

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: India
Project: Delhi Water Supply Improvement Project
Loan Agreement: October 29, 2012
Loan amount: 28,975 million yen
Borrower: The President of India

2. Background and Necessity of the Project

(1) Current Status and Issues of the Water Supply and Sewerage System/Sanitary Sector in India

In India, accessibility to safe water has been improved from 72% in 1990 to 88% in 2008. The country has been reaching its goal of establishing sustainable access to drinking water throughout India under the Eleventh Five-Year Plan (April 2007 through March 2012). However, water resource development and construction of water supply/sewerage systems are not keeping pace with increasing demand of drinking water stemming from India's increasing population and economic growth. Now, the country suffers from excessive dependence on groundwater and persistent troubles such as insufficient volume, poor water quality, and inadequate services. Even worse, groundwater in some areas contains substances harmful to humans such as Fluoride and Arsenic. In particular, the fluoride level in the water far beyond the WHO criteria of 1.5 mg/L, calling for urgent action to ensure supply of the safe drinking water. The sewerage systems in the country are also in-appropriate. Specifically, the facilities connected to the sewer system remains extremely low—just 28% in urban areas. Due to a drastic influx of population into urban areas and rapid industrialization, wastewater has overflowed treatment capacity and is passing untreated into rivers and the water bodies, threatening living conditions and sanitation for local residents. The organizations providing drinking/sewage water services face technical and financial challenges in operation/maintenance, such as high ratios of non-revenue water, problems in setting tariffs and lack of technical capacity.

(2) Development Policy for the Water Supply/Sewerage Sector in India and Priority of the Project

The Government of India set a goal of providing drinking water to India's entire urban population by 2011 and constructing sanitation facilities under the Eleventh Five-Year Plan (April 2007 through March 2012). Under the Twelfth Five-Year Plan (April 2012 through March 2017), government announced that they would follow the same approach. The Master Plan for Delhi-2021 formulated by the Delhi Development Authority in 2008 pointed out remedies for the drinking water sector: (1) taking measures to reduce non-revenue water and (2) achieving equitable water supply. Delhi Jal Board (DJB) will promote implementation of projects based on the M P. As a part of the M P, JICA supported the formulation of the M P through Delhi Water Supply Operation and Maintenance Project in India (2009–2011). The project is defined as the top priority scheme under M P.

(3) Japan/JICA's Policy/and Operations in the Water Supply/Sewerage Sector in India

As a part of environmental measures, priority goals for improving poverty alleviation and environmental issues under the Country Assistance Program for India by the Government of Japan were formulated. The Country Assistance Program considers rapid growth of urban population and support the supply of adequate and safe drinking water and the remediation of poor public sanitation in order to improve living standards and prevent water contamination in the major rivers. Further, in rural areas, water supply projects are supported as part of the development of basic infrastructure for the living environment of the poor. In Japanese ODA loans for India in the water supply/sewerage and sanitation sector, there are 24 projects with loans totaling 435.1 billion yen (13.6% of the entire approved amount). Under non-Japanese ODA loans,

JICA currently provides the Capacity Development Project for Non-Revenue Water Reduction in Goa (2011-2014). JICA's other contributions include dispatching policy advisors (2011-2013) in charge of the sewerage sector to the Ministry of Urban Development.

(4) Other Donors' Activity

The World Bank (WB) and Asian Development Bank (ADB) provide assistance in the water supply and sewerage system sector as a part of poverty reduction measures. Their priority issues are: (1) reorganization of relevant institutions, (2) fostering competition between local municipalities to provide drinking and sewerage services, (3) optimizing water fees, (4) introducing private-sector capital, and (5) considering impoverished groups. The World Bank supported a survey related to the improvement of drinking water facilities in Delhi.

(5) Necessity of the Project

India's National Capital Territory of Delhi (population: 16.75 million) suffers from limited water supply (only 6 hours or so in a day due to high leakage). The intermittent water supply makes things worse, since to stop and resume water supply, it is necessary to switch water distribution pumps on and off. This causes deterioration in pipes and drains due to the pressure resulting from water hammering. Further, system sections have not been delimited based on purification facility capacity. Therefore, per-capita water supply volume is not even among the system sections. To make matters worse, aging drinking water facilities and insufficient maintenance of the systems further aggravate the leakage. Taking ever-increasing drinking water usage due to explosive population growth along with economic development into account, the drinking water supply in the future is expected to become even tighter, despite the development of new water resources. This project aims to drastically improve leakage reduction to boost the volume of water to be supplied and thereby achieve a consistent equitable water supply. The project further aims to enhance maintenance by improving geographic information systems (GIS) related to drinking water facility data. Therefore, the aim of the project satisfies the development policies of the Indian government as well as the support policies of the Japanese government and JICA. Consequently, JICA's support for this project is necessary and very much relevant.

3. Project Description

(1) Project Objectives

The objective of the Project is to achieve equitable and continuous water distribution in the National Capital Territory of Delhi, by improving the water supply network including service network to customers, thereby contributing in upgrading citizen's living standard.

