying higher tariffs. The FIRR was 5.4 percent. The details are presented in Table A5.2.

Table A5.1: Operational Performance of Delanggu Subproject

Item	Unit	1997	1998	1999	2000	Target
Water Production	l/sec	9.9	11.4	14.5	21.5	25.0
Service Population	Number	6,762	8,136	10,074	13,692	18,000
No. of House Connections	Number	1,081	1,323	1,407	2,188	3,000
Unit O&M Costs	Rp/m^3	355	235	232	199	199
Average Tariff	Rp/m^3	330	391	402	410	410
Unaccounted for Water	%	25.0	18.1	27.9	25.9	25.0
House Connection Fee[a]	Rp x 10^3/hh	0	108	259	82	82

hh = household, l/sec = liter per second, m^3 = cubic meter, O&M = operation and maintenance.

[a] Calculated as $\frac{\text{(Total revenue) - (Total billing)}}{\text{(Incremental house connections)}}$

Table A5.2: Financial Internal Rate of Return for Delanggu Subproject

Year	Production (l/sec)	UFW (%)	Capital Cost (Rp x 10^6)	O&M Costs (Rp x 10^6)	HC Fee Revenue (Rp x 10^6)	Tariff Revenue (Rp x 10^6)	Net Cash Flow (Rp x 10^6)
1993			2,340				(2,340.0)
1994	7.0	30		50.8	0	40.9	(9.9)
1995	8.0	30		58.0	14	50.3	6.3
1996	9.0	28		65.3	18	62.3	15.0
1997	10.0	25		72.5	22	84.0	33.5
1998	11.5	25		83.4	27.5	96.6	40.7
1999	14.5	25		105.2	34.4	130.3	59.5
2000	21.5	25		155.9	42.9	208.5	95.5
2001	25.0	25		181.3	107.6	260.2	186.5
2002	25.0	25		181.3	94.2	280.9	193.8
2003	25.0	25	234	181.3	0.0	301.6	(113.7)
2004	25.0	25		181.3	0.0	325.2	143.9
2005	25.0	25		181.3	0.0	348.9	167.6
2006	25.0	25		181.3	0.0	372.5	191.2
2007	25.0	25		181.3	0.0	402.1	220.8
2008	25.0	25		181.3	0.0	431.6	250.3
2009	25.0	25		181.3	0.0	464.2	282.9
2010	25.0	25		181.3	0.0	499.6	318.3
2011	25.0	25		181.3	0.0	538.1	356.8
2012	25.0	25	234	181.3	0.0	576.5	161.2
2013	25.0	25		181.3	0.0	620.9	439.6
2014	25.0	25		181.3	0.0	668.2	486.9
2015	25.0	25		181.3	0.0	718.4	537.1
2016	25.0	25		181.3	0.0	771.6	590.3
2017	25.0	25		181.3	0.0	827.8	646.5
2018	25.0	25		181.3	0.0	892.9	711.6
						FIRR	**5.4%**

FIRR = financial internal rate of return, l/sec = liter per second, m^3 = cubic meter, HC = household connection, hh = household, O&M = operation and maintenance, UFW = unaccounted for water.

3. **Musuk.** This subproject, using springs and surface water, is an example of a subproject that faced serious problems with water treatment facilities. The operational data are as in Table A5.3. The service population is 2,500, and the construction cost is derived as Rp325 million following the method for Delanggu. The O&M costs are Rp300/m^3 in 1990 prices of water produced. The unaccounted for water was 10 percent. The base tariff was Rp400/m^3. The average tariff increases by about 5 percent per year. This is a very modest assumption. The house connection fee is Rp100,000 for each new connection; however, there have been no new connections since 1997. Total production capacity has increased from 2.5 l/sec in 1997 to 5 l/sec in 2000. Hours of operation have increased from 8 hrs/day in 1997 to 12 hrs/day in 2000. This subproject may be among the worst cases of financial success. The FIRR was 3.1 percent. The details are presented in Table A5.4.

Table A5.3: Operational Performance of Musuk Subproject

Item	Unit	1997	1998	1999	2000	Target
Water Production	l/sec	5.0	5.0	5.0	5.0	5.0
Average Operating Hours	hours/day	10.3	9.5	9.2	11.9	12.0
Service Population	Number	2,602	2,450	2,450	2,426	2,500
No. of House Connections	Number	317	325	325	321	350
Unit O&M Costs	Rp/m^3	320	473	752	563	563
Average Tariff	Rp/m^3	394	462	479	457	457
Unaccounted for Water	%	11.2	4.7	5.5	12.1	10.0
House Connection Fee	Rp x 10^3/hh	0	0	0	0	0

hh = household, l/sec = liter per second, m^3 = cubic meter, O&M = operation and maintenance.

