



1. Project Data

Project ID P124614	Project Name IN: Rajasthan ACP	
Country India	Practice Area(Lead) Agriculture and Food	
L/C/TF Number(s) IDA-50850	Closing Date (Original) 30-Apr-2019	Total Project Cost (USD) 57,656,196.98
Bank Approval Date 27-Mar-2012	Closing Date (Actual) 30-Jun-2020	
	IBRD/IDA (USD)	Grants (USD)
Original Commitment	109,000,000.00	0.00
Revised Commitment	68,395,702.74	0.00
Actual	57,656,196.98	0.00

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2. Project Objectives and Components

a. Objectives

The Project Development Objective (PDO) of the Rajasthan Agricultural Competitiveness Project (RACP) as articulated in the Project Appraisal Document (paragraph 12) was identical to the one in the Financing Agreement (FA, page 4) and aimed to:

"establish the feasibility of sustainably increasing agricultural productivity and farmer incomes through a distinct agricultural development approach by integrating agriculture water management



and agricultural technology, farmer organizations and market innovations in selected locations across the ten agro-ecological zones of Rajasthan.

The PDO was clarified through restructuring in June 2018 as follows:

“to sustainably increase agricultural productivity and farmer incomes in selected locations of Rajasthan.”

Parsing of the Objective: For the purpose of this review the PDO will be parsed into two sub-objectives which will be referred to as Objective 1 and Objective 2 as follows:

Objective 1: To sustainably increase agricultural productivity in selected locations in Rajasthan.

Objective 2: To sustainably increase farmers' incomes in selected locations in Rajasthan.

This Review will not assess the project outcome based on a split rating given that neither the objectives nor overall level of ambition of the project were changed. The "clarification of the PDO and the updated indicator targets maintained the project's scope and scale and increased its measurability (ICR, paragraph 19)."

b. Were the project objectives/key associated outcome targets revised during implementation?

Yes

Did the Board approve the revised objectives/key associated outcome targets?

No

c. Will a split evaluation be undertaken?

No

d. Components

The project contained the following four components to achieve the PDO:

1. Climate Resilient Agriculture (appraisal cost: US\$87.7 million, actual cost: US\$79.94 million). This component would support climate-resilient approaches that allows for the sustainable use of the natural resource base through agricultural and livestock production systems aiming to increase long term productivity and farm incomes in an environment marked by increased climate and, in particular, rainfall variability. This component would support measures that improve: (a) harvest, capture, collection, delivery and distribution of water for agriculture and livestock purposes in surface water irrigated canal command areas, ground water sources and rainfed areas; (b) on-farm water use efficiency; (c) soil moisture and fertility improvements; (d) sustainable intensification and diversification of farm production; and (e) integrated crop and livestock farming systems. It included the following three sub-components:

1.1. Improvement of water use efficiency. This would be taken up under three different water scenarios, i.e., (i) irrigated command areas using surface water (canal) irrigation, (ii) areas using groundwater irrigation and (iii) rainfed areas. The project would support various institutional, physical and modern water management practices with a view to promote sustainable water use available for agriculture, and improved



water use efficiency. Specifically, the project would support: (i) in irrigated canal command areas the fostering and capacity building of water users organizations, irrigation system rehabilitation and modernization including installation of measuring devices, and improved water management practices; (ii) in ground water irrigation areas formation and capacity building of village and aquifer level community organizations, construction of rain gauge stations, construction of recharge structures and piezometers, and installation of water meters; and (iii) in watershed areas formation and capacity building of village and watershed level community organizations, installation of runoff recorders, sediment samplers, automatic rain gauges, construction of drop spill ways, anicuts, waste water weirs and vegetative barriers. Across all three water resource scenarios the project would also support promotion of on-farm water use efficiency measures, including construction of diggies (small reservoirs) and farm ponds (as appropriate) and drip and sprinkler irrigation, benchmarking and water auditing, and complimentary agriculture support services. Matching grant financing would be provided for the development plans proposed, developed and implemented by the respective farmer groups which in turn would be responsible for mobilizing their contribution either in cash or in-kind or both.

1.2. Technology transfer and market led advisory services. The focus of this sub-component would be on improving on-farm water use efficiency in the clusters representing three water scenarios by promoting the demonstration and adoption of land and water management and crop husbandry practices which improve agricultural productivity, profitability and sustainability while reducing water footprint of agriculture. The project would finance (a) the demonstration and adaptation of location-specific soil and water conservation practices, including soil carbon sequestration practices with a view to possibly mobilize carbon payments; and (b) the demonstration and use of improved crop varieties, integrated pest and nutrition management, as well as appropriate water management and other agronomic practices. Options towards public-private partnerships in agricultural service delivery would be explored.

1.3. Livestock strengthening and management. The focus of this subcomponent would be on small ruminants. The project would support improved productivity and incomes from goat meat production in a few clusters by (a) improving market access and value addition; (b) adopting climate smart practices focused on breeding, animal health and feeding and other husbandry practices such as stallfeeding, better use of crop residues, fodder storage and improved grazing land and silvipasture on private and common property; and (c) building capacity of farmers and strengthening Animal Husbandry Department (AHD) staff to backstop delivery of technical services and advice to farmers. Small local support units will be built to support farmer training and access to services.

