

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

### 1. Name of the Project

Country: India

Project: Rajasthan Water Sector Livelihood Improvement Project (I)

Loan Agreement: March 31, 2017

Loan Amount: 13,725 million yen

Borrower: The President of India

### 2. Background and Necessity of the Project

#### (1) Current State and Issues of Agriculture and Irrigation Sector Development in India

Economic growth has been strong in India in recent years and the number of people living in poverty is getting lower. Nevertheless, 270 million people accounting for 21.9% of the total population (2011) continue to live below the poverty line, and about 220 million of the poverty class, corresponding to 81%, live in farming villages. The agricultural sector account for 13.9% of India's GDP (2013), but about half of the entire working population is engaged in agricultural work and about 46% of the land area is farmland. As such, development of agriculture and farming villages is essential for balanced socioeconomic development and eradication of poverty.

The climate in India varies by region, and crops that match the respective climate are cultivated. Wet season crops are mostly cotton, peanuts, and grains, and dry season crops are mostly wheat and beans. Crop productivity depends on seasonal fluctuations in amount of rainfall and amount of river water and is affected by the floods and droughts caused by uneven distribution or instability in amount of rainfall due to climate change in recent years. In addition, although the agricultural sector (irrigation) accounts for 83% of total usage of the water resources in India, demand is expected to increase in municipal and industrial water as the economy grows, which will likely result in a strain on water resources. Meanwhile, water seepage due to aging or deterioration of facilities and supply water losses due to improper water supply management have resulted in a low water-use efficiency (irrigation efficiency) of 38%. As much as 62% of water resources for irrigation water depend on groundwater, and excessive water pumping has caused serious problems such as a reduced groundwater level and depletion of groundwater. More widespread application of irrigation agriculture practices that use water resources more efficiently is needed to achieve stable crop productivity. About 46% of workers in the agriculture sector are women and women have a pivotal role in agricultural production processes and maintenance and management of irrigation facilities. Despite this, women have only limited access to irrigation water and farming support services and they cannot participate in farming associations or water user associations, so women's needs are not being reflected.

Rajasthan that is the target site for this Project is located in northeast India and is the state with the largest land area in the country. It has the 7th largest population in India,

at 68.55 million people (2011), and 10.29 million live in poverty, which is 14.7% of the state's population. About 8.42 million of them, corresponding to 82%, live in farming villages. Furthermore, the farming population comprises 62% of the entire working population in the state, so that 21% of total production in Rajasthan is made up of farming or related industries. Rajasthan also receives limited annual rainfall, at only 584 mm that is about half the national average of 1,083 mm. (It is particularly low in the western arid region, at only 322 mm.)

To use these limited water resources effectively, irrigation facilities have been developed starting about the 18th century, primarily in the eastern part of the state, and there are over 3,900 irrigation areas in Rajasthan. Existing irrigation facilities that use surface stream water cover 25% of all irrigation areas in the state, but many have problems, such as aging, damage, and seepage due to improper maintenance and management. The remaining 75% of all irrigation areas are covered by groundwater, but groundwater supplies are under strain with the marked increase in population and growth of the economy in recent years. Because of this, areas with existing irrigation facilities (areas that can use surface stream water) urgently need to increase water use efficiency by fixing existing irrigation facilities, improving water supply, and improving maintenance and management and to better control groundwater use in those areas and increase farming productivity. Many women are involved in agricultural production activities and maintenance and management of water routes in rural areas of Rajasthan. However, they have only limited opportunities to participate in workshops to obtain proper water management or farming skills or skills to maintain and manage irrigation facilities as well as in decision making processes carried out by associations that include formulating farming plans or water management plans. Equal participation by men and women in workshops and association activities is required in order to raise agricultural productivity based on sustainable operation, maintenance, and management of existing facilities and fair and efficient water use.

