Ex-Ante Evaluation (for Japanese ODA Loan)

South Asia Division 1, South Asia Department, JICA

1. Name of the Project

Country: India

Project: Rajasthan Rural Water Supply and Fluorosis Mitigation Project (Phase 2)

L/A signing date: March 26, 2021

2. Background and Necessity of the Project

(1) Current State and Issues of the Water Supply Sector/Rajasthan in India

The Government of India set a target of "establishing access to drinking water for the entire population of India" in its "National Water Policy" of 2012 and has promoted the development of water supply systems throughout the country. However, water resource development and construction of water supply facilities have not caught up with the increase of water supply demand that has been caused from population growth and economic growth. The percentage of households capable of receiving piped water supply (water supplied though pipes to individual houses) in India is particularly low in rural areas at about 32% (2020), and the development of water supply systems in rural areas is lagging. In addition, there are many regions in which the groundwater is contaminated with substances that are harmful to humans, such as naturally occurring fluorine that exceeds standard values. Thus, the supply of safe potable water through the construction of water supply systems is urgently needed. The Department of Drinking Water and Sanitation, Ministry of Rural Development (reorganized into the Ministry of Jal Shakti in 2019), launched the "National Rural Drinking Water Program" in 2009. It engaged in development of water resources and construction of water supply system with the aim of supplying safe and sufficient drinking water to all rural residents. Under the second Modi ministry, which came into power in May 2019, the Ministry of Jal Shakti reorganized the "National Rural Drinking Water Program" into a national strategy named "Jal Jeevan Mission" in August 2019, which aims to provide functional household tap connection to every rural household in India by 2024.

The target area of the Rajasthan Rural Water Supply and Fluorosis Mitigation Project (Phase 2) (hereinafter "the Project") is the state of Rajasthan, which is the largest state in India and has a population of approximately 69 million people (2011). However, the ratio of rural households with piped water supply is less than 17% in the state as of December, 2020, which is far lower than the average

ratio in India, which is around 32%. In Jhunjhunu District and Barmer District, which are the targeted districts of the Project, the piped water ratio is about 20% and 8% (2020), respectively, and they are also far lower than the average ratio in India. Rajasthan is one of the states facing the severest water shortages in India. In many areas of the state, including the two districts, the Baseline Water Stress (an indicator used to value amount of actual water use vis-à-vis annual amount of water availability in each region) far exceeds 40%, which is the level indicating a highly severe situation, and even surpasses 80% (2010), which is the worst level in India. The construction of water supply facilities utilizing surface water is lagging in Rajasthan, as surface water is relatively scarce in the state due to its geographical conditions. Meanwhile, a decline in ground water level has been observed in the state due to excessive use of groundwater by the local residents as their main water source, which causes serious concern in terms of securing stable water supplies in the long term. Furthermore, contamination of groundwater has been confirmed in all parts of the state. In February 2020, fluorine contamination was observed at 3,582 locations in Rajasthan out of 7,161 locations throughout India, which is the largest share in India. Additionally, around one million cases of water-borne diseases, such as dysentery and cholera caused by contamination of groundwater by bacteria from livestock feces, are reported (2016) in the state. Overuse of groundwater is severe in the targeted two districts, which mainly rely on groundwater as their water source. The rate of ground water extraction in Jhunjhunu District and Barmer District is approximately 218% and 124%, respectively. These figures far exceed the sustainable level of 100%, and therefore concerns for decline or depletion of groundwater in the future are high. Similarly, the “Rajasthan Rural Water Supply and Fluorosis Mitigation Project” is underway to construct new water supply facilities using surface water and to implement fluorosis mitigation measures with a Japanese ODA loan in Nagaur District in Rajasthan. The two target districts of the Project are experiencing similar groundwater contamination from fluorine and other contaminants and a similar decline in groundwater level as Nagaur, while their piped water percentages are below that of Nagaur, which is approximately 25% (2020). Thus, urgent action is required. Moreover, the “Jal Jeevan Mission” identifies the necessity of proper operation and maintenance of existing water supply facilities in rural areas. Accordingly, there is a need of comprehensive support to implement the capacity building of the village-level organizations comprised of residents, such as “Village Water Sanitation

Committees (hereinafter “VWSCs”),” in formulating plans for village-level operation and management of water supply facilities as well as in conducting public awareness campaigns.