2. Markets and Value Chains (appraisal cost: US\$33.80 million, actual cost: US\$4.83 million). The aim of this component is to enable farmers to engage in profitable market oriented sustainable production, and to promote partnerships and market linkages with other value chain participants and agribusinesses. The component would help producer groups, agro- enterprises, and commodity associations, to actively engage in the development of commodity value chains by partially financing demand-driven investment proposals to producer organization through a matching grant. It included the following two sub-components:

2.1. Agri-Business Promotion Facility (ABPF). The competitiveness of small-holder farmers and agribusinesses would be promoted by facilitating the development and establishment of demand-driven value chains through a participatory approach. The ABPF established under the project, would facilitate (i) the roll out of these participative value chains identification and stakeholder consultation; (ii) promote investments in agribusiness, foster backward and forward linkages in the value chains for agricultural



products, facilitate access to finance by agribusiness entrepreneurs, and promote positive policy change; (iii) facilitate the implementation of Rajasthan's Agribusiness Policy; and (iv) mobilize national and state grants.

2.2. Market Infrastructure and Agribusiness Support. This sub-component would finance demand-based sub-projects proposed by farmer groups, and producer organizations to build strategic linkages amongst the value chain participants with a view to increase competitiveness, productivity, quality and market access. Market Infrastructure support would be provided to support farmer groups with matching grant investments in rural market infrastructure and for productive infrastructure such as storage facilities, grading and sorting equipment, collection centers, etc. Agribusiness support would provide producer organizations with matching grants directed towards improving marketing activities (such as product aggregation, cleaning, grading, packaging) and would co-finance investment proposals from producer organizations and producer groups established under the project which are actively seeking to expand their operations.

3. Farmers Organizations and Capacity Building (appraisal cost: US\$25.50 million, actual cost: US\$5.01 million). This component would support (a) mobilization and establishment of farmer groups and organizations, (b) capacity building for participatory planning and plan implementation of collective actions; and (c) strengthening of institutions and human resources associated with the project implementation (i.e. participating line department and other relevant agencies). Community based organizations (CBO) would be organized around the three themes of the RACP - water resource management, agriculture practices, and value chain development.

4. Project Management and M&E (appraisal cost: US\$19.50 million, actual cost: US\$11.72 million). This component would undertake project management, provide for robust monitoring and evaluation (M&E) systems with a view of potentially scaling up approaches deemed successful under this operation across the state; as well as aim to build synergies and convergence with ongoing schemes from the Government of Rajasthan (GoR) and the Government of India (GoI).

Revised Components

Activities were added post-effectiveness in response to challenges and opportunities, as follows:

Component 1: (i) a Groundwater-Energy-Agriculture (GEA) Nexus Diagnostic Study to explore practical, politically feasible, scalable and sustainable approaches to address the adverse water-energy-agriculture nexus in Rajasthan; and, (ii) tractor-mounted and drone-based sprayers were provided to areas affected by the 2020 desert locust outbreak.

Component 2: The Project and ABPF identified the need to reform licensing rules to allow FPCs to purchase production directly from their members, and provided technical assistance to the GoR to undertake the needed reforms.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates



Project Cost. The estimated total project cost at appraisal was US\$166.5 million. This amount was revised downwards to US\$104.46 million (see below for details). The actual total project cost according to the ICR data sheet (page 2) and Annex 3 was US\$101.51 million.

Financing. The project was financed through an International Development Association (IDA) Credit worth US\$109.0 million. This amount was revised downwards to US\$68.40 million (US\$40.9 million reduction). The ICR (paragraph 22) reported that a total of US\$32.69 million of IDA Credit was cancelled due to cost savings that resulted from significant INR/US\$ exchange rate depreciation (ICR, paragraph 23). However this leaves a difference of US\$7.91 million of IDA Credit unaccounted for by the ICR. The actual amount disbursed according to the ICR data sheet (page 2) was US\$57.66 million (84% of the revised amount). The US\$10.74 million difference between the revised amount and the actual amount was not explained in the ICR. In a further communication, the project team explained that "The IDA Credit is denominated in SDR, so the USD equivalent was a moving target over the course of implementation. The partial cancellations (prior to Credit Closing) were fixed at the prevailing exchange rate on the date of the cancellation, and therefore their total is finite – USD 40,906,596.49. Total disbursements over the course of implementation were USD 57,656,196.98 (confirmed in Client Connection). At loan closure, there was a final cancellation of SDR 3,312,987.82 (USD 4.77 million equivalent), due to significant INR/US\$ exchange rate depreciation, a three-fold increase in farmer equity contributions compared to appraisal estimates, and greater than expected procurement economy (see paragraph 23), and this zeroed out the balance of IDA Credit 5085."

Borrower Contribution. The Government of Rajasthan (GoR) was expected to provide US\$48.40 million of counterpart funds, while farmers (project beneficiaries) were expected to contribute US\$9.10 million bringing a total of US\$57.50 million. Both amounts were revised downwards to US\$30.37 million and US\$5.71 million (total: US\$36.08 million), for the GoR and the farmers, respectively. The actual amounts according to the ICR data sheet (page 2) were US\$23.37 million and US\$20.46 million (total: US\$43.83 million), for the GoR and the farmers, respectively. The ICR did not explain the reason(s) behind the lower than expected GoR amount and the significantly higher than expected amount for the farmers.

Dates. The project was approved on March 27, 2012 and became effective on July 2, 2012. The Mid-Term Review (MTR) was conducted on May 31, 2017, five years into implementation. The PAD (Annex 6, page 90) had the MTR scheduled during the third year after effectiveness with no exact date specified. According to this, conducting the MTR was delayed by about two years. The project closed on June 30, 2020, which was fourteen months later than the original closing date on April 30, 2019. According to the ICR (paragraph 23) "the combined 14-month extension enabled the advancement of RACP investments and achievement of expected outcomes."

