Ex-Ante Evaluation Paper (for Japanese ODA Loan)

South Asia Division 1, South Asia Department, JICA

1. Name of the Project

Country: India

Project: Project for Pollution Abatement of Nag River in Nagpur

Loan Agreement: March 27, 2020

2. Background and Necessity of the Project

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

In India, sewerage emissions are increasing as the demand for clean water increases following the population growth and economic development, but only about 37% of sewerage emissions are treated with the current treatment capacity of the sewerage treatment facilities (according to the data of the India Central Pollution Control Board, 2016), and the access ratio to sanitary facilities is 39.6% (World Bank, 2015), which is low and causing problems such as water pollution in rivers in various regions. Moreover, there are problems in terms of operation, maintenance, and management such as insufficient human resources of entities in charge of sewerage services.

The Indian government has set the policy goals of providing sewerage and sanitary facilities to the whole population in urban areas and eradicating outdoor excretion, etc. in the National Urban Sanitation Policy 2008. The insufficient water supply and sewerage systems was pointed out as an issue for urban development in the Three Year Action Agenda (from 2017/18 to 2019/20) announced in 2017, and toward the solution of the issue, the Clean India Mission: Swachh Bharat Mission to eradicate outdoor excretion and improve environments of each city through the development of sewerage and sanitary facilities and the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) to promote infrastructure developments, including water supply and sewerage facilities in major cities, started in 2014.

In Maharashtra, the target region of the Project, water policies have been formulated in accordance with the directions of both of the above policies of the central government, and efforts have been made proactively such as utilization of water resources, conservation of rivers, and mandatory recycling of industrial water, etc.

Nagpur in Maharashtra is a hub city of the state, whose population is approx. 250 million (2011 census). The city is being rapidly urbanized, but pipes and

drains in the city have not been developed accordingly, and untreated sewerage is discharged into the rivers flowing though the city, causing serious pollution and enormous adverse effects in dwelling environments especially of northern and central zones, where the populations are concentrated. These rivers flow into the dams that are used for irrigation and industrial water downstream, so the water pollution in the dams is also a serious problem. This Project, whose purpose is to improve the water quality of the Nag River, Pili River, etc. and improve the sanitary and living environments of residents in the basins of the rivers and downstream through the developments of the intake weir that takes sewerage at the point before flowing into the mainstreams of the Nag River and Pili River, major pipes and drains to deliver the sewerage to sewerage treatment facilities, and sewerage treatment facilities, is positioned as a key project in the Indian Sewerage Sector.

(2) Japan and JICA's Sewerage Sector Policy and the Positioning of the Project

Country Assistance Policy for India (March 2016) has set a priority goal of "assistance for sustainable and comprehensive growth" and positioned the assistance for water supply and sewerage as a part of countermeasures against environmental problems and climate change. Moreover, the paper of the JICA Country Analysis Paper for India (March 2018) set "assistance for sustainable and comprehensive growth" as a priority field and assumed that responses to rapid urbanization could be made by providing assistance to the social sector such as fundamental social infrastructure development, etc., including sewerage and sanitary facilities as a part of urban development in the water supply and sewerage, sanitary improvement, and pollution prevention measure program. Therefore, this Project is consistent with the analysis and policies. This Project also agrees with the development issues and policies of India as well as cooperation policies and analyses of Japan and JICA and is presumed to contribute to the SDGs Goal 6, "securing of sustainable water resources, water, and sanitation for everyone".

(3) Other Donors' Activities

The World Bank set the revitalization of urban areas and the sustainability improvement as a priority item in the Country Partnership Framework (from 2018 to 2022), adopted the policy of providing assistance to water discharge management and waste management, and placed emphasis on the enhancement of collaboration in the private sector and capacity enhancement

of autonomous communities in urban areas in order to achieve the goal. The Asian Development Bank is promoting the development of public infrastructure, including water supply and sewerage, toward comprehensive urbanization as a priority field in the Country Partnership Strategy (from 2018 to 2022) as well as placing emphases on institutional system enhancement, capability improvement, and promotion of PPP utilizing lessons from other countries. They have recently implemented the Tamil Nadu City Flagship Investment Program, which supports the supply water and sewerage development in Tamil Nadu (3 tranches in total, up to 500 million USD. The 2nd tranche (206 million USD) was approved in 2019). The United States Agency for International Development has a proven record of supporting the capacity development of business operation institutions of water supply and sewerage and the sanitation sector in 70 cities of 13 states in total, such as Karnataka and Maharashtra, from 1993 to 2011. Moreover, they provided technical assistance for effective utilization of water sources in Maharashtra, Haryana, and Rajasthan from 2012 to 2013. Agence Française de Développement (AFD) has set the sustainable urban development in assistance to India as a priority item and has a proven record of implementing water supply and sewerage development projects, etc. in the field of water resources. It is planning to implement the Riverfront Development Project also in Nagpur, Maharashtra that is a target region of this Project as described later in 3. (7).

