

Japanese ODA Loan**Ex-Ante Evaluation (for Japanese ODA Loan)****South Asia Division 1, South Asia Department****Japan International Cooperation Agency****1. Basic Information**

- (1) Country: India
- (2) Project: Rajasthan Water Sector Livelihood Improvement Project (II)
- (3) Project Site / Target Area: 27 districts in State of Rajasthan with a population of approximately 54 million (2011 census)
- (4) Loan Agreement: March 29, 2023

2. Background and Necessity of the Project

- (1) Current State and Issues of the agriculture and irrigation Sector and the Priority of the Project in India

In India, agriculture and allied sectors are important industries, accounting for about 17% of GDP and about 50% of the employment (World Bank 2021), and crops are planted in different regions in response to diverse climates. The growing season is divided into Kharif (Rainy) and Rabi (Dry) seasons, and cotton, groundnuts and cereals are planted in Kharif season, and wheat and pulses are planted in the dry season. Crop productivity depends on seasonal variations in rainfall and river water levels and is exposed to the effects of floods and droughts resulting from uneven and unstable rainfall due to recent climate change. Another challenge is the efficiency of water use in agriculture (irrigation efficiency) and water distribution losses caused by leaks due to deterioration and damage to facilities. Furthermore, 62% of the water source for irrigation depends on groundwater, and problems such as the lowering of ground water level and depletion of the groundwater due to excessive pumping are becoming more serious. Therefore, there is a need to promote irrigated agriculture that uses water resources efficiently to ensure stable crop productivity.

In addition, 80% of women living in rural areas in India are engaged in the agricultural sector, and women play a vital role in the agricultural production process and maintenance of irrigation facilities (NITI Aayog (2022)). On the other hand, women's access to irrigation water, farming support services, etc. is limited, and their needs are not reflected in the activities of Farmer's Groups and Water Users' Organizations.

The Doubling Farmers' Income (2017) strategy document for the agricultural

sector in India, developed by NITI Aayog, identifies the need to increase agricultural productivity to double farmers' income from FY2015 to FY2022, through efficient use of water resources and increasing the productivity of irrigated agriculture. Improving the efficiency of use of water resources by rehabilitating irrigation facilities and ensuring proper management of the facilities, is one of the key pillars of the aforementioned strategy. Rajasthan is located in northwestern India and is the country's largest state, and has the seventh largest population (i.e. 68.55 million, 2011 census) in the country. The population engaged in Agriculture sector accounts for 66% of the state's total workforce and agriculture and related industries account for 26% of GDP (Rajasthan Agriculture Department (2015)), placing agriculture as an important sector in the state. On the other hand, the Thar Desert covers three-fifths of the state's total area in the western part of the state, and annual rainfall is low at 584 mm (322 mm in the arid western part in particular), about half the national average of 1,083 mm in India, making it necessary to make effective use of water resources. In Rajasthan, there are more than 3,900 irrigation blocks, and 25% of the total irrigated area is irrigated by using surface water, but many of these have problems such as damage and leakage due to deterioration and improper Operation and Maintenance. As a result, groundwater continues to be utilized as the source of water for many irrigation facilities that cover the remaining 75%, which has contributed to factors such as the recent remarkable population growth and shortage of groundwater supply and demand due to economic growth. In fact, over-pumping is now taking place in about 80% of the state's districts, and the situation is so severe that groundwater levels continue to drop by 1-3 m per year (Rajasthan Water Resources Sector Livelihood Improvement Project Preparatory Survey Final Report (2017)). Therefore, there is an urgent need to improve agricultural productivity in existing irrigated areas (areas where surface water is available) while controlling groundwater use in the area by improving irrigation efficiency through rehabilitation of existing irrigation facilities, water distribution and improved maintenance.

In addition, farmers do not have sufficient agricultural production technology and are not able to conduct market-oriented farming activities, which does not lead to income from agricultural products and does not improve farmers' livelihoods. Therefore, there is a strong need to transfer production technology to farmers through training and to formulate and implement farming plans based on market demand through marketing by the farmers themselves. Furthermore, while

women are involved in agricultural production activities and canal maintenance work, opportunities for their participation in training on appropriate water management, farming techniques and irrigation facility maintenance, and in the organizations' decision-making process on the development of farming and water management plans are extremely limited. In order to ensure sustainable operation and maintenance of irrigation facilities and increase agricultural productivity based on fair and efficient water use, it is important to realize equal participation and involvement of men and women in training and Groups activities. In response to this situation, Rajasthan state has developed the State Agriculture Policy 2013 (State Agriculture Policy 2013, latest.) with the goal of ensuring a real GDP growth rate of 4% in the agricultural sector, as well as food and nutrition security and strengthening the economic capacity of the agricultural sector through increased agricultural production. The strategy includes the dissemination of water-saving irrigation, development of irrigation facilities, and increasing farmers' income through crop diversification and higher value addition. In addition, the state, which has extremely scarce water resources, has developed a State Water Policy (State Water Policy 2010, latest.), emphasizes on maintenance of existing irrigation facilities, improvement of irrigation efficiency and proper allocation of water.