The project was restructured six times, all level 2 restructuring as follows:

1. On June 29, 2016, when the amount disbursed was US\$2.13 million, in order to introduce changes in: institutional arrangements, financial management, and procurement.
2. On June 25, 2018, when the amount disbursed was US\$22.32 million, in order to clarify the PDO and amend the Results Framework.
3. On November 13, 2018, when the amount disbursed was US\$27.42 million, in order to reallocate funds between disbursement categories and cancel US\$19.187 million equivalent of the IDA Credit due to cost savings.



4. On March 27, 2019, when the amount disbursed was US\$32.03 million, in order to amend the Results Framework and extend the Loan closing date by six months to October 31, 2019.
5. On September 26, 2019, when the amount disbursed was US\$41.52 million, in order to extend the Loan closing date by eight months to June 30, 2020, cancel US\$10 million equivalent of the IDA Credit due to cost savings, and reallocate funds between disbursement categories.
6. On June 30, 2020, when the amount disbursed was US\$49.68 million, in order to increase IDA financing proportion from 70% to 87% and retroactively apply this to expenditures since effectiveness (according to the ICR footnote#7, this was necessary to maintain the 70/30 IDA/GoR financing ratio over the entire project period); cancel US\$3.5 million of the remaining undisbursed balance; increase Category 1 (goods, works, non-consulting services, consultants' services, training and operating costs) by US\$526,642 equivalent; and decreased Category 2 (grants) by US\$4.02 million equivalent.

The above-mentioned changes were relevant and needed. According to the ICR (paragraph 23), the decentralized implementation arrangements to the six Line Departments enabled increased disbursement by following GoR budgeting procedures; the minor clarifications of the RF and updates to four of the PDO indicators and the replacement of PDO 5 better reflected the actual project activities and their relationships with the project's Theory of Change (ToC) and outcomes; the cancellation of funds were mainly the result of a combination of cost savings from local currency depreciation combined with a three-fold increase of farmer equity contributions compared to appraisal estimates and greater than expected procurement economy in purchase orders and contracts. Finally, the extension of the closing date was required to allow the advancement of this project investments and achievement of expected outcomes (ICR, paragraph 23).

3. Relevance of Objectives

Rationale

Context at Appraisal. Rajasthan, located in western India, is the largest state in the country (about 350,000 km²). It is an overwhelmingly rural and agricultural state, with very limited water resources availability. With limited water resources and increasing constraints on water availability for various uses, in particular for agriculture, improving productivity per unit of water use in irrigated agriculture (both surface and groundwater) and achieving productivity gains in rain-fed agriculture (watersheds) are one of the great untapped opportunities of the agriculture sector in the state. This project aimed to introduce and implement an end-to-end approach ranging from water management to agricultural practices and marketing to enable Rajasthan's farmers to get more rupees per unit of water in compensation for farmers using fewer units of water. According to the PAD (paragraph 11), this project was expected to coordinate and establish synergies with other on-going World Bank supported projects in Rajasthan, particularly the Rajasthan Water Sector Restructuring Project, the Rural Livelihood Project and the proposed Rural Water Supply Project.

Previous Bank Experience. The RACP was the third operation in a series of Bank-supported Agriculture Competitiveness Projects (ACP) in India each supporting an end-to-end approach from farm production to produce marketing. The Bank had several on-going projects in Rajasthan including the Rajasthan Water Sector Restructuring Project, the Rural Livelihood Project and the Rural Water Supply Project. In addition,



the Bank had extensive experience working in different states in India on water related issues (PAD, paragraph 11).

Consistency with the Bank Strategies. At appraisal, the PDO was in line with the Bank's Country Assistance Strategy (CAS) for India (FY2009-FY12) which called for achieving rapid, inclusive growth by expanding agriculture productivity and ensuring sustainable development through improved natural resources management (soil and water). The CAS emphasized the need to foster farmer-centered extension systems as well as provide efficient and competitive markets. The project featured several areas that contributed to the CAS including: (a) sustainable and efficient use of water resources, (b) increased private sector participation in the development of processing and marketing value chains; and (c) improved public sector capacity to deliver agriculture services.

At completion, the PDO was in line with four focus areas (resource-efficient growth; enhancing competitiveness and enabling job creation; and investing in human capital) of the Country Partnership Framework (CPF, FY2018-FY22). Specifically, the project investments in climate resilient agriculture and the development of value addition and marketing systems supported the CPF's goal of promoting private sector development for agri-value chain infrastructure. This also directly contributed to the CPF's rural priorities of increasing and diversifying economic opportunities to double farmers' income by 2022 while improving efficiency in agricultural water and land use. Also, the project investments to increase irrigation water availability and provide financing and training to enable farmers to adopt higher-value, more water-efficient agricultural practices supported the CPF's emphasis on climate resilience and improved resource management through infrastructure investments, new agricultural approaches, and crop diversification. Finally the PDO was in line with Bank's Climate Change Action Plan and the Agriculture and Rural Development Strategy for India, which promoted resilient and resource-efficient agricultural growth; improved access to efficient markets, value chain development, and competitiveness; inclusive livelihoods; and higher incomes.

Consistency with the Government Strategies. At appraisal, the PDO was in line with key Government of Rajasthan (GoR) policies, namely, the State Water Policy (2010) and Policy for Promotion of Agro-Processing and Agri-Business (2010). Specifically, the project's support to sustainable, integrated water resources planning, development, and management at river basin (cluster) level and investments in reducing agricultural water use was aligned with the State Water Policy. Also, the project investments in value addition, reduced post-harvest losses, and private agro-investment were consistent with the Agribusiness Policy. Further, the PDO was in line with the objectives of the Rajasthan Action Plan on Climate Change (2010-14) and the State Environment Policy (2010): to enhance resilience and assure environmental sustainability, respectively.

