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PERFORMANCE AUDIT REPORT

INDIA

**KERALA WATER SUPPLY AND SANITATION PROJECT
(CREDIT 1622-IN)**

May 29, 1998

Operations Evaluation Department

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Currency Equivalents (annual averages)

Currency Unit = India Rupee (Rs)

1985	US\$ 1.00	Rs 11.00 (at appraisal June 1985)
	US\$ 0.909	Rs 1.00
1994	US\$ 1.00	Rs 30.85 (at project close March 1994)
	US\$ 0.0324	Rs 1.00
1997	US\$ 1.00	Rs 36.18 (at project audit October 1997)
	US\$ 0.0276	Rs 1.00

Abbreviations and Acronyms

AIC	average incremental cost
DMA	Directorate of Municipal Administration
DP	Directorate of <i>Panchayats</i>
ERR	economic rate of return
GOI	Government of India
GOK	Government of Kerala
IDWSSD	International Drinking Water Supply and Sanitation Decade
KWA	Kerala Water Authority
LCS	low-cost sanitation
LIC	Life Insurance Corporation of India
OED	Operations Evaluation Department
PHED	Public Health Engineering Department
PMU	Project Management Unit
PWD	Public Works Department
ROR	rate of return
TAG	Technology Advisory Group
UNDP	United Nations Development Program
WHO	World Health Organization

Fiscal Year

Government: April 1–March 31

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Office of the Director-General
Operations Evaluation

May 29, 1998

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

**SUBJECT: Performance Audit Report on India
Kerala Water Supply and Sanitation Project (Credit 1622-IN)**

Attached is the Performance Audit Report prepared by the Operations Evaluation Department (OED) on the India Kerala Water Supply and Sanitation Project (Credit 1622-IN) involving an IDA Credit for SDR 42.70 million equivalent to the Government of India which was approved on July 16, 1985, and closed on March 31, 1994, after four extensions. In December 1991, SDR 20.00 million was canceled, and SDR 21.69 was disbursed out of the remaining SDR 22.70 million.

During project preparation, circumstances in Kerala appeared particularly appropriate for a state-wide water supply and sanitation project when the state government created a new agency, the Kerala Water Authority (KWA). KWA was given clear authority to function semi-autonomously, and assigned responsibility for production, distribution, and retail sale of water services. The broad aim of the project was to strengthen the institutional, operational, and financial performance of KWA. About 75 percent of credit proceeds went to rural water supply components for communities that had no piped water as well as to those that had unsafe or distant sources of supply. A small urban water supply component was also included as were pilot low-cost sanitation works.

The specific objectives of the project involved (a) promoting staff training, reducing water wastage, and improving accounting systems and financial targets; (b) providing piped water supplies to about one million people in seven rural areas; (c) increasing the supply of water and extending the distribution facilities in the city of Quilon (about 150,000 new users); and (d) financing twin pit water-seal latrines facilities for about 200,000 people in 10 urban areas and a number of rural villages.

Even after three years' of project extensions, physical works had remained incomplete. Institutional development and financial management and accounting aspects also showed little progress. Sources of delays included inadequate organization and management, fast staff turnover, lack of counterpart finance, land acquisition difficulties and poor procurement administration practices. Four years after credit closing, the Audit found a much improved situation because many of the things that were supposed to happen during the project cycle took place later.

During the period since credit closing KWA made a series of administrative improvements that should ensure continuing institutional development and better service to its customers. KWA also achieved greater financial self-reliance following two tariff increases, began enforcing key regulations, and aggressively collecting accounts receivable. Only two of the seven rural schemes were fully completed at credit closing. The remaining five have finally been commissioned. Staff training is now a major activity, financial management is much improved, staff openings in critical areas have been filled, and there is a significant improvement in health status in the rural areas.

An important lesson learned is that changes are necessary in the relationship between state government and KWA, so that public organizations can begin paying their utility bills, and KWA can stop borrowing to pay normal operating expenditures. The Audit also analyzed how investments in piped rural water schemes can lead to increased densification and higher land and housing prices, especially if the intervention is highly localized. This means that estimates of population growth rates may be necessary but not sufficient to establish future usage patterns and trends during rural water system design.

The audit rates project outcome as marginally satisfactory, sustainability as uncertain, and institutional development impact as substantial. This differs from the ICR, which rated outcome as unsatisfactory, sustainability as likely, and institutional development as modest. OED's evaluative memorandum on the ICR also downgraded the sustainability rating to uncertain.

Robert Picciotto by
Elizabeth McAllister

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This report was prepared by Ronald Parker (Task Manager), who audited the project in December 1997. Nalini Kumar and Reno Dewina (consultants) provided research support. Helen Watkins furnished administrative support.

Principal Ratings

	<i>ICR</i>	<i>Audit</i>
Outcome	Unsatisfactory	Marginally Satisfactory
Sustainability	Likely	Uncertain
Institutional Development	Modest	Substantial
Borrower Performance	Unsatisfactory	Satisfactory
Bank Performance	Unsatisfactory	Unsatisfactory

Key Staff Responsible

	<i>Task Manager</i>	<i>Division Chief</i>	<i>Country Director</i>
Appraisal	V. Saravanapavam	Sven Sandstrom	Enrique Lerdau
Midterm	Chris Couzens	No Midterm Review	No Midterm Review
Completion	Shyamal Sarkar	Robert Panfil	Heinz Vergin

Preface

This is a Performance Audit Report (PAR) on the Kerala Water Supply and Sanitation Project, involving an IDA Credit for SDR 42.70 million equivalent to the Government of India. The Credit was approved on July 16, 1985, and closed on March 31, 1994, after four extensions. In December 1991, SDR 20.00 million was canceled, and SDR 21.69 was disbursed out of the remaining SDR 22.70 million.

The PAR was prepared by the Operations Evaluation Department (OED). It is based on the President's Report, Staff Appraisal Report, sector and economic reports, special studies, Country Strategy and Policy Framework Papers, the loan documents, review of the project files, and discussions with Bank staff. An Implementation Completion Report (ICR, Report No. 14873, dated June 30, 1995) was prepared by the South Asia Region. An OED mission visited India in November and December of 1997 and discussed the effectiveness of the Bank's assistance with government officials, other development organizations, bilateral donors, beneficiaries, and stakeholders. Their kind cooperation and invaluable assistance in the preparation of this report are gratefully acknowledged.

The ICR provides an account of the project experience and covers project design, the role of the Bank, achievements, and sustainability. The PAR focuses on the impacts of the project in the rural areas, discusses low-cost sanitation, catalogues institutional development progress in the three and a half years since the July 1994 ICR mission. It assesses the quality of the design of the intervention approach, including its consistency with the problems identified. It considers the effectiveness of the Bank and borrower dialogue; reflects on the borrower's ownership, consensus, and commitment; and determines the effectiveness of the various project subcomponents.