In 2010, Rajasthan formulated a “State Water Policy.” The policy sets the objectives of provision of adequate potable drinking water to every citizen, both in urban and rural areas through conjunctive use of surface and groundwater. Accordingly, the Government of Rajasthan has engaged in construction of water supply facilities using surface water. The Project will contribute in providing sustainable and safe water supply in two districts in Rajasthan, which faces the aforementioned challenges, by constructing water treatment plants and related facilities and implementing capacity development for VWSCs as well as Community Development Activities. It is therefore positioned as an important project in India’s water supply sector.

(2) Japan and JICA’s Water Sector Policy and the Positioning of the Project

The Country Assistance Policy for India (March 2016) formulated by the Government of Japan establishes “supporting sustainable and inclusive growth” as a priority area and states its support for the water supply sector as a part of efforts to “tackle environment and climate change issues.” Additionally, the JICA Country Analysis Paper for India (March 2018) mentions programs for “improvement of basic social services” as a part of “supporting sustainable and inclusive growth,” which is one of the paper’s priority areas. It also calls for support to realize sustainable economic growth in India and the sharing of the fruits of growth by society on a broad and equitable basis. Thus, the Project is consistent with this policy and analysis.

Furthermore, the Project will contribute to the achievement of Goal 3 (ensure healthy lives and promote well-being for all at all ages), Goal 6 (ensure access to water and sanitation for all), and Goal 13 (take urgent action to combat climate change and its impacts) of the Sustainable Development Goals. Therefore JICA’s support for the implementation of the Project is highly necessary.

(3) Other Donors’ Activities

The World Bank has provided support for the “Rajasthan Urban Development Project” (approved in 2017, 166 million USD) to build the capacity of public urban development corporations in charge of water supply and sewerage system maintenance in urban areas. This support is based on its policy to contribute to the health and economic welfare of rural residents. The Asian Development Bank is promoting public infrastructure development, which includes water

supply and sewerage systems, for inclusive urbanization as a priority area. The ADB is also providing support to promote public-private partnerships as its priority. The ADB approved a “Rajasthan Secondary Towns Development Sector Project” (300 million USD) in September 2020, which will develop water supply and sewerage systems in several cities of Rajasthan. Thus, the ADB has a solid record of supporting the water supply and sewerage field in Rajasthan, particularly in the area of urban water supply. The New Development Bank is also working to improve irrigation systems and drinking water supply capability in Rajasthan’s rural areas through the “Rajasthan Water Sector Restructuring Project” (approved in 2017; 345 million USD).

3. Project Description

(1) Project Objective

The objective of the Project is to provide sustainable and safe water supply in Jhunjhunu District and Barmer District in the state of Rajasthan by constructing water treatment plants and related facilities and implementing capacity development of Village Water Sanitation Committee as well as Community Development Activities, thereby contributing to the improvement of living conditions, hygiene and health conditions of residents in the area.

(2) Project Site/Target Area

Jhunjhunu District (population of approximately 2.14 million) in the northeastern area of Rajasthan and Barmer District (population of approximately 2.60 million) in the western area of Rajasthan.

(3) Project Components

a) Construction of water supply facilities:

Intake facilities (2 locations), raw water pumping main (approx. 25 km), water treatment plant (2 locations, total capacity of approx. 103,000 m^3/day), pump stations (approx. 60 locations), treated water transmission pipeline (approx. 550 km), cluster pumping main (approx. 2,200 km), elevated service reservoir (approx. 350 locations), cluster distribution pipeline (approx. 4,200 km), village distribution pipeline (approx. 20,000 km), house connection (approx. 400,000), etc..

b) Capacity Development of Community and Public Awareness Campaigns by NGOs:

Support for the formation and capacity development of village-level VWSCs, promotion of house connections, public awareness campaigns for water usage in relation to improvement of sanitation (including

countermeasures against fluorosis, etc.) and health issues, public awareness campaigns for gender awareness, surveys, and public relations.

c) Consulting services:

Basic designs, tender assistance, construction supervision, capacity development of executing agency, assistance for plan formulation and activity by NGOs in implementing capacity development of community and public awareness campaigns, etc.