Table A5.4: Financial Internal Rate of Return for Musuk Subproject

Year	Production (l/sec)	Hours of Operation (hrs)	UFW (%)	Capital Cost (Rp x 10^6)	O&M Costs (Rp x 10^6)	HC Fee Revenue (Rp x 10^6)	Tariff Revenue (Rp x 10^6)	Net Cash Flow (Rp x 10^6)
1993				325.0				(325.0)
1994	2.5	8	15		7.8	0	7.4	(0.4)
1995	3.0	8	14		9.6	19.5	9.5	19.4
1996	4.0	8	13		12.6	19.5	13.5	20.4
1997	5.0	8	12		15.9	19.5	18.0	21.6
1998	5.0	9	11		17.7	0.0	21.6	3.9
1999	5.0	10	10		19.8	0.0	25.4	5.6
2000	5.0	11	10		21.6	0.0	29.3	7.7
2001	5.0	12	10		23.7	0.0	33.3	9.6
2002	5.0	12	10		23.7	0.0	35.1	11.4
2003	5.0	12	10	32.5	23.7	0.0	36.9	(19.3)
2004	5.0	12	10		23.7	0.0	39.0	15.3
2005	5.0	12	10		23.7	0.0	40.8	17.1
2006	5.0	12	10		23.7	0.0	42.9	19.2
2007	5.0	12	10		23.7	0.0	45.1	21.4
2008	5.0	12	10		23.7	0.0	47.5	23.8
2009	5.0	12	10		23.7	0.0	49.7	26.0
2010	5.0	12	10		23.7	0.0	52.5	28.8
2011	5.0	12	10		23.7	0.0	55.0	31.3
2012	5.0	12	10		23.7	0.0	57.8	34.1
2013	5.0	12	10	32.5	23.7	0.0	60.7	4.5
2014	5.0	12	10		23.7	0.0	63.2	39.5
2015	5.0	12	10		23.7	0.0	67.1	43.4
2016	5.0	12	10		23.7	0.0	70.2	46.5
2017	5.0	12	10		23.7	0.0	73.8	50.1
2018	5.0	12	10		23.7	0.0	77.7	54.0
							FIRR	**3.1%**

FIRR = financial internal rate of return, l/sec = liter per second, m^3 = cubic meter, HC = household connection, hh = household, O&M = operation and maintenance, UFW = unaccounted for water.

ACTIONS TAKEN ON THE RECOMMENDATIONS IN THE PROJECT COMPLETION REPORTS[a]

Recommendations	Operations Evaluation Mission Observations (2001)
1. Add appropriate process to the treatment facilities provided to remove high level of iron. Local water supply enterprises (PDAMs) should ensure that adequate funds are available for their purpose.	Modular water treatment facilities have been installed for deep well-based subprojects in Central Java, Yogyakarta, and South Sumatra to remove iron and manganese by aeration, sedimentation, and filtration. Iron and manganese removal from deep well water has been generally successful, although limited cases of degraded filters are reported.
2. Some PDAMs lack financial capacity to undertake necessary actions as above and appropriate funds may have to be made available from local governments or other appropriate sources.	Financial performance of many PDAMs has improved after the Project. Profit transfer to local governments is a constraint for PDAMs to attain financial autonomy.
3. Actual numbers of house connections and standpipes installed were considerably less than envisaged at appraisal. Also, more than half the installed connections remained inactive at completion review in 1993. This led to considerably lower revenues for PDAMs concerned than originally expected.	Most public standpipes installed in subprojects serving peri-urban and urbanizing areas have been either converted to house connections or abandoned. Even for operational standpipes, the number of users is smaller (usually up to 15 households or 70 people) than originally envisaged (100 people). Users of standpipes organized themselves into groups, and their representatives collect user fees (usually a flat rate).
4. Change currently installed flow restrictors to meters. PDAMs should set aside adequate funds for the purpose.	Flow restrictors were not used in the Second IKK Water Supply Sector Project.
5. PDAMs should exert efforts to reduce unaccounted for water (UFW), improve billing and collection, and make appropriate tariff revisions.	UFW is reported to be less than 25 percent (usually about 10 percent) for new piped systems. Collection efficiency is generally good. Tariffs could be increased further, as people are willing to pay for the service.
6. Customer needs and preferences should be addressed (e.g., preference for individual house connections instead of standpipes) through proper consultation.	Community consultation was conducted in many subprojects through nongovernment organizations, community leaders, and selected residents to determine water sources, locations of public standpipes, service coverage, and balance between house connections and standpipes.
7. Progress of house connections and related tertiary distribution systems has been slower than envisaged at appraisal.	House connections within the Project have increased steadily after the project completion by PDAMs' own efforts and funds, often exceeding the original targets for some subdistrict capitals (IKKs). Marketing and public campaigns for safe water and offering of credit schemes have helped increase house connections in some subprojects.

[a] For Loans 731-INO: *IKK Water Supply Sector Project* and 1069-INO: *Second IKK Water Supply Sector Project*.

Recommendations	Operations Evaluation Mission Observations (2001)
8. Delays in transfer of project facilities to respective PDAMs should be avoided.	All the project facilities have been transferred to their respective PDAMs.
9. Advanced training for staff operating IKK water supply facilities should be provided.	Regular training has been conducted by PDAMs. Some follow-up training is also being conducted by the National Association of PDAMs.
10. New water sources for service expansion should be developed.	Some project PDAMs have plans to tap new water sources to expand service areas. Improvement of supply systems installed under the Project is contemplated by some PDAMs.
11. Regular review of water tariffs should be undertaken to improve financial sustainability.	Water tariffs were raised by many PDAMs after the economic crisis that started in 1997.
12. Public campaign to promote use of safe water distributed by PDAMs should be strengthened.	Marketing and public campaigns for safe water have been successful in increasing house connections in some subprojects.