Copies of the draft PAR will be sent to the relevant government officials and agencies concerned for their review and comments. Comments received will be attached as Annex C.

1. Background

Kerala

1.1 The State of Kerala is located on a narrow stretch of land along India's southwest coast. In 1981 the population of Kerala was estimated to be 25.5 million (a density of 650 people per square kilometer), with about 17 percent of the people living in urban areas. Since the early 1970s, Kerala's rural population has increased by 1.8 percent annually.¹ There are 1,000 rural *panchayats* (local government areas) with an average population of 25,000. The 1991 census put the state's population at 29 million. Locals joke that Kerala has urban and "rurban" areas, the point being that the rural areas are so densely populated in many zones that they are indistinguishable from the cities. Moreover, local preference for detached housing with trees and agricultural plantings in the cities leads to relatively low urban densities and settlement patterns not too different from those of the villages. On the other hand, some so-called rural settlements have more than 2,000 people per square kilometer (km²).

1.2 Unlike many other states in India, Kerala has generally satisfactory water resources—due to its tropical climate and the fact that the state receives rainfall from both the southwest and northwest monsoons. Forty-one rivers flow down from the mountains on the state's eastern border. During periods of low flows, however, these rivers are subject to tidal and saline intrusion, which makes many of them unsuitable for either irrigation or domestic consumption in the coastal areas just when they are most needed.

1.3 The average annual per capita income in the mid-1970s was 10 percent below the India average,² but many social and physical indicators were (and remain) above average. The state's literacy rate is over 75 percent compared with the India average of 47 percent. Girl's school attendance³ is nearly 90 percent. According to the 1991 Census of India, Kerala's weighted average life expectancy is 69.5 years (women 72.3, men 66.8). Although the people of Kerala are quite healthy, droughts and epidemics can still increase (sometimes quite sharply) the incidence of disease in a particular year. The state gets its name from the local word for coconut palms, which are ubiquitous. Rubber trees are also common, as are rice paddies. The state's economy is dominated by agriculture, which accounts for 44 percent of the state's net domestic product. Nearly 25,000 km² or two-thirds of the land in Kerala, is farmed; of this, 7,000 km² is irrigated.

Sector Context

1.4 The Government of Kerala (GOK) adopted the Government of India's (GOI's) proposed targets for the United Nation's International Drinking Water Supply and Sanitation Decade, and made a major commitment to upgrading sector conditions. In its Sixth Five Year Plan (1980-85), the state allocated seven percent of total investment to the sector (double the amount provided in

1. Urban population has grown at an average rate of 2.3 percent a year (14 towns have populations of more than 50,000). The largest municipality is Cochin with a population of about 515,000; the capital, Trivandrum, has a population of about 480,000.

2. Rs 988 (1981).

3. Ages 6-14.

the previous plan, and close to double the corresponding national figure). The emphasis of GOK's investment program has been on water supply rather than sanitation. Because rural systems are less expensive to build, the per capita investment in rural water supply has been only about half that for urban water supply.

1.5 *Pre-project conditions.* Before the project, 76 percent of the urban population received a piped water supply (1983 figures), while the proportion of the rural population receiving a piped supply was still only about 31 percent. The rest of the population (both urban and rural) relied on shallow wells or streams for their supply. There were 33 piped water supply systems in the state; all but three relied on surface water. Studies conducted by the national and state hydrogeological departments indicate that, although groundwater exists in the coastal belt, only one localized aquifer between Quilon and Alleppey is capable of yielding good quality water in appreciable amounts.⁴ In other areas of the coastal region, tubewell yields are low and unreliable, and the quality of the extracted water is poor. In terms of urban sanitation, few people were without some type of permanent disposal facility. This was achieved by means of septic tanks (about 40 percent) and latrines (serving approximately 53 percent). Two cities, Trivandrum and Cochin, had waterborne sewerage systems. About 37 percent of the population outside city limits used pit latrines and, apart from a few water-seal latrines, the remainder of the rural population had no sanitary facilities whatever.

1.6 During project preparation, circumstances in Kerala appeared particularly appropriate for a state-wide water supply and sanitation project. The GOK formed the Kerala Water Authority (KWA) out of the Public Health Engineering Department (PHED), which until that time had been part of GOI. KWA was given clear authority to function as the semi-autonomous agency for the sector throughout the state and assigned responsibility for production, distribution, and retail sale of water services. KWA has a statutory obligation to run as a commercial operation.

1.7 Although this was the Bank's first intervention in Kerala, Bank involvement in the water supply and sewerage sector in India began in 1973 with the Bombay Water Supply and Sewerage Project (Credit 390-IN of January 1974). Since then, the Bank has made 21 loans and credits to India totaling US\$1,917 million for water supply and sewerage projects (see Annex B).

The Project

1.8 The broad aim of the project was to improve institutional, operational, and financial performance throughout the water supply and sanitation sector in Kerala, while also tackling specific, identified, physical needs. The project water supply components were directed to rural communities that had no piped water as well as to those that had unsafe or distant sources of supply. About 75 percent of the project's funds were allocated to this component. A small urban water supply component was also included to upgrade and extend an existing system.

1.9 The specific objectives of the project were to (a) help strengthen sector-wide management in the newly created KWA and in municipalities⁵ operating their own distribution systems (by

4. Tubewell yields of 40–95 cubic meters per hour (m³/h).

5. The 10 municipalities covered under the credit are the 10 largest towns in Kerala (except for Trivandrum). With one exception, they own their water systems; Cochin is unique in owning only the distribution system. In Trivandrum, the systems are state-owned.

promoting staff training, reducing water wastage, and improving accounting systems and financial targets); (b) provide piped water supplies to about one million people in seven rural areas; (c) increase the supply of water and extend the distribution facilities in one urban area (Quilon) to about 150,000 people; and (d) introduce low-cost on-site sanitation facilities and finance their construction so as to benefit about 200,000 people in 10 urban areas and to undertake a similar pilot program for low-cost sanitation in rural areas.

Issues During Project Preparation

1.10 *Limited groundwater expensive to extract.* Careful consideration was given to selection of the project's water sources. Studies for groundwater development conducted by PHED/KWA indicated that, whereas the capital costs would be comparable to those for surface water sources, the operating costs would be high, making groundwater extraction uneconomic even in cases where groundwater was available. Surface water sources were selected for all seven water supply schemes. In five of the seven cases, the availability of water depended on other major impounding projects (hydroelectric, irrigation, or water supply) being completed.

1.11 *Waterborne sewerage too costly and wasteful.* Low-cost sanitation components were included in the project as pilot programs for both urban and rural areas. In view of the high cost of waterborne sewerage systems where treatment takes place far from the source (and the other more pressing priorities in the sector), the project included no sewerage component. The water seal household units provide many of the advantages of more expensive approaches (such as reduction of disease vectors, insects and odors).