At completion, the PDO was in line with the Government of India's (GoI) agriculture policy goals to double farmers' income by 2022 and establish 10,000 farmer producer organizations between 2019–2024. Also, through the inclusion of goat value chains involving primarily women and landless farmers the project supported the GoI efforts to increase inclusion in agri-enterprise development. The objectives were also in line with the 2019 Rajasthan Agro-processing, Agri-business and Agri-export Promotion Policy.

The original statement of objectives was relatively long with a description of causal pathways (ICR , paragraph 79). Also, the term "*to establish feasibility*" was vague and complicated the PDO as it was not clear how establishing feasibility would be assessed. That said, the PDO statement after the June 2018 restructuring was more clear, focused and pitched at an arguably more appropriate level of ambition. The PDO was in line with both the current Bank CPF and the GoI's agriculture policy goals. Also, improving



agricultural productivity and farmers incomes will continue to be a relevant objective for the State of Rajasthan in the future.

Overall, Relevance of Objectives is rated High.

Rating

High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective

To sustainably increase agricultural productivity in selected area in Rajasthan.

Rationale

Theory of Change (ToC). To achieve the stated objective, the project would rehabilitate irrigation canals and develop water storage, finance matching grants for beneficiaries to adopt micro-irrigation systems (MIS), support production technology demonstration sites, and improve animal husbandry services. The project would also provide capacity building activities to farmer organizations on sustainable production practices technology and water management, and organize farmers into community water management institutions. These activities were expected to increase the supply of irrigation water to farmers, increase farmers' access and expand the application of micro-irrigation systems, and expand farmers' access to sustainable crop/livestock production technologies. The expected outcomes would be increased agricultural productivity, improved water use efficiency in agriculture and adoption of micro-irrigation systems and sustainable production technologies by farmers. Anticipated long-term outcomes included sustainable and efficient use of water resources in Rajasthan's agricultural sector, and achieving inclusive and sustainable rural growth.

The achievement of the stated objective is underpinned by the following assumptions: (a) No adverse conditions or disease outbreaks, (b) Promote technologies that are technically and financially viable in project areas, (c) Farmers have sufficient cash/access to finance beneficiary contribution.

The activities reflected in the ToC were directly linked to the PDO in a plausible causal chain and the stated assumptions were logical and realistic.

Outputs

The following outputs were reported in the ICR (Annex 1) unless referenced otherwise:

- 1,190 diggies (small reservoirs) were constructed for water storage (target: 1,190; achieved).



- 14,707 hectares (ha) of land were provided with sprinklers (target: 14,378; exceeded).
- 10,348 pipelines were used for piped conveyance of Irrigation water (target:13,990; not achieved).
- 1,572,125 meters of field bund / peripheral bund / contour bund were constructed (target: 1,755,873; 90% achieved).
- 758 on-farm pond/dugout pond were constructed (target: 537; exceeded).
- 605 on-farm tanks were constructed (target 608; virtually achieved).
- 594 water harvesting structures / medium masonry structures / check dams / anicuts were constructed (target: 691; not achieved).
- 7,988 canal systems were renovated and/or modernized (target: 9,024; not achieved).
- 15,603 trees were planted under pastureland development (target: N/A; survival rate: 70.7%).
- 54% of farmers attended training on water conservation (target: N/A: Actual 54%).
- 88% of farmers adopted the recommended crop rotation pattern (target: N/A).
- 61,951 hectares of land were provided with crop demonstration (target: 37,000; exceeded).
- 4,320 hectares of land were provided with fodder demonstration (target: 3,200; exceeded).
- 411,345 square meters of greenhouse were constructed (target: 349,300;exceeded).
- 503 hectares of fruit planation (target: 503; achieved).
- 1,794 hectares of vegetable planation (target: 1,047; exceeded).
- 5,240 bucks (male goats) were distributed (target: 5,240; achieved).
- 2,097 goat units were distributed (target: 2,099; achieved).
- 27,376 clean milk production units were provided (target: 27,626; substantially achieved).

Outcome

The project sought to achieve sustainable productivity growth through: (a) increased adoption of less water-intensive crops; (b) increased access to irrigation water and more efficient irrigation systems; (c) improved land and animal husbandry practices; and, indirectly, (d) improved market linkages that motivated these behavior changes (discussed under objective 2). Each one of these elements is discussed:

(a) Increased adoption of less water-intensive crops. According to the ICR (paragraph 38) "the project investments in high-value, low-water use crop demonstrations, agricultural extension, and improved marketing encouraged farmers to adopt less water intensive crops suitable for local conditions." The area under less water use crops (bajra, gram, groundnut, maize, moong, sorghum, soybean; all vegetables; others (lentil, paddy, sesame, urad) as a percent of the total cultivated area at the endline was significantly higher for project households (67.5%, or 117% of the target of 60%) compared with the control (54.8%). Also, 83% of project farmers sowed crop varieties suitable for local conditions at endline (21% more than control farmers) and 88% followed the recommended cropping pattern (14% more than control farmers at endline). Further, the DiD result showed that the adoption of the recommended cropping pattern was 19% higher among project farmers more than control farmers. Also, remotely sensed surface water and vegetation data analysis by the Bank in watershed and surface water clusters where the Project financed water harvesting structures (WHS) showed an increase in monthly water storage availability from 2017–2020 and a shift towards higher-value, less water intensive crops (e.g., mustard, bajra) near WHS.

