Ex-ante Evaluation

1. Name of the Project

Country: India
Project: Hogenakkal Water Supply and Fluorosis Mitigation Project
(Loan Agreement: 03/10/2008; Loan Amount: 22,387 million yen; Borrower: The President of India)

2. Necessity and Relevance of JBIC's Assistance

In India, development of water supply facilities has not been able to keep up with the increase in water usage due to the population growth, leading to a serious imbalance in the supply and demand of water. Also, excess dependency on groundwater forced by delays in the development of water supply facilities utilizing surface water has caused groundwater level depletion, resulting in such problems as contamination of fluoride, arsenic, and other harmful substances in groundwater.

In India, the number of patients suffering from fluorosis due to drinking water contamination by fluoride is as high as 66 million. Prolonged consumption of groundwater containing more than the maximum fluoride level (1.5 mg/L) permitted under WHO guidelines has caused serious damage to people's teeth, bones, internal organs as well as to unborn children. The 11th 5-Year Plan (April 2007–March 2012) by the Government of India, incorporates a "National Fluorosis Mitigation Programme" which deals with the fluoride issue on a national scale for the first time.

The 10th 5-Year Plan (April 2002–March 2007) by the Government of India proposes to supply adequate and safe drinking water to the entire population. Based on this, in the National Water Policy (April 2002), Ministry of Water Resources aims to give priority to the allocation of water resources in the order of drinking water, irrigation, and hydroelectric power. In the current administration's Common Minimum Programme (May 2004), there is a commitment to expand public investment in water supply facilities.

In JBIC's current Medium-Term Strategy for Overseas Economic Cooperation Operations, the priority sectors for assistance to India are "Economic Infrastructure Development," "Regional Development that Benefits the Poor" and "Environmental Improvement." The assistance provided by this project is consistent with the strategy.

As of 2006, 2.98 million live in Krishnagiri and Dharmapuri Districts, located in North West of Tamil Nadu, which are the two areas targeted by this project, and about 1.1 million are living below the poverty line there. Despite the increasing demand for water due to population growth, because of the less annual rainfall in the two districts at 815 mm than the national average (1,170 mm) and the average for Tamil Nadu (977 mm) and no surface water usable all year round, people are forced to use more groundwater than they should, resulting in depletion of groundwater and chronic surface water shortages. Also, a large amount of fluoride, which is harmful to the human body, is contained in the rock ground that forms the Deccan Plateau and is transferred to the groundwater, and when people drink the groundwater contaminated by fluoride, they often suffer from such forms of dental fluorosis and skeletal fluorosis. Supplying safe surface water to the two project areas by drawing water from a point of Hogenakkal in Cauvery River, 45 km from Dharmapuri, is urgently needed to solve the problem of water shortage and contamination of drinking water by fluoride. Thus this project is highly necessary and relevant. In addition, this project plans to comprehensively tackle the fluoride problems for the first time all over India by simultaneously identifying patients suffering

from fluorosis and providing diet consultation etc.

3. Project Objectives

The objective of this project is to provide safe and stable water supply service that will meet the surging demands for water by building water supply facilities that use water conducted from a point of Hogenakkal in Cauvery River and by mitigating the health damage caused by fluoride in Dharmapuri and Krishnagiri, the two areas in Tamil Nadu with the most serious cases of water shortage and contamination of groundwater by fluoride; thereby contributing to improvement of the living conditions of local residents.

4. Project Description

(1) Target Area

Krishnagiri and Dharmapuri Districts, State of Tamil Nadu

(2) Project Outline

(a) Water supply facilities: Construction of water intake facilities and water treatment plant (160,000 m^3/day), provision of transmission pipelines, and construction of distribution network, overhead tanks and pumping stations, etc.

(b) Fluorosis mitigation: Baseline Survey; training for doctors, teachers, etc.; diet consultation; awareness campaign, etc.

(c) Capacity building of local bodies: Capacity Building for the member of Village Water and Sanitation Committee (VWSC), Operation and Maintenance (O&M), tariff collection and financial management; functional extension of training facilities, etc.

(d) Consulting services: Review of detailed design, construction monitoring and supervision, capacity building of leak detection for the executing agency, etc.

(3) Total Project Cost/Loan Amount

27,398 million yen (Yen loan amount: 22,387 million yen)

(4) Schedule

March 2008–July 2013 (65 months). The project completion is defined as when the construction work is completed.

(5) Implementation Structure

(a) Borrower: The President of India

(b) Executing Agency: Tamil Nadu Water Supply and Drainage Board (TWAD)

(c) Operation and Maintenance System: TWAD, Local Bodies

(6) Environmental and Social Consideration

(a) Environmental Effects/Land Acquisition and Resident Relocation

(i) Category: Category B

(ii) Reasons for Categorization

This project is classified as Category B because it was determined that the project will not have any significant undesirable impact on the environment given that the characteristics of

the sector is not likely to exert impact, and the project is not located in a sensitive area, based on the "Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations" (established April 2002).

(iii) Environmental Permit

The EIA report has been prepared in September 2001, though it is not required for the project in the country's legal system.