1.12 *Problem villages.* In determining priorities for the development of individual water supply schemes, the GOK focused on meeting the needs of "problem villages." The GOI defines "problem villages" as those that lack a reliable supply within a depth of 15 meters or a distance of 1.5 kilometers; or those in which the supply either has a high incidence of water-related disease or contains excessive fluorides, iron, or chlorides. For the project, the GOK identified priority areas comprising rural areas that have a high proportion of problem villages together with urban areas that have poor existing supplies. About 80 percent of the rural water supply schemes financed under the loan were for villages in the "problem village" category. The discussion of project health impacts below needs to be understood within the context that not all project villages had a high incidence of water-related health problems at the outset.

1.13 *Cost Recovery from Non-connected Users.* Quilon, the urban project area, levied a tax of 4 percent of the annual estimated rental value of buildings. The funds generated by this tax were used to pay for the water used at public standposts—essentially taps in public areas where people could fill containers and carry water home. Many rural villages followed the same approach, but the money was usually spent on urgent local priorities, and funds rarely made it to KWA.

1.14 Water systems were designed to accommodate urbanization and densification. To help determine appropriate supply levels rural areas were divided into two categories: stable and developing. The stable areas were expected to remain at their current population density over the project period and to generate limited industrial and commercial demand for water supply. The developing rural areas were expected to grow rapidly, either because they lie close to existing major towns that were expected to expand their zone of influence into the adjacent rural areas or because there was a strong pent-up demand for housing (due to lack of available water). Therefore these schemes were designed with over-capacity, expecting that larger populations would

materialize to use the spare capacity. The schemes for Kottayam and Quilon *panchayats*⁶ and the Greater Cochin Development Area (GCDA) were categorized as developing rural areas; Puthencruz, Adoor, Chithara, Vilappil, and the other remaining rural areas were categorized as stable rural areas.

Project Components

1.15 The principal project components are summarized below according to type of target area:

- Design and construct new piped water schemes. Each scheme relied on a single source and included an intake, treatment plant, transmission, distribution networks, storage and reservoirs, and meters.
- Urban System - Design and construct a scheme (intake, treatment plant, transmission, distribution networks, storage, and meters) to augment water supply to the Quilon Municipality.
- Urban Low-Cost Sanitation - Develop a prototype subproject to provide low-cost sanitation facilities to 10 towns.
- Rural Low-Cost Sanitation - Develop a similar prototype subproject for rural areas.
- Technical Assistance - Provide assistance to KWA and to the municipalities (which operate their own distribution systems) in developing sector-wide training services. Other centralized services included leak detection units, meter repair facilities, workshops, and laboratories. In addition, consulting services were included for implementation of comprehensive financial systems, training in these systems, evaluation of KWA's assets, and a state-wide water tariff audit.

6. Quilon *panchayats* shared the production facilities of the Quilon Municipality.

2. Implementation and Results

2.1 The ICR noted that the original project implementation schedule (1985–90) was too optimistic and that, even after three years' worth of project extensions, project implementation had remained incomplete. It also observed that the physical targets of the project had been substantially achieved at the time of credit closing, but the institutional development and financial management and accounting aspects had been inadequately resourced during the implementation period, which caused significant delays. Additionally, the ICR classified the detailed engineering preparation as inadequate. The key factors under GOK/KWA control (cited by the ICR) that contributed to delays were:

- imposition of excessive GOK control over the nominally autonomous KWA;
- inadequate organization and management by GOK/KWA;
- high staff turnover;
- lack of counterpart finance;
- land acquisition difficulties;
- inadequate experience in program management and contract scheduling; and
- poor procurement administration practices.

2.2 The ICR rated project outcome as unsatisfactory. Only two water supply schemes (about 30 percent of the total project scope) had been fully commissioned by the time of the ICR mission (July 1994).

Audit Findings

2.3 The audit mission in December 1997 found that, although one minor work remained unfinished, all the schemes were operating.⁷ While leak control remains a problem, safe water is being reliably provided to the target population (during set hours).⁸ Annex B summarizes the status of each scheme.

Finance and Accounting

2.4 The business areas most cited by staff as having improved because of KWA's participation in the Bank credit-financed activities are finance and accounting. Before appraisal, GOK had hired local consultants to help the newly created KWA set up accrual financial systems, do preliminary financial and socio-economic studies, and review organizational structure. Involved staff cited Aide Memoires written by one Bank task manager as having had a major impact in documenting problems and pointing the way to solutions as these and other improved procedures evolved into routine practice.

⁷ While the storage tank is under construction, the scheme is being fed by direct pumping, which leads to pressure variations during periods of heavy use.

⁸ Communities that have greatly increased the number of system users face problems giving adequate service to those 5-10 percent of users living at higher elevations.

2.5 One recent development has been the imposition of a late payment charge on water bills. Water regulations were put in place during credit implementation, but there had been no penalty for late payment. Now the regulations are being enforced, there is a penalty for delayed payments and disconnection for delinquent accounts.

2.6 KWA is currently using a commercial system of accounts. Annual balance sheet and income and expenditure accounts have been prepared since FY88.

2.7 Since the ICR mission KWA has significantly strengthened staffing in its Finance and Accounting Department. Where previously two chartered accountants (CPAs) worked largely on their own covering the entire KWA operational area, now six accountants supervise work in a structured department that is supplemented by information processing consultants.

2.8 More visually dramatic by far has been the gradual transition to computerized accounting and a well-designed management information system (MIS). (Current billing and collection results cannot be compared with past practice: the ICR noted that "records do not permit a definitive assessment" but covenanted billing and collection targets were not met by KWA). The audit mission examined rooms filled with crumbling paper receipts and illegible account books with loose and torn pages. Extracting any useful information from the old system was nearly impossible. By contrast, the new Oracle database for the billing and collection system instantly answers questions such as: which are the largest accounts outstanding; which water meters are broken; and how much water is unaccounted for? A meter repair campaign is ongoing, using monthly printouts from the MIS to identify houses with broken meters. Revenue collection is up owing not only to meter repair but also to better billing. Monthly bills totaling about Rs 38 million are sent out by the computerized system, and 35 million are routinely paid in the next 30 days;⁹ most of the rest become current within 60 days. Using information from the system, collection efforts have been able to target the largest debtors and those farthest behind in their payments. All those identified as falling beyond the first threshold have now paid, and a new list with far less flagrant debtors is being targeted for extraordinary collection measures. Staff maintain that the billing is very close to being completely up to date with the notable exception of a few public bodies.

2.9 Hospitals and the medical college do not pay their bills, knowing that service will not be cut off. *Panchayats* have not been paying the fees due for standposts (which mostly serve the poor), waiting for an often-discussed solution for their unfunded mandate problem from the national government. Total arrears from these groups come to about Rs 234 million (about 39 percent of annual revenue).

2.10 Overall, KWA currently has an annual revenue of about Rs 600 million, a GOK grant of Rs 350 million and a gap of around Rs 200 million that it is financing through local borrowing (LIC Life Insurance Corporation).

