

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country : India

Project : Project for Pollution Abatement of River Mula-Mutha in Pune

Loan Agreement : January 19, 2016

Loan Amount : 19,064 million Yen

Borrower : The President of India

2. Background and Necessity of the Project

(1) Current State and Issues of the Sewerage Sector in India

In India, the generation of sewerage has been increased due to rapid population expansion and industrialization. Meanwhile, just 30% of the amount of generated sewerage is treated by sewerage facilities, and sewer network service ratio reaches only 36% for the whole India. Therefore, a lot of raw sewerage is being discharged into rivers without any treatment. As a result, infectious diseases and bad odor are spread via polluted water, thereby compromising hygiene condition of habitants and deteriorating the living environment. In addition, sewerage service providers in India face a number of technical and financial difficulties with respect to management and maintenance of the facility, including low house connection rates, low water tariffs, lack of capacity, and personnel shortages.

(2) Development Policies for the Sewerage Sector in India and the Priority of the Project

Under the current 12th Five-Year Plan, the Government of India prioritizes establishment of sustainable access to sewerage and sanitation facilities for all urban population in India. Especially, the Government of India focused on sewerage facilities corresponding to water supply facilities and recycled sewage to tackle water scarcity. The project intends to carry out construction of sewerage facilities corresponding to water supply facilities in the urban area which has no sewerage facilities, and therefore meets the Indian government's sewerage policy.

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

In Japan's Country Assistance Programs for India (May 2006), the Japanese government designated as priority area reducing poverty and environmental problems in India as well as providing support for sewerage development as part of its efforts to solve environmental problems. Meanwhile, in its Country Analysis Paper (March 2012), JICA prioritizes the development of industrial and urban infrastructure in India, and aims to support sewerage development in order to prevent water contamination in the major rivers, solve poor public sanitation, and improve life quality. Previously, JICA received authorization to provide ODA

loans to India of the amount of 245.8 billion yen for 12 projects in sewerage sector (including water supply and sewerage projects).

(4) Other Donors' Activity

In its Country Assistance Strategy for India, the World Bank notes population increases in medium-sized cities and changes resulting from industrialization as high priority issues; the World Bank is working to support sewerage development to resolve these issues. The Asian Development Bank (ADB) is also engaged in supporting India's sewerage sector alongside implementing poverty reduction measures; in addition to developing facilities, the bank also focuses on establishing facility management and maintenance systems based on international standards, enhancing organizations and technical skills, and promoting Public-Private Partnerships (PPP) based on lessons learned in other countries.

(5) Necessity of the Project

Pune city in the state of Maharashtra, with the population of 3.12 million in 2011, generates 728 MLD of sewage in 2014, while the total sewage volume treated at the existing STPs is estimated at only 476 MLD. Thus 252 MLD of sewage is being discharged directly into three major rivers, Mula, Mutha and Mula-Mutha river, causing serious pollution there. These rivers are classified as one of the 35 most polluted rivers in India by the Central Pollution Control Board. These rivers flow into the Bhima River, of which water is for potable use in the downstream, and the pollution results in worsening hygienic condition of the city environment and greater risk to health condition of its citizen. Therefore, development of an integrated sewerage system is imperative for improving sanitation, hygiene and living condition of the citizens.

3. Project Description

(1) Project Objective

The objective of the Project is to improve the water quality in the Mula, Mutha and Mula-Mutha rivers by augmenting sewage collection systems and sewage treatment facilities in PMC area. It also includes taking other measures required for the pollution abatement and thereby improving the sanitation and living conditions of people who reside in Pune City and in the watershed of the downstream area.

(2) Project Site/Target Area

Pune, State of Maharashtra, India

(3) Project Component(s)

- 1) Construction of Sewerage Facilities (Sewerage Treatment Plant, Sewers, Pumping

Stations, and Bio-gas Power Generation Plant) (Local competitive bidding for small-scale packages of sewers, International competitive bidding for others)

- 2) Installation of Central SCADA System (International competitive bidding)
- 3) Installation of Public Toilets (Local competitive bidding)
- 4) Consulting services (Detailed design, bidding assistance, construction management, management improvement, public awareness, etc) (Short list)

(4) Estimated Project Cost (Loan Amount)

22,443 million Yen (Loan Amount : 19,064 million Yen)

(5) Schedule

February 2016–May 2023 (87 months). The Project will be completed when the facilities are put into operation.

(6) Project Implementation Structure

- 1) Borrower : The President of India
- 2) Executing Agency : National River Conservation Directorate (NRCD), Ministry of Environment, Forest and Climate Change, and Pune Municipal Corporation (PMC)
- 3) Operation and Maintenance System : PMC is responsible for supervision of O&M activities conducted by contractors. Under the Project, consulting service for institutional strengthening will be provided for PMC.