(b) Increased access to irrigation water and more efficient irrigation systems. According to the ICR (paragraph 36) the project investments increased availability of on-demand irrigation water. This was achieved through canal rehabilitation which reduced evaporation and percolation losses, resulting in water



savings of 7% and a 15-20% reduction in the time for water to reach the tail-end. Also, the project investments in water retention structures captured an estimated 32.8 million cubic meters of runoff significantly exceeding the target of 0.86 million cubic meters. In addition, farmers stored their canal water allocation in project-financed diggies (small reservoirs) to supplement rainfall as needed, which reduced overuse of canal water. Also, 76% of beneficiaries sampled reported that upland water harvesting structures supported by the project increased water table levels in their wells by 2–5.5 meters (ICR, paragraph 36). Finally, watershed development investments also reduced agricultural water use where over 94% of field bund beneficiaries reported that bunds increased soil moisture, thereby reducing farmers' irrigation water dependence (ICR, paragraph 37).

More efficient irrigation was achieved through project investments in MIS. This helped farmers convert from no irrigation (rain-fed) or low-efficiency flood irrigation to high-efficiency MIS. The area under improved (non-flood including: micro-irrigation systems (MIS) e.g., drip, sprinkler, mini-sprinkler, and innovations promoted by the Project, including MIS combined with pipes, diggies, and farm ponds) irrigation as a percent of the cultivated area reached 44% (target: 70%) in project households compared to 23.3% at baseline. While the indicator target of 70% was not achieved, physical targets for mini-sprinklers and diggies were both achieved. According to the ICR (paragraph 37) 60% of farmers who received project training on MIS and water conservation adopted MIS. The Borrower Completion Report (BCR) attributed the under-achievement of drip targets to its lower technical and financial suitability for low-value, widely spaced field crops compared to high-value, closely-spaced vegetable and plantation crops, theft risk and poor water quality. The DiD result indicated that project farmers increased the cultivated area under MIS by 10% more than control farmers. As a result of irrigation improvements and more efficient irrigation systems, agricultural water use was reduced for six major crops and for the unit model (PDO indicator # 1) by 22% (from a baseline of 3,000 m³/ha to 2,340 m³/ha exceeding the target of 2,500 m³/ha). In contrast, control farmers' water use per ha increased by 5% over the 2017 baseline for these crops. The Difference-in-Difference (DiD) results showed that project farmers reduced their reported water use by 8% more than the control farmers for six major crops (bajra, barley, gram, maize, mustard, and wheat) between the 2017 baseline and 2020 endline (ranging from a 4% greater reduction for barley to a 19% greater reduction for maize), indicating strong attribution to the project (ICR, Annex 1). Project farmers' Water Use Efficiency (WUE) (gross income in US\$/m³ of irrigation water applied) increased from the 2017 baseline to endline for all 11 field crops studied, ranging from an increase of 15% for soy to a 104% increase for wheat. Despite these encouraging numbers, the project fell short of achieving its target on WUE (PDO outcome indicator #2), US\$0.31/m³ compared to a target of target US\$0.37/m³ and a US\$0.23/m³ at baseline. According to the ICR (paragraph 31), the DiD result indicated that project farmers' WUE increased 43% more than for control farmers.

In a further communication, the project team explained that improvements in irrigation water conveyance was assessed by "measuring canal irrigation water (a) velocity, (b) discharge, and (c) reaches (i.e., distance to the tail end users) before and after RACP-financed canal rehabilitation for each minor irrigation system and canal in all surface water clusters."

(c) Improved land and animal husbandry practices. The project investments increased cropping intensity from 117% in 2017 to 146% in 2020. Also, DiD result indicated that the project farmers increased cropping intensity 22% more than control farmers. Increased cropping intensity was achieved through efficient application of fertilizers through fertigation, mechanization of land and crop management, crop rotation, mixed cropping, and increased water availability, especially in the Rabi (dry) season. In the project areas 79% of farmers participated in a GoI program which distributed nutrient and fertilizer recommendations based on soil testing compared to 64% in control areas. Among farmers who benefited from project demonstrations, 99% of female and 99% of male, (target: 50%) adopted technologies promoted by the project-demonstrations (PDO



indicator #5) and committed to continue doing so in future. By contrast, only 68% of control farmers adopted the same technologies from demonstrations promoted under other programs. Further, project farmers increased the average daily milk production per goat from 0.8 liter at baseline to 1.38 liter at endline (242% of the target marginal increase), and average goat weight increased from 15 kg at baseline to 25.05 kg at endline (201% of the target marginal increase). The DiD results showed a 25% gain for project farmers compared to control group (ICR, paragraph 33).

The overall result of the above-mentioned achievements was reflected in improved productivity in the project areas. According to the ICR (paragraph 32), Unit model productivity at endline (PDO outcome indicator #3) increased by 38% to 2.66 MT/ha over the 2017 baseline of 1.93 MT/ha for the six major crops, exceeding the target by 19%. By contrast, control farmers' weighted average productivity dropped by 5% from baseline to endline (from 1.9 MT/ha at baseline to 1.79 MT/ha at endline). The DiD result showed a 43% marginal productivity gain for project compared to control farmers over the 2017 baseline. Project farmers' productivity at endline increased for all six crops as follows: gram by 15% (37% of target), bajra by 26% (88% of target), wheat 23 (66% of target), mustard 26% (65% of target), maize 19% (63% of target), and barley 34% (97% of target). The ICR (paragraph 32) explained that the project fell short of achieving end-targets on individual crop productivity was partially because the water infrastructure was not fully completed until March 2021, while the endline survey was conducted in October 2020. A simulation model using two average yield growth scenarios for two more seasons and based on actual project yields showed that five of these crops were likely to achieve their targeted yield increases by at least 2022–23 (ICR, paragraph 32).