2.11 Before the Bank credit there had been no tariff revisions for several years. During project implementation, KWA received the authority to revise water tariffs by up to 15 percent annually. Tariffs were raised twice before political pressure was brought to bear to hold the line. At current collection rates tariffs need to be raised 60 percent for KWA to be completely self-sustaining.

⁹ About 92 percent, unusually high for a developing country.

Procurement procedures are expected to become more agile because, for the first time, materials management is being assigned to someone on the chief engineer level.

Training

2.12 Training was an important component in the credit. The preparation of a training plan for KWA by qualified consultants was covenanted. The plan was prepared late and almost nothing¹⁰ was done according to its terms by loan closing. Since the ICR mission, however, training has become a major activity at KWA. Several buildings in Trivandrum have been converted into a training facility. There is a room with eight computers used to train 16 staff members simultaneously in the use of computers for billing and record keeping. The facility is in almost constant use. For fiscal 1998, 63 courses are planned on a range of topics including such titles as Project Management Through Network Analysis, Computer Awareness and Software Applications, Use of Water Quality Testing Kits, Accounting Course at the District Level, Water Treatment Plant Operation, Handling of Chlorine and the Use of Breathing Apparatus, and Dealing with the Public. Topics such as Leak Detection and Reducing Unaccounted For Water have not yet been adequately integrated into the curriculum.

Low-cost Sanitation Component

2.13 The low-cost sanitation (LCS) component began in 1986 in 10 towns selected as pilot sites based on socioeconomic and physical conditions. The following year 10 more towns were added in a second phase. In most towns, Rs 4,000 was given out to beneficiaries in several stages as the construction of the privy went forward. Half of that amount was a grant; the rest was to be repaid. The project planned to build 16,000 units in the urban areas, and an equal number in the rural areas. In addition, a series of consciousness-raising activities were undertaken in environmental hygiene, and all the families originally chosen to receive a unit received educational literature. The total budget for the 32,000 units was divided into smaller allocations (targets) for participating cities and villages, and also divided again into phases I and II. In the first phase, seven of the 10 towns achieved at least 90 percent of the proposed target. The second phase did less well: one town achieved 86 percent of the target, four others accomplished under 50 percent. Out of the estimated total of 16,000 units, 11,730 were built. This represents 73 percent of initial projections. Only 42 percent of LCS units planned in the rural areas were constructed. The cost of the facilities exceeded the amount of the subsidy by Rs 2,000, and many rural families doubted their ability to make the required payment.

2.14 Only Adoor municipality provided data on the inclusion of scheduled castes and scheduled tribes. In that instance, 77 of the 350 units built went to members of those often marginalized groups. Cost recovery has been generally poor, although it has gone better in some areas than others. In Adoor (which reported 350 completed units, not the 223 listed in the ICR), over 50 percent of beneficiaries reportedly had made 60 installment payments and were fully paid. Other areas reported that hardly anyone is bothering to make payments on their latrine.

10. One training course, on handpump repair and maintenance, was given. It was sponsored by UNICEF, and the trainer was a UNICEF consultant.

3. Project Impacts

Densification of Settlement and Increase in Land Values Even in Stable Areas

3.1 Beneficiary interviews during audit mission visits to stable rural areas (para. 1.14) served by the project revealed that as water was being introduced into the various *panchayat* wards, many more homes were built. Quite late in the field visits, the evaluator decided to find out just how stable the stable areas were. Municipal officials in one village offered their assistance: they reviewed land records to ascertain to what extent reality matched the popular perception. Table 3.1 gives the year-end figures based on a review of *panchayat* records.¹¹ Figure 3.1 shows the growth from 1993–97, the period for which data are available on all wards. Average cumulative growth in the three wards for which eight years of data exist was 35.3 percent.

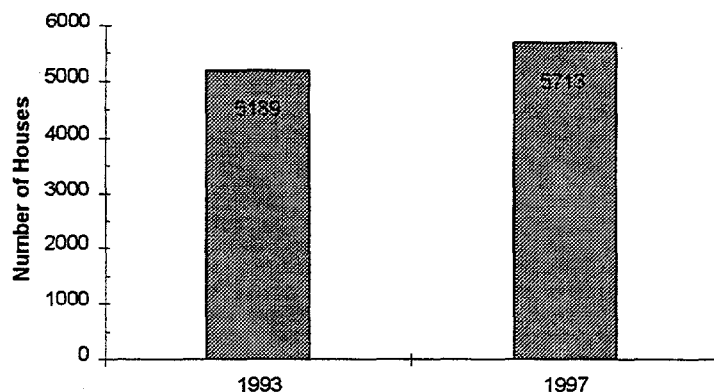
Table 3.1: Housing Densification in Alkkaranad

<i>Ward</i>	<i>Houses in existence in 1989</i>		<i>Houses in existence by 1993</i>		<i>Houses in existence by 1997¹²</i>	
	<i>Number</i>	<i>% change</i>	<i>Number</i>	<i>% change</i>	<i>Number</i>	<i>% change</i>
I			601		643	6.9
II			632		663	4.9
III			678		776	14.5
IV	405	NA	469	16	523	11.5
V	592	NA	755	28	841	11.4
VI	461	NA	584	27	654	11.9
VII			751		825	9.9
VIII			719		788	9.6

11. Data are incomplete because the record search had to be done on a time-available basis by officials whose primary responsibility is to attend to the public. The mission had moved on to a different district before the time-consuming work could be completed.

12. Up to December 12, 1997.

Figure 3.1: Increase in the Number of Houses in Alkkaranad 1993–97

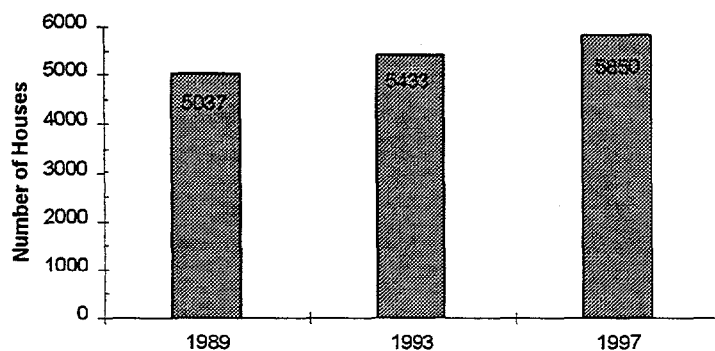


3.2 In another *panchayat*, Puthencruz, a comparable settlement pattern prevailed. While there was not sufficient time for a detailed review of the land records, housing totals from the tax rolls (which are not as accurate¹³) paint a similar picture in terms of rural densification: over the eight-year period there was a 16.1 percent increase in the number of houses, over 2 percent annually. The increase in the number of houses (average occupancy of about seven) outpaced the rural population growth.

