

## Ex-Ante Evaluation (for Japanese ODA Loan)

### 1. Name of the Project

Country: India

Project: Rajasthan Rural Water Supply and Fluorosis Mitigation Project

Loan Agreement: September 28, 2012

Loan amount: 37,598 million yen

Borrower: The President of India

### 2. Background and Necessity of the Project

#### (1) Current State and Issues of the Water Supply/Sewerage System and 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 in 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 up with the increasing demand in drinking water stemming from India's increasing population and economic growth. Today, the country suffers from an excessive dependence on groundwater and chronic problems such as a broken and uneven water supply. 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 the supply of safe drinking water. The sewerage systems in the country are also troubled. Specifically, the percentage of facilities connected to sewer pipes remains extremely low—just 28% even 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 like, threatening living conditions and sanitation for local residents. The organizations providing drinking/sewerage water services face technical and financial challenges in operation/maintenance, such as high ratios of non-revenue water, problems in setting fees, and a lack of trained employees.

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

The Government of India set a policy agenda under the Eleventh Five-Year Plan (April 2007 through March 2012) to establish sustainable access to drinking water and supply drinking/sewerage water services and sanitary facilities to the entire urban population of India. In 2009, the Union Government further formulated the National Rural Drinking Water Programme (NRDWP) to supply safe and sufficient drinking water in rural areas as soon as possible and to promote sustainable maintenance. In the same year, the Union Government also formulated the National Fluorosis Reduction Programme to address fluoride contamination of groundwater, which is becoming increasingly worse in certain areas.

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

As a part of environmental measures, priority goals were formulated by the Government of Japan for improving poverty and environmental issues under the Country Assistance Program for India. The Country Assistance Program will consider the 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 development 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 is currently providing the Capacity Development Project for Non-Revenue Water Reduction in Goa (2011-2014). JICA's other contributions include dispatching policy advisors in charge of the sewerage water 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 United States Agency for International Development (USAID) provides assistance focusing on capacity building to improve the financial conditions of the project operation agencies.

#### (5) Necessity of the Project

The site of this project, the Nagaur District in the state of Rajasthan, is located next to the state capital of Jaipur City. The area is in an arid region of the Thar Desert and has a population of approximately 3.31 million. Nagaur District's annual precipitation is 410 mm, which is lower than the national average (1,200 mm) and state average (531 mm) and makes it difficult to meet the increasing water demand from the region's growing population. Low rainfall makes limited surface stream water available, resulting in overuse or depletion of groundwater, and the district suffers from chronic water shortages. Moreover, most of the groundwater in

Nagaur District contains a large amount of naturally derived fluoride. The level of the fluoride is well over the WHO drinking water criteria. The people in the district have no option other than to use the undrinkable groundwater, since they have no other source of water. Consequently, a significant portion of local residents suffer from diseases such as dental fluorosis and osteofluorosis. According to the 2010 survey, about 34% of children aged 6–14 in the district are affected with fluorosis. With about 80% of its residents unable to access safe water, the Nagaur District has the most serious water shortage in Rajasthan. This project aims to resolve water shortages and problems with fluoride-contaminated drinking water so that local residents have access to safe water. 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 highly necessary and relevant.

### **3. Project Description**

#### **(1) Project Objectives**

The project will provide safe and adequate drinking water supply to people in Nagaur District suffering from acute scarcity of potable water and ground water which is heavily contaminated by fluoride, by constructing surface water supply facilities, thereby reducing hardship and improving the health and quality of life.

#### **(2) Project Site/Target Area**

Southern and Eastern region of Nagaur District, State of Rajasthan, India

#### **(3) Project Components**

1) Construction of new drinking water facilities (e.g. water purifying plants, water transmission lines, pump stations, and water supply networks) that take water from the Indira Gandhi Canal.

2) Measures to prevent fluorosis (e.g. training health experts, dietary instructions, and educational activities for local residents)

3) Capacity building (supporting the formation of operation and maintenance organizations, technology transfers) for the Village Water Sanitation Committee (VWSC), taking charge of operation and maintenance for facilities in local municipalities

4) Consultation services (e.g. reviewing detailed designs, bidding support, supervising construction work, and enhancing maintenance management)

#### **(4) Estimated Project Cost (Loan Amount)**

51,143 million yen (Yen Loan Amount: 37,598 million yen)

#### **(5) Schedule**

Planned between September 2012 and October 2017 (total of 62 months). Project completion is defined as the commencement of the service of the facilities (May 2017).