(iv) Anti-Pollution Measures

Regarding water supply facilities, since water is taken from surface water, no ground subsidence is foreseen. Water treatment plants, pumping stations and other facilities will be designed and constructed by taking noise into consideration. Additionally, sludge produced at the water treatment plant will be dried under the sun, after which, based on the direction of State Pollution Control Board, it will either be provided to local farmers as compost or be buried in a prescribed repository site.

(v) Natural Environment

The project site is not located in and around any sensitive areas such as national parks, and it is likely to have a minimal adverse impact on the natural environment.

(vi) Social Environment

The project requires land acquisition of about 3.14ha as well as deforestation, which will be implemented in accordance with the country's domestic procedures. The project will not involve any involuntary resettlement. In addition, the clearance for deforestation has been approved.

(vii) Other/ Monitoring

In this project, TWAD will monitor the quality of water inflow to and outflow from the water supply facilities, while each local body will monitor the water quality etc. in overhead tanks.

(b) Promotion of Poverty Reduction

The incidence of poverty in the project areas is about 36.7%, which is higher than the national average of 26.1%. The project will contribute to the alleviation of poverty by improving health condition of poorest residents and upgrading their living environment. Also, in implementing the project and reforming the water tariff structure etc., consensus has been reached to give adequate consideration to the needs of the weak and the poorest residents including women and members of Scheduled Tribes and Scheduled Castes.

(c) Promotion of Social Development (e.g. Gender Perspective, Measures to Prevent Infectious Diseases Including AIDS, Participatory Development, Consideration for the Handicapped, etc.)

From the planning stage, participation of local residents will be promoted by preparing a distribution plan for each village, building the capacity of VWSC, and by carrying out O&M of water supply facilities and awareness campaign etc. Additionally, it was agreed that at least one out of three members of VWSC who shall get the training under the project should be a woman. Thus promotion of capacity building for women and their participation can be expected. Meanwhile, providing stable supply of water in the project areas, especially in rural areas, reduces the burden on women, who are normally in charge of drawing water, thereby raising expectation for improvement of women's health and productivity.

(7) Other Important Issues

- The request for ODA loans includes Krishnagiri District including Hosur area, and the entire Dharmapuri District. From the viewpoint of depletion of groundwater and contamination of groundwater by fluoride, in addition to the areas targeted by this project, it is necessary to implement the project for the remaining area of Hosur (which will cost about 8.8 billion yen and affect about 800,000 people) as early as possible.
- Training for the staff who is in charge of O&M, financial management and other related skills are planned to be given to members of VWSC of the local bodies.
- Experts or NGOs with knowledge and experience are scheduled to be involved in awareness campaigns concerning fluorosis mitigation, preparation of a distribution plan for each village, capacity building of tariff collection etc.

5. Outcome Targets

(1) Evaluation Indicators (Operation and Effect Indicator)

Indicator	Baseline (2007)	Target (2015, 2 years after completion)
Population served (1000 persons)	660	2,388
Amount of water supply (m^3/day)	28,608	67,263
Available water per capita per day (L)	Urban area: 29–37; rural area: 10	Urban area: 70–90; rural area: 40
Water supply hours (hr/day)	1 hour on average	5 hours on average
Number of women who participated in capacity building training (%)	-	More than 30% of participants

Impact indicators:

(a) Difference in the ratio of patients afflicted with non-skeletal fluorosis (effects as stomach discomfort, extreme weakness, abortion, still birth etc.) (Difference in the ratio of non-skeletal fluorosis patients to general population in the project areas before and after the project)

(b) Difference in the ratio of dental fluorosis among students (the ratio of students suffering from dental fluorosis to the total number of students in the project areas before and after the project)

(2) Number of Beneficiaries

About 2.39 million

(2) Internal Rate of Return (Financial and Economic Internal Rate of Return)

Based on the conditions indicated below, the project's Economic Internal Rate of Return (EIRR) is 13.2%

[EIRR]

(a) Cost: Project cost (excluding tax), operation and maintenance expenses

(b) Benefit: Reduction in the number of hours for drawing water, increase in the number of working hours, decrease in healthcare related expenditure
(c) Project Life: 30 years

6. External Risk Factors

None

7. Lessons Learned from Findings of Similar Projects Undertaken in the Past

From ex-post evaluations of similar projects in the past, it has been learned that it is important to improve the existing water distribution network and to conduct public relations and awareness raising campaign for the project targeting the residents in order to boost the projects effects. In this project, in addition to improving and expanding the existing water distribution network, public relations and awareness raising campaign for the residents will be implemented.

8. Plans for Future Evaluation

(1) Indicators for Future Evaluation
(a) Population served (1000 persons)
(b) Amount of water supply (m^3/day)
(c) Available water per capita per day (L)
(d) Water supply hours (hr/day)
(e) Number of women who participated in capacity building training (%)
(f) Difference in the ratio of patients afflicted with non-skeletal fluorosis
(g) Difference in the ratio of dental fluorosis among students
(h) Internal rate of return: EIRR (%)

(2) Timing of Next Evaluation
2 years after project completion