Table 3.2: Housing Densification in Puthencruz

Year	1989	1993	1997
Total Number of Houses	5037	5433	5850
Percent Increase Over the Four-year Period	NA	8%	8%

Figure 3.2: Increase in the Number of Houses in Puthencruz Panchayat



13. Because they are not updated as often as the land records.

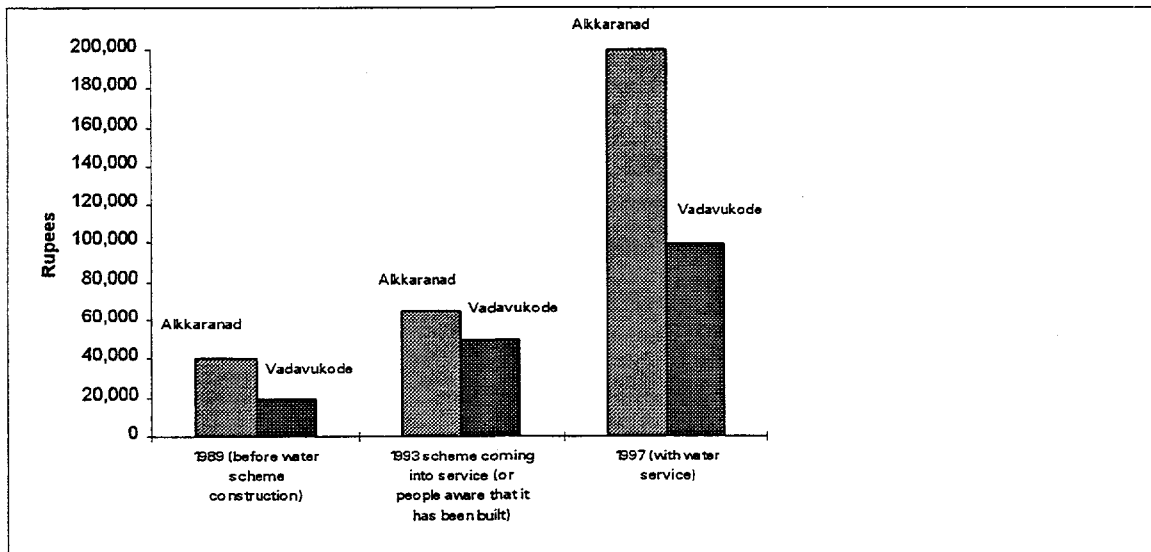
3.3 Although it was not anticipated at appraisal, another significant project impact turned out to be that plots of land that were served by project water schemes appreciated substantially in value. Because of the project rules, the plots were all, at a minimum, within easy walking distance of standposts, and usually entitled to make house connections for a charge of about Rs 2,000. With a house connection sinks, showers and other improvements can be installed. While it was not possible to conduct an in-depth study during the time available for the audit, in two Puthencruz communities focus group meetings were held with the *panchayat* executive council members and other municipal employees to see how much they estimated the increase in land values (their percentage estimates for the increase in the cost of one house plot are in Table 3.2).

Table 3.2: Appreciation in the Cost of One House Plot

Year	Percentage change in cost of one house plot served by water scheme	
	Alkkaranad	Vadavukode
From 1989 to 1993, scheme coming into service (or people aware that it has been built)	63%	250%
From 1994 to 1997 (with water service)	308%	200%
Average	186	225

3.4 The focus group monetary estimates are in Figure 3.3.

Figure 3.3: Post-Project Appreciation in Land Values

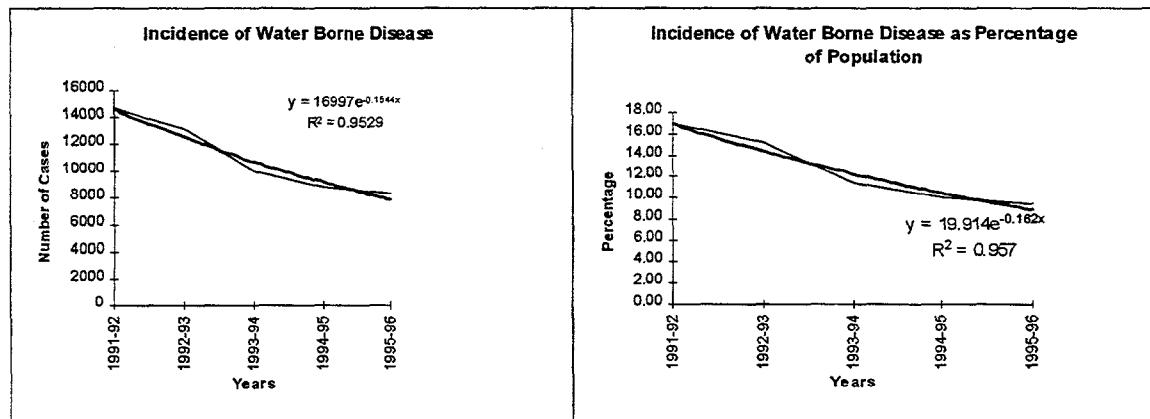


Health Impacts

3.5 In both project villages and the various districts in the state of Kerala, *deaths* due to water-related disease are declining. However, the *incidence* of disease (number of occurrences) is also declining in the project villages while it is not declining in the surrounding areas.

3.6 The audit team obtained statistics on the incidence of water-related diseases for five¹⁴ of the seven rural project areas. The rural *panchayats* of Puthencruz and Vilappil—which were chosen to participate in the project during preparation in the early 1980s because existing water sources were poor in quality and reliability (and they had more than a decade of worse-than-average health problems)—showed the greatest improvement. In Fiscal 1992, in those Puthencruz villages for which data were available, about 17 percent¹⁵ of the rural population was afflicted. By FY96, following 3-4 years of safe water use, the percentage of the afflicted population came down to almost 9 percent. Between FY92 and FY96, the incidence of disease declined at a rate of 15 percent in the project area. Taking into account the increase in population¹⁶ in the project area, the rate of decline rises to 16.2 percent (see Figure 3.4). Both before and after numbers are much higher than the overall state average of less than 4 percent annually. In Vilappil, though the percentage of population affected did not decrease as rapidly as in Puthencruz, the data show a decline of about 5 percent in the incidence of water-related diseases.

Figure 3.4: Decreases in Disease Incidence in Puthencruz Project Areas



3.7 When the project *panchayats* in Puthencruz are compared with their district, the district data do not show a declining trend, while the project area data do.

14. Data are available for Kottayam, Puthencruz, GCDA, Vilappil, and Adoor project areas.

15. Calculations made on the basis of available data which is for 4 of the 5 *panchayats* covered by the project.

16. Basic data for calculating increase in population in the project area are from project documents. For lack of availability of *panchayat* data, population data used are for the whole project area, even though information on incidence of disease was for 4 out of 5 *panchayats*.