3. Project Description

(1) Project Objective

The objective of the Project is to improve the water quality and abate the pollution of Nag River and Pili River in Nagpur, Maharashtra by developing sewerage system and sanitary facilities in their basins, thereby contributing to the improvement of urban environment.

(2) Project site / Target Area: Nagpur in Maharashtra (northern and central zones)

(3) Project Components

1) Establishment and renovation of sewerage facilities (sewerage treatment plants, pumping stations, and sewerage pipes and drains, etc.)
2) Establishment of other facilities that contribute to the improvement of sanitary environments (public toilets, electric crematoriums, and cattle-washing facilities)

3) Consulting services (basic design, detailed design, bidding support, construction management, PR and enlightenment activities, and institutional capability enhancement, etc.)

(4) Estimated Project Cost

37,637 million yen (of which, the ODA Loan amount is 29,082 million yen)

(5) Schedule

March 2020 - October 2029 (116 months in total). The Project will be completed upon the commencement of services of the facilities of the entire package (July 2028).

(6) Project Implementation System

1) Borrower: President of India

2) Guarantor: None

3) Executing Agency: National River Conservation Directorate, Ministry of Jal Shakti (NRCD)

4) Operation and Maintenance System: Nagpur Municipal Corporation (NMC)

(7) Collaboration with Other Schemes and Donors

1) Japan's Assistance Activity: N/A

2) Other Donors' Assistance Activities

AFD is planning to implement riverfront development projects, such as bank protection to mitigate floods and renovation of roads and facilities surrounding rivers in the basin of the Nag River, Nagpur City, and the master plan that summarized the project plan and DPR were created by the NMC at the time of examination and are now in the process of approval by the Indian government. It has been confirmed that there is no overlapping in the contents between the project of AFD and this Project, but if the river pollution is mitigated by this Project, the significance of riverfront development will increase.

(8) Environmental and Social Consideration / Cross-Sectoral Issues / Gender Category

1) Environmental and Social Consideration

① Category: B

② Reason for Categorization: This Project is not located in a sensitive area, nor falls in to sensitive sectors under JICA Guidelines for Environmental and Social Considerations (published in April 2010), and its potential adverse impacts on the environment are not likely to be significant.

③ Environmental Permit

There is no obligation to prepare an environmental impact assessment (EIA) report concerning this Project in the domestic laws of India.

④ Anti-Pollution Measures

During the work, mitigation measures are planned to be taken such as water sprinkling, transport of waste to appropriate disposal sites, utilization of low-pollution equipment, and installation of sound insulation walls, etc. in order to meet the domestic emission criteria and environmental criteria of the country in terms of air pollution, water pollution, noise, etc. When the services are commenced, the effects of bad odor, noise, and vibration, etc. shall be reduced by deploying facilities and equipment concerning deodorization and noise insulation to meet the criteria of the country. Regarding the water quality and soil, early detection of leakage is performed, and countermeasures are taken through the monitoring of untreated sewerage and sludge. Moreover, regarding the components which are likely to influence the environment such as heavy metals in untreated sewerage, it has been confirmed that values exceeding the domestic standard in India and international effluent standards are not detected. Furthermore, in the project implementation phase, the NMC makes it a point to perform water quality surveys periodically in the environmental monitoring plan.

⑤ Natural Environment

The project target area does not fall under national parks and other vulnerable areas or their vicinities, and adverse effects on the natural environment are assumed to be minimal.

⑥ Social Environment

This Project includes a land acquisition of 2.5 ha, and the acquisition is implemented in accordance with domestic procedures in the country and the JICA Guidelines. Moreover, the stakeholders meeting concerning the Project has already been held and no objections to the project implementation have been confirmed.

⑦ Other / Monitoring

The contractor and the NMC perform monitoring of air quality, water quality, noise, waste disposal, and ecosystem, etc. during the construction. After the commencement of services, regarding sewerage treatment plants, the NMC sewerage department performs the

monitoring of pipes and drains in the form that the NMC monitors the private company to which they have consigned the operation and management/maintenance and administration.

2) Cross-Sectoral Issues

① Projects related to the countermeasures against climate change

In Nagpur, a forecast has been made that while the average temperature in the city may increase owing to climate change in the future, precipitation is unlikely to increase. Therefore, the amount of river water may decrease in the future and subsequently cause problems such as deterioration of the water sanitation environment, etc. This Project, which mitigates the pollution of a river by taking and treating untreated sewerage before it flows into the river and discharging the treated water into the river, is something that contributes positively to climate change (adaptation measures) because it can control the deterioration of the water sanitation environment.

② Poverty countermeasures and consideration

It falls under the category of poverty countermeasures because it is planned to develop sewerage facilities in the areas, including slums spread across northern and central
zones.

