India: Rural water supply, West Bengal

Ex post evaluation report

OECD sector	14020 – Water supply and sewerage – large-scale systems	
BMZ project ID	1995 65 672	
Project executing agency	State of West Bengal, represented by the Public Health Engineering Department (PHED)	
Consultant	GKW/CES	
Year of ex post evaluation report	**2009**	
	Project appraisal (planned)	**Ex post evaluation (actual)**
Start of implementation	Q1 1996	Q4 1996
Period of implementation	46 months	65 months
Investment costs	EUR 39.5 million	EUR 38.9 million
Counterpart contribution	EUR 13.9 million	EUR 12.0 million
Financing, of which Financial Cooperation (FC) funds	EUR 25.5 million	EUR 26.9 million
Other institutions/donors involved	-	-
Performance rating	2	
• Relevance	2	
• Effectiveness	2	
• Efficiency	3	
• Overarching developmental impact	2	
• Sustainability	3	

Brief description, overall objective and project objectives with indicators

This project in the Indian state of West Bengal comprised the construction of central systems for the supply of drinking water to the small rural towns of Bolpur and Raghunathpur and their immediate surroundings, together with independent supply systems (hand-pumped wells) for the rural areas around Bolpur. In addition, a limited amount of financing was provided for human waste disposal measures. Around 297,000 people live in the project area around Bolpur and a further 145,000 in Raghunathpur and its environs. The Public Health Engineering Department (PHED) carried out the works. The independent supply systems in the rural areas were planned and installed with the assistance of local users.

The overall objective of the project was to reduce the health risks from waterborne diseases. The project goal was the ongoing provision of an adequate supply of drinking water to a regional population expected to reach 485,000 by the year 2011, together with improvements in their sewage disposal situation and general hygiene awareness.

The project was to be evaluated on the basis of the following indicators:

- Water supplies should be available on a year-round, continuous basis at the rate of 45 l per person per day in the villages and 95 l per person per day in the towns.
- Water quality at the point of supply should conform to WHO guidelines for chemical/ physical consistence and bacterial count.
- In areas supplied by the central systems, water utilisation (based on the volumes produced to meet the demand projection) should reach 90% in towns and 80% in villages (allowing for 15% distribution losses).
- Supply interruptions should be resolved within 48 hours, and should on average amount to less than 14 days per year in total.
- 80% of the hand pumps should be in good working order and in active use.
- Foul water and rainwater should run off freely without blockages, and there should be no uncontrolled build-up of waste.

In addition, the following indicators were defined during the ex post evaluation:

- Following implementation of the planned measures, the coverage rate for clean drinking water in each project area should reach a minimum of 85%.
- Hygiene practices — at the wells, at the taps, during water transport and water storage — should not lead to a deterioration in water quality.

Project design / major deviations from original planning and their main causes

Under the project, similar measures were planned and implemented at the two locations of Bolpur and Raghunathpur: in each case, central water supply facilities for a rural town and its surrounding rural area.

In Bolpur, groundwater free of chemical or bacterial contamination was drawn from 15 deep wells and fed into the distribution network via three waterworks. The high levels of arsenic found in the groundwater of some regions of West Bengal (due to local geological conditions) are not present in Bolpur. At ex-post evaluation, approx. 18,000 m³/day of the deep wells' output of 22,000 m³/day was being used, at approx. 16 operating hours/day, indicating some reserve capacity. No raw water preparation facilities were planned during project appraisal. It was to be fed into the supply network immediately after chlorination. However, analysis of the tapped supplies established that one of the deep wells was delivering water with a raised iron content. Although this poses no health threat, the taste is adversely affected and laundry can become discoloured. Hence an iron removal plant was built for this well using project funds.

In Raghunathpur, water from a valley reservoir was purified in a conventional preparation plant (flocculation, sedimentation, filtration and chlorination). During the project appraisal the risk was identified that the water from the River Damodar used to supply Raghunathpur could be contaminated. Samples taken at the time showed elevated levels of phenols and mercury. Fortunately the offending factory, a coking plant in the river's upper reaches, had already been closed down before the waterworks was commissioned, and the pollution did not recur. Even so, the raw water is checked against the above parameters every six months at a specialised laboratory in Kolkota. The waterworks has a supply of chemicals which can eliminate phenols and mercury in an emergency. At ex post evaluation, 9,800 m³/day from the waterworks' capacity of 10,500 m³/day (93%) is already being utilised.

In both locations, the drinking water from the waterworks is fed into the distribution network via water towers. The population receives their drinking water from the distribution network through some 1,500 public water taps and 16,000 domestic connections. During the detailed planning phase, the length of the distribution networks had to be substantially increased as compared to what had been envisaged at the project appraisal stage.