Water Security in Alkkaranad *Panchayat*

The village of Alkkaranad normally can provide itself with safe water. Most villagers have shallow wells near their homes that provide them with ample safe water given average rainfall. In 1991, a severe drought dried up local wells. This forced villagers to use increasingly questionable sources of water, and the incidence of diarrheal disease rose considerably. By summertime, almost all local water resources were used up, and emergency supply of water by means of tanker trucks needed to be undertaken in all nine wards of the Panchayat. Following the commissioning of the Bank-supported system, emergency measures on that scale have not been needed.¹⁷ Cases of water-related stomach problems have declined markedly within the Panchayat. From a high of 8,613 reported cases of diarrhea (requiring medical attention at health posts reporting to the District Medical Officer), the 1995-96 data showed that only 1,591 individuals were similarly afflicted.

17. In one recent dry spell, tanker trucks were again needed in one ward briefly. This was because so many additional household connections have been made that when water is scarce the very highest areas are not reached by the water in the system.

4. Ratings

4.1 The audit rates project outcome as marginally satisfactory, sustainability as uncertain, and institutional development impact as substantial. This differs from the ICR, which rated outcome as unsatisfactory, sustainability as likely, and institutional development as modest.

4.2 *Outcome.* All the factors identified by the ICR as contributing to poor performance are present. The list (see para. 2.1) is both exhaustive and correct. But the ICR also noted that, “it must be recognized that the attitudinal and institutional adjustments. . . will take time.” Four years later it is apparent that many things that were supposed to happen during the project cycle took place later. During the period since credit closing KWA began a series of administrative improvements and financial reforms that should ensure continuing institutional development and better service to its customers. KWA also achieved greater financial self-reliance following tariff increases, which also materialized late.

4.3 It is true that the physical targets of the project had not been achieved at the time of credit closing; the last remaining structure, a water tank at Chellanam, is still under construction. Nevertheless, this is progress. Only two of the seven rural schemes were fully completed at credit closing. The audit mission was able to ascertain that the remaining five were finally commissioned (one only provisionally). The economic rate of return (ERR) is 8.7 percent for the Quilon water supply (12.2 percent at appraisal) and rates range from 5.2 percent to 11.6 percent for the rural schemes (7.1 percent to 14.1 percent at appraisal). This lower achievement is attributed to implementation delays and thus deferred project benefits.

4.4 *Sustainability.* The ICR considers the improvements made under the credit to be sustainable because KWA is the regular recipient of funds from the state’s force account. The audit gives a lower rating on sustainability for precisely the same reason, finding that a reliance on state government grants has prevented the tariff increases necessary to make KWA self-sustaining, and that borrowing to pay operating expenses not covered by the grants puts the institution additionally at risk.

4.5 *Institutional development.* Major institutional development occurred after credit closing. The KWA’s staff training center has had a strong positive impact on KWA’s operational efficiency and staff productivity. Staffing is an area that shows how institutional development through participation in the credit can now be seen to be substantial. The Aide Memoire of the ICR mission notes that no staff position was created for the operation of the Kottayam Water Supply scheme. By the time of the audit mission, 15 new slots had been created just within the water treatment facility.¹⁸

Bank Performance

4.6 Bank performance is rated as unsatisfactory. The project as appraised was too supply-driven, too ambitious, and it overtaxed the implementation capacity of a new institution. Additionally, the potential health benefits were significantly overestimated given the actual health

18. Five positions are filled for three full shifts to cover the 24-hour day (Operator and Assistant Treatment; Operator and Assistant Clearwater; and Operator Raw Water).

status of the state. Most of the deficiencies in Bank performance are confined to identification and appraisal processes, however. Supervision was productive: KWA cited Bank missions' practice of using the Aide Memoirs to keep the focus on the agency's administrative weaknesses as particularly effective in causing change. Bank staff on supervision missions promoted new administrative concepts and pressed for more meaningful cost recovery targets and more informative systems for reporting and accounting.

Borrower Performance

4.7 As KWA tried to become the autonomous body it was intended to be, there were frequent missteps because its role within the sector was unclear. Its continued reliance on grants was also problematic. The full implications of the institutional reforms took time to permeate KWA and, as a consequence, the detailed operating procedures needed to implement them were established late in the project and after credit closing. Schedules for phasing in regulations were never developed, and procedures evolved without the necessary planning. The borrower did not prioritize training and technical assistance, with the result that information needed to facilitate the changes was only obtained just before credit closing.

4.8 The performance of the borrower during the early implementation years was characterized by contracting, reporting and implementation delays, and was clearly unsatisfactory. However, towards the end of the implementation period (*inter alia* in response to improved Bank supervision and technical assistance) it improved markedly. Borrower performance has continued to improve, and especially after credit closing it would warrant a rating of highly satisfactory (in some domains). On balance, borrower performance is rated satisfactory.

4.9 *Compliance with Covenants and Operational Directives.* Apart from the standard covenants of a typical credit agreement the covenants that applied to the credit fell into the following categories:

- covenants regarding the terms and conditions of local bodies' participation in credit-funded activities (credit terms, bylaws, selection criteria) were complied with;
- covenants on progress monitoring, audits, and reporting were complied with, although audit reports were often late;
- covenants on the employment of sufficient trained staff by KWA were not fully complied with;
- covenants on tariff increases by KWA and participating municipalities were partially complied with, but those on billing collection rate increases were not;
- covenants on studies were complied with following considerable delays;
- covenants regarding the establishment of a leak detection unit were complied with (but the unit is no longer operational); and
- covenants regarding the establishment of a Project Management Unit were complied with.

5. Conclusions and Lessons

Conclusions

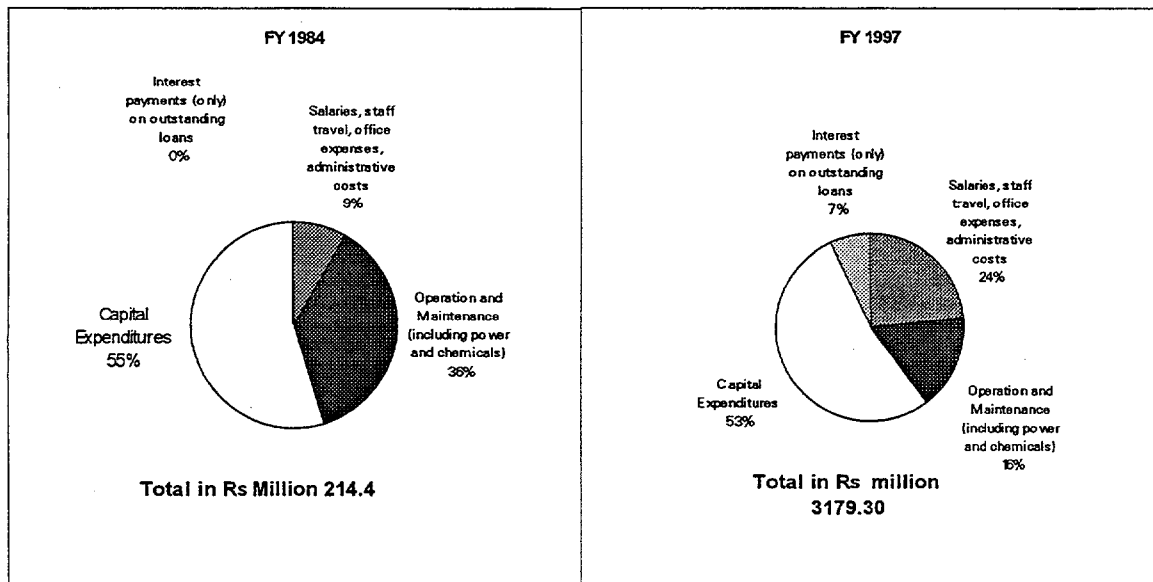
5.1 The investment did result in the hoped-for improvements in the sector; they just took longer to appear than was anticipated during appraisal. It was not just that the number of activities increased for KWA staff with the approval of the credit, but rather that their scale did. Staff accustomed to buying small orders of materials from multiple sources found that their systems and suppliers were unable to cope with the volume of material needed under the credit. Staff used to acquiring a few small parcels of land found that acquiring larger parcels was qualitatively different.