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

1) Environmental and Social Consideration

- ① Category : B
- ② Reason for Categorization : The project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors under the JICA guidelines for environmental and social considerations (April 2010), and its potential adverse impacts on the environment are not likely to be significant.
- ③ Environmental Permit : Submission of Environmental Impact Assessment (EIA) reports is not required for the project under Indian law. Clearance for effluent standards and design of STP will be obtained from Maharashtra State Pollution Control Board before the commencement of bidding process.
- ④ Anti-Pollution Measures : Air quality, water quality, noise and solid waste during construction will be monitored by contractors to adhere to Indian law through such measures as regular sprinkling of water, prohibition of disposal sediment nearby water place, velocity limitations, and regular collection of solid wastes, and thus there is no serious negative impact on air quality, water quality, noise and solid waste

management. Sewage and sludge during operation are treated to adhere to Indian environmental standards and effluent standards, and thus there is no serious negative impact on sewerage discharged and sludge treatment.

- ⑤ Natural Environment : The project area is not in or near an area that is susceptible to impact, such as a nature preserve. Therefore, the project is assessed as having a minimal negative impact on the natural environment.
 - ⑥ Social Environment : A total of 3.64 ha of public land and 5.27 ha of private land will be acquired for pumping stations in the Project in accordance with India's land acquisition procedures as well as the JICA Environmental and Social Guidelines. No resettlements will be required during the construction. Although there was an opinion about compensation amount in the stakeholder meeting, PMC explained to the participants that the amount will be decided to adhere to JICA Environmental and Social Guidelines and Indian law and the participants understood.
 - ⑦ Other / Monitoring : PMC monitors air quality, water quality, noise, vibration, solid waste, and the like during the construction period. When in service, PMC will monitor treated sewerage, sludge, air quality, noise, and other parameters.
- 2) Promotion of Poverty Reduction : This project will implement public awareness activities to improve sanitation and living condition for local residents including impoverished groups.
 - 3) Promotion of Social Development (e.g. Gender Perspective, Measure for Infectious Diseases Including HIV/AIDS, Participatory Development, Consideration for the Person with Disability etc.) : The aspect of gender will be taken into consideration in the capacity building of relevant organizations, and awareness activities. HIV/AIDS clause will be included in the tender document, with reference to the Sample Bidding Documents of JICA.

(8) Collaboration with Other Donors : The Project is seeking the collaboration with Japanese Urban and Local Body.

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicator)

Indicator	Baseline (Actual Value in 2014)	Target (2024) 【Expected value 2 years after project completion】
Treated sewage amount (m ³ /day) average of the year	465,600	794,400
Serviced population (person) and service coverage (%)	2,192,000 (64%)	4,794,000 (94%)
Effluent BOD concentration (mg/L)	10	10
Effluent SS concentration (mg/L)	13	10

- 1) Treated sewage amount: in 2011; existing joint STP capacity (80%) 381,600 + individual STP 84,000 = 465,600 m³/d, in 2023; existing STPs 477,000 + Planned STPs (60%) 237,600 + individual STP (95%) 79,800 = 794,400 m³/d
- 2) Service Population: in 2011 service coverage (treated 465,600/generated 728,000 m³/day) = 64%, Population the Project area 3,425,000 x 0.64 = 2,192,000
- 3) Service Population: in 2023 service coverage (treated 794,400/generated 841,500 m³/day) = 94%, Population the Project area 5,100,000 x 0.94 = 4,794,000

2) Internal Rate of Return

Based on the conditions indicated below, Economic Internal Rate of Return (EIRR) for this project has been calculated to be 6.5%. The Financial Internal Rate of Return (FIRR) was not calculated because there is no sufficient revenue to recover neither of capital cost or O&M cost.

【EIRR】

Cost : Construction cost, O&M cost, Rehabilitation cost

Benefit : (a) Cost reduction regarding medical cost, (b) Saving cost to Bleaching powder for purification of water in downstream villages, (c) Saving cost for building septic tank, (d) Profit for CAP trade of emission gas in future market, (e) Land trade price with without contribution of sewerage system in urbanization

Project Life : 30 years after completion

(2) Qualitative Effects : Improvement in sanitation, hygienic and living condition, improvement of residents' awareness about sanitation, improvement in health condition of the people by reducing water-borne diseases in Pune, and adaptation to climate change (Improvement of sewerage and drainage capacity by installing separate sewer system)

5. External Factors and Risk Control

Deterioration of the political and economic situation and natural disasters in India and the regions surrounding the project area

6. Lessons Learned from Past Projects

(1) Lessons Learned from Similar Projects

The ex-post evaluation of the Urban Water Supply and Sanitation Improvement Program in India and other findings show that the following measures are important for smooth implementation and ensuring sustainability of the project: consideration of new tariff structure; supports for individual house connections; institutional improvement for operation and maintenance of sewerage facilities, financial management; simplification of decision-making process; and public awareness.

(2) Utilization of the Lessons in this Project

To benefit from the above lesson, suitable sewerage tariff system will be introduced as part of this project based on data on residents' willingness and capability to pay sewerage charge which is surveyed under consulting service. In addition, preparation of necessary legal system and public relations activities for raising residents' awareness to promote house connection will be conducted as part of social development efforts.

7. Plan for Future Evaluation

(1) Indicators to be Used

Treated sewage amount (m³/day) average of the year

- 1) Treated sewage amount (m³/day) average of the year
- 2) Serviced population (person) and service coverage (%)
- 3) Effluent BOD Concentration (mg/L)
- 4) Effluent SS concentration (mg/L)
- 5) Economic Internal Rate of Return (EIRR) (%)

(2) Timing

Two years after project completion