(2) Project Site/Target Area

Territory of Delhi

(3) Project Components

- 1) Reconstruction and renewal of drinking water facilities (e.g. water purification plants, pump stations, water distribution pipes, and water meters) in the Chandrawal water treatment system command area
- 2) Introduction of Supervisory Control and Data Acquisition (SCADA) system and improvement of GIS for drinking water facility data
- 3) Consulting services (e.g. detailed designs, bidding support, supervision of construction, enhancing maintenance management, and supporting educational activities for local residents)

(4) Estimated Project Cost (Loan Amount)

34,310 million yen (Yen Loan Amount: 28,975 million yen)

(5) Schedule

Planned between November 2012 and December 2022 (total of 122 months). Project completion is defined as the commencement of the service of the facilities (December 2021).

(6) Project Implementation Structure

- 1) Borrower: The President of India
- 2) Executing Agency: Delhi Jal Board (DJB)
- 3) Operation and Maintenance System: same as 2)

(7) Environmental and Social Consideration, Poverty Reduction/Social Development

1) Environmental and Social Consideration

- i. Category: B
- ii. Reason for Categorization: This project is classified as Category B because it will not have undesirable impact on the environment given the characteristics of the sector, the characteristics of the project and the characteristics of the project area under the "JICA Environmental and Social Guideline" (established in April 2010).
- iii. Environmental Permit: Preparation of an Environmental Impact Assessment (EIA) report for this project is not required under Indian law.
- iv. Anti-Pollution Measures: Drinking water facilities, including water purification plants, are designed and constructed in consideration of minimized noise and dust. Also, the sludge produced during facility operations will be adequately treated.
- v. Natural Environment: Adverse impact on the natural environment is expected to be minimal because the project sites and peripheral areas are located outside of national parks.
- vi. Social Environment: This project envisages renovation/rehabilitation of the existing facilities and does not involve land acquisition or resettlement.
- vii. Other/Monitoring: This project monitors air quality, water quality, noise, vibration, and the like during the construction period. When in service, the execution agency will monitor wastewater, solid waste, air quality, noise, and other parameters.

2) Promotion of Poverty Reduction: This project will involve educational activities for local residents, including slums.

3) Promotion of Social Development: JICA will study educational and capacity building activities, which will be reviewed in consideration of the gender perspective.

(8) Collaboration with Other Donors:

Japan plans to provide assistance through yen loan projects using the knowledge accumulated by Japan's municipal governments, including: (1) achieving a consistent water supply through management of drinking water facility data through GIS and SCADA and (2) enhancing operation and maintenance systems at drinking water facilities.

(9) Other Important Issues:

This project contributes to a stable drinking water supply by reconstructing and renewing drinking water facilities. It also mitigates the impact of climate change by improving living conditions for local residents. Therefore, this project contributes to climate change adaptation.

4. Project Benefits

(1) Quantitative benefits

- 1) Evaluation Indicators (operation and effect indicators)

Indicators	Baseline (2011 actual)	Target (2023) two years after completion
Capacity utilization (%)	-	100
Average water supply hours per day	6	24
Meter Installation ratio (%)	40	100
Water tariff revenue collection ratio (%)	65	90
Non-revenue water ratio (%)	50	15

2) Internal Rate of Return (IRR)

Based on the conditions below, the Economic Internal Rate of Return (EIRR) of this project was calculated as 16.5%.

EIRR:

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

Benefits: Enhanced water charge payments and reduction in investment costs for water reservoirs

Project Life: 30 years

- (2) Qualitative benefits: Improvement of living conditions for residents of the Delhi territory, capacity building for the financial sustainability and facilities maintenance by the executing agency, and adaptation to climate change

5. External Factors and Risk Control

Economic stagnation and unstable political situation in India and the surrounding area of the project as well as natural disasters

6. Lessons Learned from Past Projects

(1) Assessment results of similar projects

A lesson learned from the results of Jamaica's ex-post monitoring of the Montego Bay Water Supply (Great River) Project was that reducing non-revenue water is absolutely critical to ensure the financial sustainability of water supply projects. Therefore, it is necessary to include programs that reduces non-revenue water and adoption of energy efficient systems.

(2) Lessons for the Project

To ensure appropriate O & M after project completion, funds to cover new investment costs, and stronger financial health of DJB, JICA will make an effort to reduce the non-revenue water ratio through enhanced operation and maintenance systems of drinking water facilities using GIS and Supervisory Control and Data Acquisition (SCADA) system.

7. Plans for Future Evaluation

(1) Indicators for Future Evaluation:

- 1) Facility Operation rate (%)
- 2) Average water supply hours (hour per day)
- 3) Installation rate of water meter (%)
- 4) Water fare collection ratio (%)
- 5) Non-revenue water ratio (%)
- 6) Economic Internal Rate of Return (EIRR) (%)

(2) Timing of Next Evaluation:

Two years after plan completion