The Rajasthan Water Sector Livelihood Improvement Project ('the Project') is positioned as a priority project that is in line with these policies, as it aims to improve irrigation efficiency and agricultural productivity by rehabilitating irrigation facilities and supporting farmers based on market demand, including by promoting the participation of women in agriculture.

(2) Japan's and JICA's Cooperation Policy and Operations in the Agriculture and irrigation Sector

The Country Development Cooperation Policy for India (2016) identifies 'support for sustainable and inclusive growth' which contributes Poverty reduction and Social sector development, as a priority issue, and states that the country will work on programmes to increase the incomes of the poor (including improving small-scale infrastructure, increasing agricultural productivity, and building food value chains). In addition, the JICA Country Analysis Paper to India (2018) sets 'inclusive growth in rural areas' as one of the development challenges and analyses those farmers' income should be increased through improving agricultural productivity, and this Project is in line with these policies and analyses. Furthermore, in "Agriculture and Rural Development (Sustainable Food System)"

of JICA's Global Agenda (issue-specific project strategies), the Project aims to reduce poverty in rural areas through improving farmers' income and revitalizing the rural economy, and to ensure food security through stable production and supply of food. In terms of yen loans to India, as of December 2022, a total of 23 projects amounting to approximately JPY 231.4 billion had been approved for the agriculture and irrigation sector. In Rajasthan, the Government has also implemented a yen loan project "Rajasthan Small Scale Irrigation Improvement Project" (approved in 2005) between 2005 and 2015. In the first phase of the project (Loan Agreement signed in March 2017), JPY 13,725 million was provided.

(3) Other Donors' Activities

The World Bank has made long-term efforts to rehabilitate irrigation facilities, strengthen farming capacity and reform the irrigation and water resources sector in Rajasthan through the 'Rajasthan Water Resources Sector Rehabilitation Project' (2002-2013). Furthermore, through the 'Rajasthan Agricultural Competitiveness Enhancement Project' (2012-2019), the World Bank supported efficient water resources management to improve agricultural productivity, as well as providing support for agribusiness planning and business matching activities. The target irrigation districts of the Project are different irrigation districts from this project and there is no overlap.

3. Project Description

(1) Project Description

① Project Objective

The Project aims to improve livelihoods of farmers as well as promote gender mainstreaming in agriculture and irrigation sector in the State of Rajasthan, by improving water use efficiency and agriculture productivity, through improvement of existing irrigation facilities and agriculture support services based on participation of both male and female farmers, thereby contributing to socio-economic development in the State.

② Project Components

- (a) Participatory irrigation rehabilitation work
- (b) Fostering and Capacity Enhancement of Water Users Organizations
Farming support (crop diversification, marketing, etc.)
- (c) Improvement of Agriculture Practices and Marketing Capacity (e.g., formation of women's groups in water user organizations, support for self-help groups, nutritional improvement)

- (d) Gender Mainstreaming in Agriculture and Water Sector
- (e) Enhancement for Project Implementation
- (f) Consulting services (construction supervision, procurement support, technical guidance, etc.)
- ③ Project Beneficiaries (Target Group)
 - Direct beneficiaries: users of the improved irrigation facilities (approximately 760,000 people)
 - Final beneficiaries: consumers who will benefit from increased crop yields and lower prices (approximately 54 million people)
- (2) Estimated Project Cost
 - 40,807 million Yen (Japanese ODA loan: 18,894 million Yen)
- (3) Schedule
 - March 2017- March 2028 (133 months)
 - Completion of all activities, including consultancy services (March 2028) is considered as the completion of the Project.
- (4) Project Implementation Structure
 - 1) Borrower: President of India
 - 2) Guarantor: N/A
 - 3) Executing Agency: Water Resources Department, Government of Rajasthan (WRD)
 - 4) Operation and Maintenance System: Responsibility for operating and maintaining the irrigation facilities and related infrastructure will be transferred from the Water Resources Department (WRD) to the water users' organization upon completion of the rehabilitation. As part of the Project, the water users' organizations will receive technical training and support to develop maintenance and management plans, thereby enhancing their capacity for maintenance and management. Furthermore, the non-governmental organization (NGO) and the water users' organization Support Task Force, established within the Project Management Unit (PMU) of the implementing agency, will provide assistance to the water users' organizations during the project period. After the completion of the Project, the WRD responsible for supporting water users' organization, which was reorganized from the existing task force in the WRD, will continue to support continuously. Once the transfer is completed, the water users' organization itself will collect fees for water usage and remit them to the state government. The state government