Conclusion. The project exceeded its PDO indicator targets for three out of four indicators. On the other hand, the project missed individual productivity targets for the six crops. On this basis, the efficacy with which Objective 1 was achieved is rated marginally Substantial, because of the shortcomings in achievements. In addition, there is no basis for assuming that project locations would achieve further sustainable productivity gains in the coming years. This assessment is underlined by the observation that the target for modernized irrigation (70% of project areas) was ambitious given the low baseline (23.3%) and challenges were experienced during implementation with regards to modern irrigation technologies.

Rating

Substantial

OBJECTIVE 2

Objective

To sustainably increase farmers' incomes in selected locations in Rajasthan.

Rationale

Theory of Change (ToC). The achievement of this objective is co-dependent on the activities mentioned under the ToC for objective #1, and in addition to these activities, the project would identify and support high potential water-efficient value chains and provide Farmer Producer Companies (FPCs) advisory service for matching grants (MGs) for storage, value addition, and marketing equipment. As a result of these activities, value addition and marketing systems were expected to improve and FPCs would become formally registered and licensed. The expected outcomes were: an increase in farmers' agricultural incomes, FPCs would



generate profits, and farmers would sell a larger proportion of their production. Anticipated long-term outcomes included sustainable and efficient use of water resources in Rajasthan's agricultural sector, and achieving inclusive and sustainable rural growth.

The expected achievement of the objective was underpinned by the assumption that an enabling policy for FPC operations existed including purchasing from member farmers.

The activities reflected in the ToC were directly linked to the PDO in a plausible causal chain and the stated assumption was logical and realistic.

Outputs

The following outputs were reported in the ICR (Annex 1) unless referenced otherwise:

- 30 Farmer Producer Companies were formed under the project (target: N/A).
- 7,605 Multi-task groups were formed under the project (target: N/A).
- US\$158,739 was the value of equity raised by FPCs with project support (target: N/A).
- 6 Memoranda of Understandings signed between the project-supported Farmer Producer Companies (FPCs) and potential buyers (target: N/A).
- 8 FPC sales to private commercial buyers and processors completed (target: N/A).
- 17 cluster commodity profiles were developed with support of the Agri-Business Promotion Facility (ABPF) (target 17, achieved).
- 15 commodities had their value chain analyses completed (target: 15).
- 40 detailed project reports were prepared for projects implementable in the state (target: N/A).
- 4 business trainings programs were provided to FPC and Farmer Common Service Center (FCSC) personnel (target: N/A).
- 2 agri-policy seminars were organized with GoR officials, FPC members, and industry representatives (target N/A).
- 1 digital database of experts, buyers, and suppliers was developed to support FPC market linkages (target N/A).
- 20 FPCs were assisted to obtain required license to open and operate agri-input shops (target: 20, achieved).
- 12 FCSCs were established by FPCs with support from the project (target: 10; exceeded).

Outcome

According to the ICR (paragraph 40), sustainable income growth was expected from: (a) increased adoption of high-value crops; (b) increased value addition and access to markets, including through producer organizations to aggregate inputs and outputs; (c) an increase in the proportion of overall production that is marketed; and, indirectly, (d) increased productivity (discussed under Objective1).

(a) Increased adoption of high-value crops. This was achieved through project investments in improved irrigation, MIS, and greenhouses. Project farmers increased the total vegetable cultivated area (in both open fields and greenhouses) from just over 1% at the 2017 baseline to 10.5% according to the endline survey. By contrast, control farmers increased their vegetable area from 2% at the 2017 baseline to 2.5% at endline. The



DiD analysis showed a 843% marginal increase among project farmers over the control group, indicating extremely high project attribution (ICR, paragraph 42).

(b) Increased value addition and access to markets, including through producer organizations to aggregate inputs and outputs. The project Agribusiness Promotion Facility (ABPF) improved the value addition and marketing system for eight commodities (barley, goat milk and milk products, green gram, live goats, maize, potato, soy, and wheat) (target achieved) by organizing farmers into 30 FPCs, financing value addition and storage infrastructure, and linking them to markets. The project financed the establishment of 12 Farmer Common Service Centers (FCSCs) to aggregate and add value to member farmers' production and supported FPCs to select and procure capital assets. By project completion 20 FPCs (target:10, exceeded) with their own revenue-generating input shops were generating net revenue. The project also provided FPCs training on business operations and helped FPCs obtain licenses to operate input shops, prepare business plans, access finance, and develop relationships with input suppliers and commodity buyers. This included facilitating the signing of Memoranda of Understanding (MoUs) between FPCs and commercial buyers. According to the ICR (paragraph 44) "six FPCs have signed MoUs with 11 potential buyers, and 3 FPCs completed sales to private buyers in kharif (monsoon) season 2019-20, all for low-water using crops."

(c) An increase in the proportion of overall production that is marketed. As a result of the project investments and support to farmers' organizations, the proportion of total production (marketable surplus net of own-consumption and losses for the 11 major crops) that project farmers sold increased from 50% at the 2017 baseline to 87% at the 2020 endline survey (174% of the target). According to the ICR (paragraph 45) "project farmers sold a larger share of their production at endline compared to the 2017 baseline for all 11 field crops studied." By contrast, control farmers sold a lower proportion of groundnut, sorghum, and mustard production at endline compared to the 2017 baseline. The DiD analysis showed that while project farmers increased their sold production proportion, this was only 3% more than control farmers.