5.2 In scale, the project dwarfed KWA's capacities (procurement, land acquisition, supervision, financial management, etc.). KWA's budget was Rs 214 million (1984 rupees) compared to total project cost of Rs 935 million. A glance at Table 5.1 shows that a similar project would be less daunting to the current KWA than it was back in 1984 (at appraisal).

Table 5.1: KWA's Annual Budget Then and Now (Rupees Millions)

	<i>FY 1984</i>	<i>FY 1997</i>
Salaries, staff travel, office expenses, administrative costs	18.6	750.8
Operation and Maintenance (including power and chemicals)	77.6	508.0
Capital expenditures	118.2	1700.5
Interest payments (only) on outstanding loans	0	220.0
Total (total project cost Rs 935 million)	214.4	3,179.3

Figure 5.1: KWA Annual Budget Then and Now



5.3 The project started the use of LCS in the state and demonstrated the successful use of twin-pit latrines as a low-cost sanitation measure for rural and urban areas. Although the quantitative achievement was far below targets, the demonstration effect was substantial. Increasing population densities in the rural areas made open defecation an increasingly undesirable option, and the use of the twin-pit technology is nearly universal in many communities. In some instances *panchayats* continued the project's subsidized program on the same financial terms with their own funds. In other areas, nongovernmental organizations took the lead. Various LCS programs taken up by GOK after the project also largely copied the approach. It could be argued that subsidizing families to provide themselves with improved toilet facilities might not be necessary (because they would eventually build sanitary closets on their own in any event) and it is unnecessarily paternalistic. In defense of the approach taken by the project, the health risks and other unpleasantness associated with open defecation in densely populated areas argue strongly for using public funds to support this component. Access to improved sanitation has impacts that go beyond the health impacts of open defecation. In some villages, women were limited to hours of darkness, as it is not proper for them to be seen attending to bodily functions by light of day.

Key Lessons

5.4 The main lessons that can be derived from project experience are as follows:

- Investments in piped rural water schemes will often lead to increased densification and higher land and housing prices, especially if the intervention is highly localized. The same trend was revealed in the recent OED Impact Evaluation of rural water in Paraguay. This means that estimates of population growth rates may be necessary but not sufficient to establish future usage patterns and trends during rural water system design.
- When water sector projects will be implemented by newly created agencies, Bank staff should anticipate that—at least at the outset—there will only be a modest management capacity.

- The capital grants from GOK kept service levels affordable, but they compromised KWA's autonomy because they constrained it from making politically sensitive tariff increases, which impeded its progress toward financial viability and sustainability.
- In India, public organizations "borrow" (increase the amount that they have to spend) by not paying public utilities. Hospitals and other large users (such as educational institutions) do not pay their water bills because KWA's only recourse—to cut off water supply—is not a credible deterrent. Similarly, decentralization has shifted numerous unfunded mandates to the *panchayats*. The 4 percent tax on the estimated rental value of buildings that was supposed to generate funds to pay for the water used at public standposts was collected, but the proceeds did not usually make it to KWA, largely because the *panchayats* needed funds for their new responsibilities. Mechanisms need to be found to ensure that all public institutions pay their utility bills and that tariffs collected by the *panchayats* for water get used for that purpose. Such changes may alter the relationship between state government and KWA, but they are necessary if KWA is ever to end the practice of borrowing to pay normal operating expenditures.

Basic Data Sheet

KERALA WATER SUPPLY AND SANITATION PROJECT (CREDIT 1622-IN)

Key Project Data (amounts in US\$ million)

	<i>Appraisal estimate</i>	<i>Actual or current estimate</i>	<i>Actual as % of appraisal estimate</i>
	85.14	56.11	65.90
Loan amount	41.00	28.98	70.68
Cofinancing	44.15	27.13	61.45
Cancellation	20.20		
Date physical components completed	03/31/90	10/31/94	
Economic rate of return			
Quilon Municipality	12.2	8.7	
Developing Rural	14.1	11.6	
Stable Rural	7.1	5.2	
Institutional performance			

Cumulative Estimated and Actual Disbursements

	<i>FY86</i>	<i>FY87</i>	<i>FY88</i>	<i>FY89</i>	<i>FY90</i>	<i>FY91</i>	<i>FY92</i>	<i>FY93</i>	<i>FY94</i>	<i>FY95</i>
Appraisal estimate (US\$M)	2.6	10.7	22.1	32.9	39.2	40.9	41.0			
Actual (US\$M)	0.0	5.095	6.17	10.655	14.727	18.602	22.524	22.524	25.715	28.978
Actual as % of appraisal	0	47.6	27.9	32.4	37.6	45.5	54.9	54.9	62.7	70.7

Date of final disbursement: 08/17/94

Project Dates

	<i>Original</i>	<i>Actual</i>
Identification (Executive Project Summary)		11/26/82
Preparation	05/83	07/30/83
Appraisal	09/83	05/28/84
Negotiations	01/84	03/25/85
Letters of Development Policy	N/A	N/A
Board approval	03/84	07/16/85
Signing		09/24/85
Effectiveness	06/84	12/09/85
Project Completion	03/31/90	10/31/94
Closing date	03/31/91	03/31/94

Staff Inputs (staff weeks)

	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>FY</i>	<i>TOTAL</i>
	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97		
Preappraisal	8.3	7.9	23.2															39.4
Appraisal			11.7	27.4														39.1
Negotiations				6.8	1.2													8.0
Supervision					8.7	17.3	9.9	6.1	12.3	28.2	22.3	17.3	14.2	3.3				139.6
Completion													0.7	11.3	0.1	0.1		12.2
Other			1.7	9.8		0.5												12.0
Total	8.3	7.9	36.6	44.0	9.9	17.8	9.9	6.1	12.3	28.2	22.3	17.3	14.9	14.6	0.1	0.1		250.3