## (2) Development Policies for Agriculture and Irrigation Sector Development in India and the Priority of the Program

India established a five-year plan in 1951 aimed at achieving food self-sufficiency and improving and stabilizing the lives of citizens. The target average real GDP growth rate for the agricultural sector is currently set to 4%, and effective use of resources, widespread use of sustainable technologies, responses to climate change, and increased productivity have been given as priority issues to address in order to achieve that target. Particular emphasis has been given to increasing irrigation farming productivity through efficient use of water resources. Increasing productivity by repairing aging irrigation facilities, carrying out proper facility management, and improving inefficient water resource usage that is carried out in this Project will help increase farmers' income and reduce poverty and is therefore a major pillar in this plan, and so the Project is in line with the plan.

In the state's 12th five-year plan (2012 to 2017), the Rajasthan state government aims to guarantee stable food provisions and nutrition, strengthen the economic leverage of the agricultural sector, and expand agricultural production, and formulated the State Agriculture Policy 2013. Strategies proposed within this plan aim to increase use of water-saving irrigation, develop irrigation facilities, and increase income of far of crops and creation of high added value. The state that is extremely poor in water resources has been carrying out a Rajasthan Minor Irrigation Improvement Project (RAJAMIIP; approved for 11.555 billion yen) as an ODA project from 2005. While some improvement has been seen, further repair of irrigation facilities, more widespread use of proper water supply systems, and improvement in water use efficiency are needed. The State Water Policy established by Rajasthan in 2010 aims to improve maintenance and management of existing irrigation facilities and increase irrigation efficiency as well as ensure proper water supply. This Project is in line with these policies. In addition, the state's 12th five-year plan aims to encourage social participation by women to achieve gender equality, and multi-faceted support is provided to grant rights to women and increase their involvement in decision-making processes at the policy level.

(3) Japan and JICA's Policy and Operations in India's Agriculture and Irrigation Sector

Japan's Country Assistance Policy for India (March 2016) states that 'supporting sustainable and inclusive growth' is a priority and that the government will provide the type of support that will help reduce poverty and develop the social sector, for example with programs to increase income to the poverty class (including programs to improve small-scale infrastructure, strengthen agricultural productivity, and build food value chains). Also, JICA's Country Analysis Paper for India (March 2012) identified priority areas as using limited water resources effectively, securing water for agricultural use, and increasing agricultural productivity through efficient use of resources in order to increase the food supply to match the increase in population and reduce poverty in farming villages. This Project is in line with these policies and analyses. JICA previously received authorization to provide ODA loans to India for the agriculture and irrigation sector of the amount of 257.5 billion yen for 26 projects in February 2017. Rajasthan has the experience of carrying out RAJAMIIP from 2005 to 2015.

(4) Other Donors' Activities

The World Bank has been active for many years with projects to restore irrigation facilities, support in farming capacity building, and reform of the irrigation and water resource sector through the Rajasthan Water Sector Restructuring Project. Moreover, through the Rajasthan Agriculture Competitiveness Project, activities are being carried out to efficiently manage water resources, increase agricultural productivity, support the establishment of agribusiness plans, and carry out business matching, for example. The target irrigation areas of that project differ from those of this Project, and so there is no overlap.

## (5) Necessity of the Project

This Project is congruent with the development tasks and policies of the Indian government and Japan's and JICA's assistance policies and may help achieve SDG 2 to achieve food security and promote sustainable agriculture and SDG 5 to achieve gender equality and empower all women and girls. It is therefore strongly necessary for JICA to assist in the implementation of this project.

### **3. Project Description**

#### (1) Project Objective

The project will rehabilitate deteriorating irrigation facilities and provide agricultural technical support based on the needs of domestic market with consideration for participation of both male and female farmers to improve water use efficiency and agricultural productivity, thereby improving farmers' livelihoods and promoting gender mainstreaming in the agriculture and irrigation sectors in Rajasthan State.

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

The target is 27 of the 33 districts in Rajasthan, excluding the 6 in desert areas.