In the area surrounding Bolpur, which is not within reach of the central water supply, 909 hand-pumped wells were installed. They are of robust quality and deliver safe drinking water.

As complementary sanitation activities, it had been planned at project appraisal to put in place a large number of latrines, to provide refuse disposal equipment and to build or refurbish rainwater sewers and culverts at critical points. As it became apparent during detailed planning that longer pipelines would be required than originally planned, and that substantial cost increases were to be expected, these complementary activities were deferred. Another consideration that played a part here was the accurate observation that the towns might be overstretched by taking over the operation of the water distribution network and the disposal facilities at the same time.
Instead, 90 private latrines with washing facilities were built in a test region in the area surrounding Bolpur, using a revolving fund. In addition, three public toilets with washing facilities were built in Bolpur and one in Raghunathpur, all of which were found to be functioning satisfactorily during the ex-post evaluation. These sanitation measures could serve as useful models. In this instance, we consider the decision to focus first and foremost on supplying the population with safe drinking water to have been correct. Given the realities of rural West Bengal, this approach was more effective in reducing the prevalence of waterborne diseases. The ex-post evaluation identified no sewage-related problems. The reason for this is that wastewater leaches and dissipates through existing rainwater ditches, against a background of relatively low population densities in the affected areas.
All the funded activities were properly executed and taken over, and their quality is either good (Bolpur) or satisfactory (Raghunathpur).

Key results of the impact analysis and performance rating

In a cost-effective manner, the project established the satisfactory and reliable year-round supply of safe drinking water to the population that was connected under the scheme. Since the population no longer relies on unsafe water sources, the project also achieved a reduction in health risks. Overall a total of 440,000 users are being supplied with clean drinking water, and their number will probably increase to 454,000 by 2011.
Also, since fetching water and care of the sick are mostly female tasks in India, the project has eased daily life for women by improving the availability of potable water and, to a lesser extent, by reducing health risks, especially the risks to children.
Those who use the public taps and hand-pumped wells (approx. 329,000 inhabitants in 2008) constitute 75% of private water users and belong predominantly to the rural poor, indicating a direct relevance for poverty alleviation. Unfortunately, the intended participation of those who use the public taps, and the involvement of communities in the operation of the water distribution facilities (good governance), have only been realised to a limited extent.
The risk identified during the project appraisal of phenol and mercury contamination in the river Damodar, which serves as a source for the Raghunathpur waterworks, proved unfounded. The offending factory, a coking plant, was closed down before project commissioning. The ex-post evaluation identified no unacceptable negative consequences for the environment caused by the significantly reduced sewage disposal measures.
In summary, we assess the efficacy of the project as follows:
Relevance
Shortcomings in the water sector continue to represent a significant constraint on India's further development. Measures to rectify this continue to hold a high priority for the Indian government, as evidenced by the substantial budget allocated for this sector and also by statements in their latest five-year plan. They further contribute towards achieving MDG 7. For the target group, the rural poor, access to safe drinking water is invariably of great importance. Similarly, the Federal Government of Germany attaches a great deal of significance to this sector in their water strategy. Hence, although water supply has lost its status as a priority sector in German-Indian cooperation (due to the problems of implementing reform in this sector), the relevance of this particular project is not adversely affected. Project activities have fitted well into Indian structures. There

are no conflicts or overlaps with other policy areas in India, nor with the activities of other donors. It is reasonable to assume that reliable, regular and adequate water supplies have contributed to the perceived health benefits, especially considering that, at project appraisal, some water resources were affected by both bacterial and chemical contamination.
We therefore assess the project's Relevance as good (rating 2).

Effectiveness

The project objective indicators were all achieved: in the areas served by the project facilities, water supplies of an estimated 45 litres per person per day are available at the public taps and 160 litres per person per day through domestic connections. There is a great need for additional water supplies; however, in view of the relatively high volumes consumed through domestic connections, this needs to be put into context. In view of the dependency of the water supply companies on subsidies, the high level of consumption has a negative impact on their profitability. Supplies are usually available for 5 hours per day in Bolpur, and for 3.75 hours per day at Raghunathpur. The wells are available 24 hours a day. Supply interruptions to date have only arisen due to external factors (power cuts). In each case they have lasted less than 48 hours. Continuous supply has not been achieved for reasons of cost; nevertheless, users are being supplied with adequate volumes of drinking water at predictable times. Yet there remains the risk of contamination in the distribution network caused by – a common problem in developing countries – intermittent operation. However, water quality is routinely measured in the Bolpur and Raghunathpur waterworks' reliable laboratories. All WHO quality-related guidelines are currently being observed.
So far approx. 900 of the 909 hand pumps (99%) are still in good working order and being put to use.
We therefore rate the project's effectiveness as good (rating 2).