Mission Data

	<i>Date</i> (month/year)	<i>No. of</i> <i>persons</i>	<i>Staff days in</i> <i>field</i>	<i>Specializations</i> <i>represented</i>	<i>Performance</i> <i>rating</i>		<i>Types of problems</i>
					<i>Imple-</i> <i>mentation</i> <i>Status</i>	<i>Devel-</i> <i>opment</i> <i>Impact</i>	
Identification/ Preparation	Nov-Dec/82	2	12	SE, FA			
	Oct-83	3	10	SE, FA, EC			
Appraisal	May-Jun/84	6	20	SE, FA, TR, OR, LE			
Appraisal through Board Approval			nil				
Board Approval through effectiveness	Aug-85	1	2	FA			
Supervision	Feb-86	2	10	FA, SE	1	1	Some land acquisition fell behind. Four months' delay in appointing financial consultants and consequent delay in full implementation of the new accounting and financial system anticipated
	Aug-86	1	8	FA	1	1	Project implementation is delayed by five months due to late signing of project and KWA adjustment to IDA procurement and reporting procedures
	Mar-87	3	8	FA, SE	1	1	Water supply construction delayed by six months due to KWA's adjustment to IDA procurement and reporting procedures
	Nov-87	1	4	SE	1	1	(see note below)
	Feb-88	2	8	FA, SE	1	1	Implementation of new financial systems and civil works are falling behind
	Mar-89	2	3	SE, FA	2	2	Covenants relating to counterpart funding and GOK's interim funding of KWA's operating deficit are not in compliance. Audit reports are overdue. Accounting reforms are taking longer to implement.
							Commencement of covenanted

Date (month/year)	No. of persons	Staff days in field	Specializations represented	Performance rating		Types of problems
				Imple- mentation Status	Devel- opment Impact	
Apr-90	3	13	SE, FA, EC	3	2	Cost and Revenue Audit and Training Audit are overdue. Slower implementation pace, counterpart funding constraints; outstanding critical land acquisition in three of the seven water supply schemes, outstanding final design
Nov/Dec-90	3	17	SE, FA, EC	3	2	Slow progress, non-compliance of covenants including audit covenants, counterpart funding constraints
Mar-91	3	15	SE, EC, FA	3	2	Slow progress in implementation; studies initiated under the technical assistance have been substantially delayed
Sep-91	3	14	SE, FA, LO	3	2	Delays in completion of accounts and audits, weak financial management, weak project management; delays in appointment of staff for revenue billing and collection
May/June-92	3	14	SE, FA	3	2	Slow progress and weak financial performance
Sep/Oct-92	2	14	SE, FA	3	2	Counterpart funding constraints, need for a further tariff revision, need for additional permanent qualified staff in the Finance and Accounts Department of KWA, weak organization for low-cost sanitation program, and poor procedures for the related matters of cost estimation and contract awards
Feb-93	4	12	SE, SA, EC	2	2	Slow progress
Nov-93	4	14	SE, SA, EC	2	2	Slow progress in water supply works and LCS implementation

November 1987 supervision mission dealt with procurement matters only. No report is available

Key to specialized staff skills: FA = Financial Analyst; LO = Disbursement; SE = Sanitary Engineer; OR = Organization and Management; EC = Economist; LE = Legal; TR = Training; SA = Low-Cost Sanitation Specialist

Other Project Data

Borrower/Executing Agency: Kerala Water Authority

<i>LENDING FOR WATER SUPPLY IN INDIA</i>			
<i>Operation</i>	<i>Credit no.</i>	<i>Amount (US\$ million)</i>	<i>Board date</i>
Bombay Water Supply and Sewerage Project	Cr. 390-IN	55.0	05/15/73
Uttar Pradesh Water Supply and Sewerage Project	Cr. 585-IN	40.0	08/19/75
Second Bombay Water Supply and Sewerage Project	Cr. 842-IN	196.0	07/25/78
Punjab Water Supply and Sewerage Project	Cr. 848-IN	38.0	09/12/78
Maharashtra Water Supply and Sewerage Project	Cr. 899-IN	48.0	05/1/79
Rajasthan Water Supply and Sewerage Project	Cr. 1046-IN	80.0	06/19/80
Gujarat Water Supply and Sanitation Project	Cr. 1280-IN	72.0	07/6/82
Haryana Irrigation II	Cr. 1319-IN	150.0	01/25/83
Tamil Nadu Water Supply and Sanitation Project	Cr. 1454-IN	36.5	03/29/84
Third Bombay Water Supply and Sewerage Project	Cr. 1750-IN & Ln. 2769-IN	145.0	12/16/86
Madras Water Supply and Sanitation Project	Ln. 2846-IN	69.0	06/17/87
Hyderabad Water Supply and Sanitation Project	Cr. 2115-IN	79.9	03/27/90
Maharashtra Rural Water Supply and Sanitation Project	Cr. 2234-IN	109.9	05/2/91
Agr. Dev I Tamil Nadu (Rural Water Supply Component)	Cr. 2215-IN	92.8	03/12/91
ADP Rajasthan (Water Resources)	Cr. 2433-IN	106.0	11/12/92
Bihar Plateau Project (Rural Water Supply Component)	Cr. 2439-IN	117.0	11/19/92
Karnataka Rural Water Supply and Environmental Sanitation Project	Cr. 2483-IN	92.0	04/20/93
Maharashtra Earthquake and Reconstruction	Cr. 2594-IN	246.0	03/31/94
Madras Water Supply II	Ln. 3907-IN	6.0	06/20/95
Hydrology Project	Cr. 2774-IN	142.0	08/22/95
UP Rural Water	Ln. 4056-IN	59.6	06/25/96
TOTAL		1,916.5	

Status of Scheme Achievements

Scheme	<i>Panchayats</i> currently served	Status
Puthencruz	Alkkarandu, Poothrikka, Vadavukode, Puthencruz, Thirunvaniyoor	All works completed by loan closing
Greater Cochin Development Area	Edathala, Choomikkara, Keezhumadu, Kizhakkambalam, Vazhakkulam, Thrikkakkara, Kalamasserry, Maradu, Kumbalam, Kunnathunadu, Kumbalangi, Chellanam	Five of 12 <i>panchayats</i> in service by ICR mission Only the storage tank in Chellanam remains to be completed
Kottayam	Nattakom, Panachikadavu, Vijayapuram, Kumaranalloor	Not in service by ICR mission Fully commissioned 11/94
Adoor	Adoor, Exhamkualm, South Pattazhi, North Pattazhi	Commissioned 12/94 Still not serving all users/communities in the manner anticipated
Quilon	Kollam (municipality), Neendakara, Sakthikulangara, Thrikkadavoor, Kililloor, Vadakkevila, Eravirpuram	Commissioned in late 1994
Chithara	Chithara, Nilamel, Chadayamangalam, Kadakkal	System operating on a trial basis
Vilappil	Vilappil	Fully commissioned

Source: KWA