(4) Estimated Project Cost

65,375 million yen (Yen Loan Amount: 45,816 million yen)

(5) Schedule

March 2021 to July 2028 (total of 89 months). The Project will be completed upon the completion of capacity development of community and public awareness campaigns by NGOs (July 2028).

(6) Project Implementation Structure

1) Borrower: President of India

2) Guarantor: None

3) Executing Agency: Public Health Engineering Department, Government of Rajasthan

4) Operation and Maintenance Agency: Same as above

(7) Collaboration with Other Schemes and Donors

N/A

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

1) Environmental and Social Consideration

① Category: B

② Reason of 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: The preparation of an Environmental Impact Assessment (EIA) report for this Project is not required under the domestic laws of India.

④ Anti-Pollution Measures: During the construction, mitigation measures such as water sprinkling, leachate treatment, restriction of

work hours, etc, will be implemented in order to meet the domestic emissions standards as well as environmental standards of India in terms of air pollution, water pollution, waste, noise, vibration, etc.. In addition, it is anticipated that the negative impacts of waste, etc., generated when the facilities are in service will be minimized through collection, transport, treatment, etc., in accordance with the domestic laws of India.

⑤ Natural Environment: There are no eco-sensitive zones of any protected areas within the Project's target areas. Some pipelines and other facilities will be installed within forest areas; therefore, permissions for "Works in the forest area" must be obtained. The procedure for acquiring the permission takes about six months. It has been confirmed that steps will be taken to obtain the permission by June 2024, after the areas to be used have been confirmed in the detailed designs prepared by contractors.

⑥ Social Environment: The Project requires acquisition of a land (1,620 m^2) for the construction of one pumping station among the main facilities of the Project (the other main facilities are planned to be built on government-owned land). The executing agency will provide compensation for the acquired land based on a plan that will be formulated in accordance with domestic laws of India and JICA guidelines. No opposition to the land acquisition was expressed by the residents of the land and the residents consented to the aforementioned land acquisition plan. No resettlement of any residents will be required.

⑦ Other/Monitoring: The executing agency and the consultants will monitor air quality, water quality at intake points, waste, noise, etc, during construction. The executing agency will monitor waste, etc., when the facilities are under operation.

2) Cross-Sectoral Issues

① Climate Change: The Project will contribute to adaptation to climate change, as it is expected that it will effectively mitigate the negative effects of climate change because it secures stable water sources without being affected by changes in rainfall amounts that are anticipated as an effect of climate change.

② Poverty Response/Consideration: When selecting members of

VWSCs, which will be comprised of village representatives and various community representatives, 25% of the members will be secured for those belong to scheduled castes or scheduled tribes so that the issue of poverty can also be considered.

③ Countermeasures for Infectious Diseases such as AIDS/HIV: To prevent the risk of HIV infection during construction, the Project will demand that contractors cooperate in implementing HIV/AIDS countermeasures for workers. This will include the inclusion of HIV/AIDS prevention items in bidding documents. Additionally, NGOs will engage in public awareness campaigns to prevent water-borne diseases such as fluorosis, which is caused by drinking untreated groundwater. Moreover, at the time of screening, the executing agency agreed to a list of measures that must be taken when formulating projects and implementing projects (total of 36 items) to control COVID-19 infections. Items include the formulation and thorough adherence to behavior patterns for preventing infections, providing contractual consideration for contractors when infections increase, etc.

3) Gender Category:

Gender Project ■ Gender Informed (Significant) (gender activity integration project)

Activity Description/Reason for Classification: The Project's policy is to ensure that half of members of VWSCs are female in selecting its members in order to appropriately reflect women's views on its operation. In addition, public awareness campaigns for gender consideration to promote gender equality will also be conducted as a part of capacity development of community and public awareness campaigns by NGOs.

(9) Other Important Issues: N/A

4. Targeted Outcomes

(1) Quantitative Effects

1) Outcomes (Operation and Effect Indicators)

Indicator	Original (2020 actual)	Target (2030) (Two years after Project completion)
Water supply amount by the project (m^3/day)	—	47,500 (Jhunjhunu) 81,500 (Barmer)
Percentage of water samples at the tap in which residual chlorine is detected (%)	—	100
Establishment of VWSC	—	270 (Jhunjhunu) 845 (Barmer)
Female ratio of VWSC members (%)	—	50
Number of household connection (nos.)	—	108,900 (Jhunjhunu) 228,600 (Barmer)

2) Impact Indicators:

Number of cases of water-borne diseases, rate of villagers washing their hands in order not to get the infectious diseases, time taken to fetch water every day, time taken to use their activities other than household chores, etc.