Efficiency

The facilities for the catchment, preparation and distribution of water are of simple and robust construction. The average specific investment cost of EUR 99 per user is minimal. This is also true for the hand pumps, at an investment cost of EUR 42 per user. The installed facilities are suitably sized and are already being utilised at 80 - 90%, two years before the planning horizon. Operating costs are very favourable. Since water consumption is not measured, water losses can not be stated. Overall production efficiency is considered good. Given the present unsatisfactory tariff system and a collection efficiency of just 70%, Bolpur's running costs can only be covered in part. However, currently this has no significant effect on the operation or maintenance of the facilities, because to date the Government of West Bengal has always provided subsidies to cover the deficit. In Raghunathpur, with a collection efficiency of 118%, cost recovery has been achieved. Certainly, as a result of flat-rate tariffs which are not linked to consumption, water is being wasted at both locations. We therefore consider the allocative efficiency as satisfactory. Based on the shortcomings in allocative efficiency, we assess the overall efficiency of the project as satisfactory (rating 3).

Overarching developmental impact

The intended results were largely achieved, although the measures planned for the disposal of solid and liquid human waste were only partially implemented. When asked, doctors, members of the target group and individuals unconnected to the project who are familiar with local conditions reliably confirm that illness associated with drinking water quality has dropped significantly. We therefore assess the overarching developmental impact as good (rating 2).

Sustainability

From today's perspective, operation of the hand pumps by users and operation of the distribution network by the communities carry some risk to sustainability. Moreover, due to the unsatisfactory tariff design and poor collection efficiency, the project executing agency is dependent upon ongoing subsidies from the State of West Bengal for the operation and maintenance of the central water supply facilities. There are certainly no indications at present that these subsidies would not be made available. This situation nonetheless represents a certain risk, particularly given that the cost of

maintenance, and therefore the level of subsidy required, will increase with the age of the facilities. Overall we assess the sustainability of the project as satisfactory (rating 3).

Overall assessment
Because of its positive effects we rate this project, despite the deficiencies in allocative efficiency and the accompanying risks to sustainability, as good (rating 2).

General conclusions and recommendations

This project's positive experience in entrusting the operation of project resources to private enterprise provides fresh motivation to explore public-private partnership initiatives with our partners, and to examine the suitability of these concepts in the context of the prevailing conditions.
The apparent conflict between the introduction of a sensible tariff and the democratic process is worth noting. It is difficult to find a solution. On an individual basis, it could lie in the transfer of tariff-setting powers to an institution outside the influence of local politics.

Notes on the methods used to evaluate project success (project rating)

Projects are evaluated on a six-point scale, the criteria being relevance, effectiveness (outcome), "overarching developmental impact" and efficiency. The ratings are also used to arrive at a final assessment of a project's overall developmental efficacy. The scale is as follows:

1	Very good rating that clearly exceeds expectations
2	Good rating fully in line with expectations and without any significant shortcomings
3	Satisfactory rating – project falls short of expectations but the positive results dominate
4	Unsatisfactory rating – significantly below expectations, with negative results dominating despite discernible positive results
5	Clearly inadequate rating – despite some positive partial results the negative results clearly dominate
6	The project has no positive results or the situation has actually deteriorated

A rating of 1 to 3 is a positive assessment and indicates a successful project while a rating of 4 to 6 is a negative assessment and indicates a project which has no sufficiently positive results.

Sustainability is evaluated according to the following four-point scale:

Sustainability level 1 (very good sustainability)

The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.

Sustainability level 2 (good sustainability)

The developmental efficacy of the project (positive to date) is very likely to decline only minimally but remain positive overall. (This is what can normally be expected.)

Sustainability level 3 (satisfactory sustainability)

The developmental efficacy of the project (positive to date) is very likely to decline significantly but remain positive overall. This rating is also assigned if the sustainability of a

project is considered inadequate up to the time of the ex post evaluation but is very likely to evolve positively so that the project will ultimately achieve positive developmental efficacy.

Sustainability level 4 (inadequate sustainability)

The developmental efficacy of the project is inadequate up to the time of the ex post evaluation and an improvement is very unlikely. This rating is also assigned if the sustainability that has been positively evaluated to date is very likely to deteriorate severely and no longer meet the level 3 criteria.

The overall rating on the six-point scale is compiled from a weighting of all five individual criteria as appropriate to the project in question. A rating of 1 to 3 indicates a “successful” project while a rating of 4 to 6 indicates an “unsuccessful” project. In using (with a project-specific weighting) the five key factors to form an overall rating, it should be noted that a project can generally only be considered developmentally “successful” if the achievement of the project objective (“effectiveness”), the impact on the overall objective (“overarching developmental impact”) and the sustainability are considered at least “satisfactory” (rating 3).