#### **(6) Project Implementation Structure**

1) Borrower: The President of India

2) Executing Agency: Public Health Engineering Department, Government of Rajasthan (PHED)

3) Operation and Maintenance System: Transmission of water up to village/towns entrance by PHED, intra-village distribution by VWSC and for towns. (partial relegation to municipal governments is planned)

#### **(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 significant 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" (dated 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 noise and dust. Also, the sludge produced when the facility starts operation 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: The approximately 215 ha of privately owned land needed for this project has already been acquired based on the country's Land Acquisition Act. No resettlement of local residents is necessary. To implement this project, approximately 60 ha of land owned by the state government is scheduled to be transferred before the start of operation in accordance with the necessary process stipulated in domestic laws.

vii. Other/Monitoring: This project monitors air quality, noise, and waste during the construction period. When in service, the execution agency will monitor water quality, methods for treating sludge, and the like.

2) Promotion of Poverty Reduction: Educational activities for local residents and capacity building activities for VWSC consider socially vulnerable and impoverished groups by encouraging the participation of at

least a certain percentage of designated tribes and castes.

- 3) Promotion of Social Development (e.g. Gender Perspective, Measures to Prevent Infectious Diseases Including AIDS, Participatory Development, Consideration for the Handicapped, etc.): To mitigate the infectious risk of HIV/AIDS during construction, the project will include preventative measures in the bidding documents to urge contractors to provide preventative programs to their labor force. Further, it has been determined that educational activities for local residents and capacity building activities for local governments should make sure that at least 30% of the participants are women. The relevant activities will be reviewed in consideration of a gender perspective.
- (8) Collaboration with Other Donors: N/A
- (9) Other Important Issues: To combat fluorosis, training in Japan is scheduled to be provided to persons involved in this project with the cooperation of Osaka Medical College. This project helps mitigate the impact of climate change by improving living conditions for local residents through the provision of safe and stable drinking water from new drinking water facilities. Thus the project contributes to climate change adaptation.

#### 4. Project Benefits

##### (1) Quantitative benefits

##### 1) Evaluation Indicators (Operation and Effect Indicator)

Indicators	Baseline (2011 actual)	Target (2019) two years after completion
Served population (thousands of people)	—	2,441
Percentage of served population (%)	—	100
Surface water supply amount (m <sup>3</sup> /day)	—	155,181
Safe water availability Lpcd (L/per capita/per day)	—	55 L (village) and 100 L (city)
Rate of facility utilization (%)	—	77.03

Impact indicators:

- 1) Difference in the percentage of patients who complain of joint pain (difference in the percentage of target area participants who complain of joint pain before and after project implementation)
- 2) Difference in the percentage of patients whose urinal fluoride exceeds normal levels (difference in the percentage of target area participants whose urinal fluoride exceeds normal levels before and after project implementation)

##### 2) Internal Rate of Return (IRR)

Based on the conditions below, the Economic Internal Rate of Return (EIRR) of this project was calculated as 15.13%.

EIRR:

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

Benefits: Water charge payments and lower costs in constructing/maintaining fluoride eliminators

Project Life: 30 years

- (2) Qualitative benefits: Improvement in health and living conditions for residents in the Eastern region of Nagur District, boosting local residents' knowledge of fluoride, capacity building (increasing operation and maintenance ability) of the executing agency and VWSC, and adaptation to climate change.

#### 5. External Risk Factors and Risk Control

Economic stagnation and deterioration in 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 Philippines' ex-post monitoring of the Boracay Environmental Infrastructure Project was that when operating party differs from the one executed the project, it is critical to secure involvement of the operating party from the project planning stage to foster ownership.

##### (2) Lessons for the Project

Operation and maintenance of drinking water facilities in the towns for this project will be delegated to respective local Municipal Governments and intra village distribution system to Panchayat Raj Institutions through Village Water and Sanitation Committee (VWSC) other than that of executing agency. Therefore, based on lessons learned, JICA thoroughly explained the outline of the project together with roles and responsibilities in the operation and maintenance of relevant facilities to the local governments and PRIs involved from the project formulation stage. JICA also carefully collected feedback from the local governments. In addition, JICA plans to provide capacity building assistance to the local governments and PRIs regarding the operation and maintenance system for the facilities.

## **7. Degree of Maturity and Possibility of Adaptation**

### (1) Indicators for Future Evaluation:

- 1) Population with access to water supply (thousands of people)
- 2) Coverage of the water supply system (%)
- 3) Water supply quantity (M<sup>3</sup>/day)
- 4) Per capita water quantity available (L)
- 5) Facility utilization ratio (%)
- 6) Economic Internal Rate of Return (EIRR) (%)

### (2) Timing of Next Evaluation:

Two years after plan completion