(2) Qualitative Effects

Stable supply of treated water, improved health and living environments for residents, improved operational and maintenance capabilities of the executing agency and VWSCs, promotion of women's participation in society

(3) Internal Rate of Return

Under following preconditions, the Project's Economic Internal Rate of Return (EIRR) will be 10.5%. The Financial Internal Rate of Return (FIRR) is not calculated because collection of water tariff from users is not anticipated.

[EIRR]

Costs: Construction costs, operation and maintenance costs (both excluding taxes)

Benefits: Willingness to pay, reduced costs for obtaining house-use water as

a result of the Project, reduced water fetching time as a result of the Project, reduced costs relating to water-borne disease as a result of the Project

Project Life: 35 years

5. Preconditions and External Conditions

(1) Preconditions: None

(2) External conditions: Public order in the target areas does not worsen significantly.

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

From the results of the ex-post evaluation for the “Rural Water Supply Project (Phases I and II)” (FY2012), a Yen Loan project for the Republic of Tunisia, it was found that educational activities for residents and support for water use associations were effectively implemented; that the capabilities of water use associations in the project’s target region were higher in comparison with other regions in Tunisia, as they had fewer water supply system problems and malfunctions; and that residents’ satisfaction with water supply services was high. As a result of these outcomes, the water cost recovery rate of the project was satisfactory. Additionally, from the results of the ex-post evaluation for the “Rural Water Supply And Sanitation Project (Phase 5)” (FY2014), a Yen Loan project for the Republic of the Philippines, it was found that training for residents during establishment of water use associations can lead to loss in motivation among residents when the construction of facilities is delayed. It is therefore learned that residents’ training should be conducted at the appropriate timing of facility construction. Furthermore, from the results of ex-post evaluation for “Hogenakkal Water Supply & Fluorosis Mitigation (Phase 1)” (FY2018), a Yen Loan project for India, it is learned that the cost for house connection for water supply should be included in the Yen Loan project because the cost of house connection is burdensome for some households in poverty.

The Project is planned to develop the capacity of VWSCs and to raise public awareness for the necessity of house connection through the activities of NGOs employed by the executing agency. It is also planned both to establish the structure of collecting water fees for operation and maintenance and to promote house connections so that the rate of collection of water fees for operation and maintenance can be improved. Additionally, the progress of the Project will be monitored through consulting services under cooperation with NGOs and others

to ensure that activities of NGOs can take place with appropriate timing according to the progress of construction. Furthermore, the Project will build a system that can steadily promote house connections by including the house connection portion within the Project in tandem with the NGO's activities so that the financial burden for residents in applying house connections can be mitigated and enable the Project to achieve its objective with its own. It should be noted that, in some regional water supply projects that are currently underway in India, it has taken time to find NGOs capable of implementing the fluorine countermeasures projects as originally planned. Given this, the Project will reduce the risk of similar delays by assuming a scope that is practicable by a local NGO and will focus on the activities that are effective in combating fluorosis, such as raising public awareness on the use of water.

7. Evaluation Results

The Project is consistent with the development issues and policy of India as well as the policy of Japan and JICA. It will contribute in providing sustainable and safe water supply in Jhunjhunu District and Barmer District in the state of Rajasthan by constructing water treatment plants and related facilities and implementing capacity development of Village Water Sanitation Committee as well as Community Development Activities, thereby contributing to the improvement of living conditions, hygiene and health conditions of residents in the area. Moreover, it will contribute to the achievement of Goal 3 (ensure healthy lives and promote well-being for all at all ages), Goal 6 (ensure access to water and sanitation for all), and Goal 13 (take urgent action to combat climate change and its impacts) of the Sustainable Development Goals. Therefore JICA's support for the implementation of the Project is highly necessary.

8. Plan for Future Evaluation

(1) Indicators to be Used

As indicated in section 4 above.

(2) Timing of the Next Evaluation

Ex-post evaluation: two years after the Project's completion.