As a result of the project investments and support to farmers' groups, farmers' unit model net incomes (production income minus production expenditures, gross margin) increased by 97% over the 2017 baseline (162% achieved, PDO outcome indicator #4). By contrast, control farmers' net income (gross margin) increased 66%, resulting in a DiD of 31% attributable to the Project (ICR, paragraph 41). Project farmers' net incomes (gross margin) increased for 10 of the field crops studied (ranging from 55% for wheat to 192% for bajra). Female project farmers' net income (gross margin) varied by less than 10% compared to males for five of the six major crops and was 29% higher for barley. By contrast, female control farmers' net incomes (gross margin) was 27% lower than males. This result suggested that the project support could have potentially contributed to closing the gender income gap for two crops. Finally, a beneficiary satisfaction survey showed that 97% of farmers expressed satisfaction with project interventions in realizing increased productivity, gross margins, and WUE on their farms (target 149% achieved). Female and male farmers both expressed high levels of satisfaction (94% vs. 98%, respectively).

Conclusion. The above-mentioned assessment of factors that can determine farm incomes is noted. However there no direct evidence on changes in the incomes of farmers in the selected locations. This review agrees that it is plausible to assume that the project, along with increases in productivity, was successful in increasing farmers' incomes. There was, however, no measurement or mention of prices received by farmers in light of the increased market supply. There was also no evidence or indication of the "sustainability" of increased incomes after the project closed. On this basis, the efficacy with which Objective 2 was achieved is rated Substantial but only marginally so.



Rating
Substantial

OVERALL EFFICACY

Rationale

Overall Efficacy is rated marginally Substantial.

For the first objective (to sustainably increase agricultural productivity), the evidence in the ICR (and discussed above) point to the success of the project in achieving a sustainable increase agricultural productivity despite shortcomings. The project exceeded its PDO indicator targets for three out of four indicators assessing this objective. Project farmers' Water Use Efficiency (WUE, PDO indicator #2) fell short but achieved a 57% of its target (US\$0.31/m³ compared to a target of target US\$0.37/m³ and a US\$0.23/m³ at baseline). The project missed individual productivity targets for the six target crops, it is uncertain whether project areas would see further sustainable productivity gains in the coming years. Also, the target for modernized irrigation (70% of project areas) was ambitious given the low baseline (23.3%) and the challenges experienced during implementation with regards to modern irrigation technologies. It is therefore concluded that the efficacy with which Objective 1 was achieved is marginally substantial,

For the second objective (to sustainably increase farmers' incomes), estimates in the ICR (and discussed above) using a "unit model" suggested that the project investments in activities under Objective 1 and in supporting farmers' organizations increased farmers' income and significantly exceeded the target for PDO indicator #4. Therefore, it is plausible to assume that the project was successful in sustainably increasing farmers' incomes. However, the sustainability of farmers' income is dependent on maintaining productivity gains and successfully marketing produce at profitable pricing. This review concludes that the efficacy with which Objective 2 was achieved is also marginally substantial.

Taking account of the moderate to sound success of the achievement of Objectives 1 and 2, but in particular the uncertainty that agricultural productivity and farmers' incomes will "sustainably increase", this project's overall efficacy is rated substantial but only marginally so.

Overall Efficacy Rating

Substantial

5. Efficiency

Economic and Financial Efficiency Analysis (EFA)

ex-ante



- The economic rate of return (ERR) on the project investments was estimated at 18.5 % while the financial rate of return (FRR) was estimated at 17.4%.
- Project benefits were quantified separately for the components and aggregated. The project would directly benefit about 155,000 farms, operating 200,000 ha of crop land area representing canal water, ground water and rainfed dominated small holder agriculture production environments. Community-led sustainable management and use of water resources in the project areas would contribute to multiple benefits as compared to without project (WOP) as follows: (i) less water intensive crops in 60% of the crop area, (ii) improved water saving practices in 70% of the crop area, (iii) saving of 95 million cubic meter of canal and ground water in agriculture and 22 million Kilo Watt hour of power from ground water pumping, (ii) reduced water use in agriculture by 11%, (iii) higher water use efficiency in agriculture by 65%, (iv) improved productivity by 20 to 75%, and (v) increased farm income by 60%. Saved canal water can meet the drinking water needs of 249,500 households. Finally, markets and value chain development would increase the share of whole sale price realized by the project farmers by 10% for the selected focus crops.
- Economic analysis was done after making appropriate adjustments to financial benefits and costs. The adjustments included: (a) netting out taxes and subsidies, (b) calculating economic parity prices where possible, (c) using Standard Conversion Factors (SCF) varying from 0.9 to 2.5 for labor cost, electrical power and drinking water. Financial analysis is done at market prices.
- Sensitivity Analysis. Sensitivity tests indicated that the project was able to absorb substantial negative impacts yet still generate robust ERRs. In summary, project costs were allowed to increase up to 25% above the base level and benefits were allowed to decrease up to 25% below their base levels. These variations caused the ERR to vary from 10.1% to 18.2% with a coefficient of variation of 9%. The expected ERR was estimated at 13.5% and is reasonably stable because the risk model predicted 76% probability for the ERR to exceed 13%.
- Overall, the EFA at appraisal was robust and realistic.