③ Countermeasures against infectious diseases like AIDS/HIV

The HIV infection risk is presumed to be high because a lot of workers are planned to be engaged in this Project. Therefore, in order to prevent the risk of HIV infection during the construction work, HIV/AIDS prevention provisions are contained in bidding documents, and contractors are requested to collaborate in HIV/AIDS countermeasures for workers.

④ Participation-type development: N/A

⑤ Disability consideration, etc.

The country ratified the UN Convention on the Rights of Persons with Disabilities in October 2007 and has to observe accessibility stipulated in Article 9 of the convention. Regarding the installation of public toilets, etc., an agreement has already been made with implementation institutions on the consideration for securing accessibility assuming the use by disabled and elderly people. A greenhouse gas (GHG) emissions reduction effect is expected from improvements in traveling performance, etc. through the Project, which contributes positively to climate change (mitigation

measures). The expected climate change mitigation effect of the Project (rough estimation of the GHG emissions reduction) is approx. 2050t/year (as of 2025).

3) Gender Category: ■GI (S) (Gender activity integration project)

<Activities/Classification Rationale>

This Project has surveyed the gender mainstreaming needs in the sewerage sector in the cooperation preparation survey, and an agreement has already been made under which women participate in the resident conference and equal pay for equal work at the stage of construction between men and women is secured in the future. Moreover, an agreement has already been made such that if a public toilet is installed as a public sanitation facility, the location and instruments shall be determined in consideration of women. Therefore, it falls under the category of Integrated Gender Activity Project.

(9) Other Important Issues: N/A

4. Targeted Outcomes

(1) Quantitative Effects

1) Outcomes (Operation and Effect Indicators)

Indicator	Baseline (Actual value in 2019)	Target (2030) [2 Years after Completion]
Amount of wastewater treated (m^3/day)*	7,400	91,000
Percentage of population served in the project area (population in treatment area / populations in northern and central zones) (%)**	74	100
Improvement of river water quality. (BOD : mg/L)***	30-70	20
Population treated (population in treatment area****) (person)	1,485,000	2,428,000

*The actual values are sewerage treatment amounts (the amount of sewerage that flows into and is treated in each sewerage treatment plant) as of 2019 at two existing sewerage treatment plants scheduled to be renovated in the Project. The estimated sewerage treatment amounts as of 2030 at three sewerage treatment plants that are scheduled to be newly constructed in the Project are added to the target values.

**The population of the region where the sewerage generated is treated / Population of the whole target area of the project (northern and central zones) This is not the development ratio of house connection pipes to each household.
***The BOD concentration of river water in central and northern zones that are project target region.
****The sewerage treatment district refers to the treatment basins of four existing sewerage treatment plants in 2019 and the whole regions of northern and central zones in 2030.

(2) Qualitative Effects:

Sanitary and living environment improvement (reduction of bad odor and mitigation of inundation damage), health condition improvement by the mitigation of waterborne infectious diseases and raised awareness of residents regarding living environment improvement.

(3) Internal Rate of Return

According to the following preconditions, the Project's Economic Internal Rate of Return (EIRR) will be 8.3%. Moreover, income to cover sufficiently the Project costs and maintenance/operation costs cannot be expected from the project, so the Economic Internal Rate of Return (EIRR) is not calculated.

[EIRR]

Cost: Project costs and maintenance/operation costs (both excluding tax)

Benefit: Increase in the sewerage charge due to the household effluent and human waste treatment cost reduction effect and new sewerage treatments

Project Life: 40 years

5. External Factors and Risk Control

(1) Preconditions: N/A

(2) External Factors: N/A

6. Lessons Learned from Past Projects and Application to the Project

Lessons have been learnt from the ex-post assessment results (2005) of the Regional Supply Water and Sewerage Sanitation Environment Development Project, the yen loan to India, that tell us consideration of charge systems, house connection support, operation and maintenance system enhancement, financial management enhancement, decision-making process rationalization and PR activity support are important for the smooth implementation of projects and securing of sustainability.

This Project supports the institutional enhancement related to the operation and maintenance system and financial management, etc. of implementation institutions through consulting services concerning institutional capability enhancement and considers appropriate fee structures and house connection promotion of sewer pipes, etc. Moreover, PR and enlightenment activities are planned to be implemented in order to further improve the understanding of people regarding the importance of sewerage treatment facilities and the prevention of solid waste dumping.

7. Evaluation Results

This Project also agrees with the development issues and policies of India as well as cooperation policies and analyses of Japan and JICA and is presumed to contribute to the SDGs Goal 6, “securing of sustainable water resources, water, and sanitation for everyone”. Therefore, the necessity of supporting the implementation of this Project is high.

8. Plan for Future Evaluation

(1) Indicators to be Used

As indicated in sections 4. (1) to (3).

(2) Timing of the Next Evaluation

Two years after the project completion

End