#### (3) Overview of Project

- 1) Upgrade participation-based irrigation facilities
- 2) Capacity building of water user associations
- 3) Farming support (diversification of crops cultivated and marketing)
- 4) Gender mainstreaming in the farming and irrigation sector (e.g. formation of women's sub-committees in water user associations, assistance from Self Help Groups)
- 5) Strengthening of implementation system
- 6) Consulting services (e.g. construction supervision, procurement support, technical advice)

#### (4) Project Cost

35,468 million yen (Loan amount: 29,763 million yen)

#### (5) Project Implementation Schedule

March 2017 to March 2025 (97 months in total). The Project is complete with the completion of all activities, including consulting services (March 2025).

#### (6) Project Implementation Structure

- 1) Borrower: The President of India
- 2) Executing Agency: Water Resources Department, Government of Rajasthan
- 3) Operation and Maintenance System:

Responsibility for the operation, maintenance, and management of irrigation facilities and adjoining facilities restored in this Project shall be borne by the water user association after restoration. For that reason, technical workshops related to maintenance and management and support in formulating maintenance and management plans are carried out for the water user associations to strengthen their capacity. In addition, the water user association support task office within the Project

Management Unit (PMU) for NGOs and Executing Agencies provides support for the water user association during the Project period and the same task office will continue to provide such support after the completion of Project after being reorganized into a department in charge of association support within the Water Resources Department.

Costs for maintenance and management of irrigation facilities are covered by 50% of the irrigation use levies collected that are returned to the water user association by the state government for operation, maintenance, and management expenses, and costs for large-scale repairs following a natural disaster or other incident that cannot be covered by the water user association shall be borne by the Water Resources Department.

#### (7) Environmental and Social Considerations/Poverty Reduction/Social Development

##### 1) Environmental and Social Considerations

- ① Category: B
- ② Reason for Categorization: This project does not correspond to a sector or characteristics that easily have an impact or areas that are easily impacted listed in the JICA Guidelines for Environmental and Social Considerations (put into effect in April 2010) and has therefore been deemed not to have a significant negative effect on the environment.
- ③ Environmental permissions: Indian law requires the creation of environmental impact assessment (EIA) reports pertaining to sub-projects to restore existing irrigation facilities that are targeted in this Project.
- ④ Pollution control measures: Emission standards and environmental standards for India shall be met for air quality, water quality, noise and vibrations during construction by isolating sprinkling water, materials, machinery, and fuel from running water and restricting construction hours and for water quality following the start of operation by conducting maintenance on irrigation channels.
- ⑤ Natural environment: Target sites for the Project do not correspond to national parks or other areas that are easily impacted or nearby areas, and negative effects on the natural environment are expected to be minimal.
- ⑥ Social environment: At this Project involves restoring existing irrigation facilities, no new land acquisition or involuntary resettlement is required. There may be forest dwellers in the target sites for this Project. Sub-projects where forest dwellers have been confirmed shall be given proper considerations by creating a plan for indigenous people based on the indigenous person framework created for this Project.
- ⑦ Other/Monitoring: Contractors and Sub-PMUs established on a district level are primarily the ones in charge of monitoring air quality, water quality, noise, and vibrations during construction, and state-level PMUs are primarily the ones in charge of monitoring water quality, soil contamination, and effects on aboriginal people after the start of operation.

## 2) Promotion of Poverty Reduction

Many minor and small-scale farmers carry out irrigation farming in the target areas for irrigation restoration in this Project, and activities to support their farming efforts are being carried out through this Project, thereby improving their livelihood.

## 3) Promotion of Social Development:

Traditionally, land ownership was not recognized for women and they could not participate in water user association activities. However, with revision of the law being carried out alongside the Project, spouses of landowners can now qualify as members of the association, and one female association member is scheduled to be selected to be part of the executive committee. In this Project, to encourage participation by female farmers in associations that became possible with the revision of the law, a women's sub-committee was established within the water user association with support from NGOs, and an environment where female association members can work easily is being developed. Also, participation by women in decision-making processes in water user associations is being encouraged through these types of activities in an effort towards gender mainstreaming in the irrigation sector. In addition, as an entry point to activities by the women's sub-committee, facilities that incorporate gender considerations will be designed and constructed based on the needs of the women's sub-committee as one part of the irrigation facility restoration construction work, thereby developing female farmers' ownership of irrigation facilities. Moreover, farming-related technical support and nutrition improvement workshops will be provided to Self Help Groups established by female farmers separately from the association.