will refund 50% of these fees as operation and maintenance fees to cover the costs associated with running and maintaining the facilities. In case of significant damage to the facilities resulting from disasters or other causes, where the water users' organization alone cannot afford the repair costs, the WRD will be responsible for repairing the damages.

(5) Collaboration and Sharing of Roles with Other Donors

- 1) Japan's Activity: The Project plans to introduce the Smallholder Horticulture Empowerment & Promotion (SHEP) approach in training for staff of implementing agencies and farmers as part of the support for marketing, aiming at improving farmers' income through the development of market-oriented farming and marketing plans and strengthening farmers' ownership of farming operations. The SHEP approach aims to promote agriculture as a business and to change the mindset of farmers from "grow and sell" to "grow to sell". It is expected that the staff of the implementing agencies will continuously participate in training courses for the Asian region, etc., and return the knowledge and learning gained in the dissemination of the SHEP approach in the Project.
- 2) Other Donors 'Activity: N/A

(6) 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: An Environmental Impact Assessment (EIA) report for the sub-projects under the Project, which will rehabilitate existing irrigation facilities, is not required under the country's national law and no other environment-related permits or approvals are required.
- ④ Anti-Pollution Measures: During construction, air quality, water quality, noise and vibration are expected to meet national emission and environmental standards for air quality, water quality, noise, and vibration by sprinkling water, isolating materials, equipment, and fuel from water flow, restricting construction hours, etc. During operation, water quality is expected to meet national emission and environmental standards through regular irrigation canal maintenance.
- ⑤ Natural Environment: The Project site does not fall in or around sensitive

areas such as national parks, etc., and undesirable effects on the natural environment are assumed to be minimal.

- ⑥ Social Environment: As the Project is to rehabilitate existing irrigation facilities, no additional land acquisition or involuntary resettlement will occur. It is also confirmed that the Project area does not include areas where there are residents who may fall under the category of indigenous peoples, such as Forest Dweller.
- ⑦ Other/Monitoring: Monitoring of air quality, water quality, noise and vibration during construction will be conducted by the contractor and Sub-PMUs, while monitoring of water and soil pollution during service will be conducted by the state-level PMUs.

(7) Cross-Sectoral Issues:

- ① Climate change measures: the Project will contribute to climate change measures (adaptation) because the improvement of irrigation facilities through the Project is expected to enable stable agricultural production in response to reduced rainfall and changes in rainfall patterns, thereby reducing the negative impacts of climate change.
- ② Poverty Alleviation: the Project is categorized as a 'Poverty alleviation project' because about 60% of the irrigation rehabilitation target areas of the Project are occupied by small and marginal farmers and the livelihoods of these farmers will be improved through the Project.
- ③ Prevention of AIDS/HIV and Other Infectious Diseases : As part of the effort to prevent the spread of the novel coronavirus infection, a list of measures (36 in total) to be implemented by the executing agency during the formation and implementation of the project was agreed upon at the time of appraisal. This agreement has clarified relevant activities including development of epidemic prevention materials and equipment, improvement of the working environment including the code of conduct, work supervision, and awareness raising. Appropriate monitoring with a constant focus on the impact of the novel coronavirus will be made by receiving quarterly reports on the status of implementation of these items from the executing agency in order to allow the executing agency to take flexible and suitable actions. In addition, HIV/AIDS measures for construction workers will be implemented by construction contractors during the construction phase.

(8) Gender Category: Gender Informed (Significant)[GI(S)]

<Details of Activities/Reason for Categorization>

The results of the gender analysis identified gender-based issues related to women's participation in decision-making processes. This is because the Project has a plan to implement the formation of women's groups in water users' organizations, support for self-help groups and nutritional improvement, and has set indicators such as the percentage of women on water users' organization boards, their right to speak up and improve their participation in meetings.

In Rajasthan, women were not traditionally allowed to own land and could not participate in the activities of water users' organization. However, with the amendment of the "Participatory Irrigation Act", spouses of landowners are now eligible to become members, and one female officer is appointed to the union's board of directors. As a result, one female officer has been elected in each of the 204 unions established. In the first phase, through these initiatives, the Project promoted women's participation in the decision-making process in water user organizations and gender mainstreaming in the irrigation sector.