(8) Collaboration with Other Donors: None in particular.

#### 4. Targeted Outcomes

##### (1) Quantitative Effects

###### 1) Outcomes (operation and effect indicators)

Indicators <sup>*1</sup>	Baseline (Recorded in 2017)	Target (2027) [2 years after project completion]
Irrigation area served (ha)	-	360,000 <sup>*2</sup>
Irrigation use levy collection rate (%)	*3	60
Production output per major crop (t/year)	*3	*3
Per unit yield per major crop (t/ha)	*3	*3
Gross agricultural income per household (rupees/year/household)	*3	*3
Ratio of women in the Irrigation Association Executive Committee (%)	*3	25

\*1 In addition to the above indicators, irrigation efficiency (water use efficiency) and farming areas by major crop will also be monitored as reference values. Although irrigation efficiency is the main purpose of this Project, it will only be used as a reference value due to the great difficulty of precise measurement. In addition to reports from the Executing Agencies, qualitative checks must also be carried out during ex-post evaluation. Main crops are expected to be wheat, barley, corn, chickpeas, and rape plants.

\*2 Total planned irrigation area in which all channels from main channels to branches are being repaired and efficient water use made possible.

\*3 Baseline surveys will be carried out and finalized by water user associations sampled after the start of the Project with assistance from project supervision consultants.

(2) Qualitative Effects E.g. establishment and development of water user associations and farmer groups, greater voice of women in water user associations and increased participation in meetings, better nutrition (women and children), greater understanding and awareness with regards to gender of farmers and of farming work, response to climate change.

##### (3) Internal Rate of Return

Based on the following preconditions, the economic internal rate of return (EIRR) of the Project is 13.2%. As making profit was not the purpose of this Project, the financial rate of return (FIRR) was not calculated.

[EIRR]

- Cost: Project cost (excluding tax), O&M cost
- Benefits: Increase in output of major crops due to increase in cultivation acreage and per unit yield
- Project Life: 30 years

#### 5. External Factors and Risk Control

Political and economic deterioration as well as natural disasters in India and the area surrounding the project sites.

## **6. Lessons Learned from Past Projects and Application to this Project**

### (1) Lessons Learned from Past Projects

We learned in ex-post monitoring for India's Upper Kolab Irrigation Project (ODA loan) that support for non-construction activities should be carried out from early stages for irrigation projects, as a suitable period of time is required until the regularly planned form of utilization is fully established, including knowledge in beneficiaries and understanding about the activities of the water user association. As for lessons from other irrigation projects in India, for projects with many sub-projects spread out over a wide area, it is difficult for district-level PMUs alone to carry out adjustments for support for non-construction activities of the spread out sub-projects such as construction supervision and farming support. To prevent delays in the project, we learned that it is necessary to establish state-level Sub-PMUs and to divide the project into stages and carry it out incrementally.

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

An aim of this Project was to achieve project continuity, and the project is connected to the progress of civil engineering work in each sub-project, capacity building of water user associations, and farming support activities. In addition, the Project area will be separated into five areas with a Sub-PMU designated for each, and the activities of those Sub-PMUS will be divided into three groups for stepwise implementation and monitoring.

## **7. Plan for Future Evaluation**

### (1) Indicators to be Used

- 1) Irrigation area served (ha)
- 2) Irrigation use levy collection rate (%)
- 3) Production output per major crop (t/year)
- 4) Per unit yield per major crop (t/ha)
- 5) Gross agricultural income per household (rupees/year/household)
- 6) Ratio of women in the Irrigation Association Executive Committee (%)
- 7) Economic internal rate of return (EIRR) (%)

### (2) Timing of the next evaluation

Two years after project completion.

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