In addition, the Project has organized 'women's sub-committees' within water users' organizations to promote women's participation, which was made possible by the amendment of the aforementioned act. In addition, facilities that also meet the needs of the women's sub-committee are designed and constructed as part of the irrigation facility renovation works to foster women's ownership of irrigation facilities. In addition, farm technical support and training for improved nutrition are provided to women-organized self help groups, which are separate from the cooperative.

(9) Other Important Issues

In Rajasthan, through the yen loan project "Rajasthan Minor Irrigation Improvement Project" (approved in 2005), manuals and guidelines on appropriate water resources management, etc. were prepared and reviewed as part of capacity building of water users' organizations and support to farming operations, in addition to the rehabilitation of irrigation facilities. These manuals and guidelines are also being used in the Project, and it is expected that the water users' organizations established through the Project will promote sustainable use of water resources.

4. Targeted Outcomes

(1) Quantitative Effects

1) Outcomes (Operation and Effect Indicators)

Indicators ※1	Baseline (Actual value in 2017)	Target (2030) [2 years after project completion]
Beneficiary irrigated area (ha)*2	-	470,000
Collection rate of irrigation water tariff / charge (%)	40	60
Cultivated area by major crops (ha)		
Maize	20,900	27,200
Wheat	75,100	97,600
Exotic vegetables (broccoli, Chinese cabbage, mushrooms, etc.)	100	150
Mustard	56,200	73,000
Chickpeas	34,600	45,000
Production volume of major crops (ton/year)		
Maize	31,300	42,800
Wheat	278,800	398,500
Exotic vegetables (broccoli, Chinese cabbage, mushrooms, etc.)	2,000	3,200
Mustard	85,500	116,500
Chickpeas	31,500	45,000
Gross annual average farm income (INR/year/ household)	72,000	140,000
Female ratio in water usage organization Management Committee	0	25

*1 In addition to the above indicators, irrigation efficiency (water use efficiency) is monitored as a reference value.

*2 Total irrigated area is the one rehabilitated from trunk to branch lines to enable efficient water use.

(2) Qualitative Effects

Organizing and fostering water users' organizations and farmers' groups, increasing women's voice and promoting a participation in meetings in water users' organizations, diversification of local agriculture with the introduction of irrigated agriculture, improvement of nutrition (women and children), improvement of gender and farming knowledge, adaptation to climate change.

(3) Internal Rate of Return

Based on the following assumptions, the economic internal rate of return (EIRR)

for the Project is 16.7%. Although the Project collects water user fees from users, the financial internal rate of return (FIRR) is not calculated as the Project costs are not collectable.

【EIRR】

Cost : Project costs (excluding taxes etc.), operation and maintenance costs

Benefit : Increase output of main crop due to increasing cropping area and yield

Project Life : 30 years

5. External Factors and Risk Control

(1) Preconditions: N/A

(2) External Factors: N/A

6. Lessons Learned from Past Projects

The ex-post monitoring of the “Upper Kolab Irrigation Project”, taught that irrigation projects, it generally requires a certain period of time for establishment of beneficiaries' knowledge of water resources management and understanding of the activities of water users' organizations, therefore the Capacity building support should be incorporated at an early stage. From other irrigation projects in India, as a large number of sub-projects are located in a broad area, it was difficult for the state-level Project Management Units (PMUs) to coordinate every support only by themselves such as construction supervision of scattered sub-projects, capacity building of water users' organizations and support to farming operations, and it was found that it was necessary to establish a sub-Project Management Unit (Sub-PMU) at the district level for preventing Project delays, and that the Project should be implemented in some Project phases.

In the Project, the progress of civil works in each Sub-PMU will be linked to water users' organization capacity strengthening and farmers' support activities, with the aim of ensuring sustainability of the Project. In addition, five Sub-PMUs will be established in the state to implement and monitor these activities in three stages.

7. Evaluation Results

In addition to meeting India's development challenges and policies, and Japan's and JICA's cooperation policies and analyses, there is a high need to support the implementation of this project as it is considered to contribute to Goal 1 (No poverty), Goal 2 (Zero hunger), Goal 5 (Achieve gender equality) and Goal 13 (Climate Action) of the SDGs (Sustainable Development Goals).

8. Plan for Future Evaluation

(1) Indicators to be Used

As indicated in Sections 4.

(2) Future Evaluation Schedule

Ex-post evaluation: Two years after the project completion