ex-post

- The ex-post EFA followed the same methodology as the ex-ante, but the ex-post EFA re-estimated the actual economic returns using the detailed household farm data from the endline survey (ICR, paragraph 48). In a further communication, the Bank project team explained to IEG that "the Unit Model concept was introduced to arrive at an aggregate value for the PDO-level results indicators 1, 2, 3 and 4. The share of the six individual crops (i.e., maize, wheat, bajra, gram, mustard and barley) in the total cultivated area (as reflected in farm-level survey data) forms the basis of the Unit Model, wherein the model is taken down to the unit level of 1 ha. The six crops comprising the Unit Model accounted for 91 percent of the cropped area in 2017 and 75 percent in 2020. The decrease in 2020 was due largely to farmers' decisions on crop diversification and cropping patterns. Data on these six crops and their proportional cultivated area generated from the Unit Model were then used in the economic and financial analysis of RACP." Project benefits for the ex-post EFA included increased crop and goat productivity and increased net income from crops and goats. The EFA was estimated for a 20 year period and the estimate of the net present value used a discount rate of 12%
- The ex-post EFA estimated the project's economic rate of return (ERR) at 28.6% higher than the appraisal ERR of 18.5%. However, the economic net present value (ENPV) was US\$24.7 million compared to US\$52 million estimated at appraisal. The difference was attributed to the four-year lag in project implementation, delays in benefit realization, and 14-month project extension (ICR, paragraph 48). The financial rate of return (FRR) was estimated at 27.7% higher than the appraisal FRR of 17.4%.



- The EFA analysis excluded some project benefit streams that could not be quantified, including positive environmental externalities, time savings, and health benefits from improved water supply.
- According to the ICR (paragraph 49): "the project achieved a higher ERR than the ex-ante estimate due to: (a) substantially higher physical achievements with lower than expected financial investments due to exchange rate gains during implementation; (b) substantially higher productivity increases and gross margins achieved than anticipated; and (c) the larger than expected number of beneficiaries supported (177% of the target).
- Sensitivity Analysis. Various sensitivity scenarios were analyzed, including 20% increase in costs, or 20% decrease adoption rates, or 20% increase in O&M costs or a delay in implementation by one year, the ERRs were expected to remain above 13.2%. This indicated that the project could absorb substantial negative impacts yet still generate positive ERRs.
- With a total project investment (including administrative costs) of US\$101.51 million, average cost per beneficiary was highly efficient at just US\$105 per beneficiary (ICR, Annex 4, paragraph 22). In a further communication, the project team explained that efficiency was assessed by comparing: "(a) the project's unit cost per beneficiary as estimated at appraisal; and (b) the actual unit cost per beneficiary at closing. The project's performance is thus considered highly efficient in comparison with its initial design. At appraisal, the project was expected to directly benefit 155,000 farmer households (US\$140 per beneficiary). At closing, this unit cost had decreased by 25% to US\$105 per beneficiary due to (a) cost savings during implementation; and (b) an increase in the number of beneficiaries (from 155,000 to 195,344) supported by the project."
- Overall, the ex-post EFA was comprehensive and reflected the expected returns on the project investments.

Administrative and Institutional Efficiency

The project closed fourteen months later than the expected closing date at appraisal. This resulted in a delay in benefit realization for the different investments of the project. The project experienced an initial four-year implementation lag. According to the ICR (paragraph 64) "the slow mobilization and frequent turnover of staff in the newly established PMU undermined the quality of project implementation arrangements at entry and delayed implementation." There were also implementation delays due to heavy rainfall in 2019 and the unavailability of materials (sand), which delayed some canal rehabilitation. While the actual project coordination costs represented 14% compared to the 12% estimated at appraisal, it was still reasonable for "a technically complex project involving coordination across the six line departments and within sectoral norms for similar projects in India (ICR, Annex 4, paragraph 22)." Finally, the project did not experience any cost overrun despite the closing date extension (ICR, Annex 4, paragraph 22).

In a further communication, the Bank project team explained to IEG that "component 2 and 3 costs at appraisal appear to have been overestimated. The combined Cluster Agriculture Competitiveness Plan (CACPs): (a) represented 88% of the total cost of RACP; (b) spanned the four project components; and (c) were both participatory and demand-driven in their construction. The Mokhampura CACP was approved during RACP preparation; the remaining CACPs were formed and approved during 2017. When comparing the CACPs as planned in 2017 with the 2021 implementation, overall investment was largely the same (i.e., US\$94.3 million vs. US\$90.7 million). The difference across the project components vis-à-vis the appraisal component estimates is largely a function of the participatory/demand-driven nature of the CACPs."



Overall, Efficiency is rated Substantial. The ex-post ERR at 28.6% was higher than the appraisal estimate at 18.5%. The project was able to reach 177% of the targeted number of beneficiaries and achieve or in many cases, exceed its objectives/intended outcomes at lower cost than planned.

Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	18.50	100.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	28.60	100.00 <input type="checkbox"/> Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

Relevance of Objectives was rated High. Overall efficacy was rated marginally Substantial. The evidence reported in the ICR pointed to the success of the project in achieving increases in agricultural productivity (Objective 1).. The project exceeded its PDO indicator targets for three out of four indicators assessing this objective. On the other hand, the project missed individual productivity targets for the six target crops, In addition, there was no evidence that supported further sustainable productivity gains in the coming years. The project was arguably also successful in increasing farmer incomes (Objective 2) based on the measured increases in productivity, but again there was insufficient evidence of a sustainable increase of farmer incomes in future. Hence the conclusion that the project's overall efficacy was rated marginally substantial. Efficiency was rated Substantial given that the estimated ex-post ERR at 28.6% was higher than the appraisal estimate of 18.5%. Also, the project was able to reach 177% of the targeted number of beneficiaries and achieve, or in many cases exceed, its objectives/intended outcomes at a lower cost than planned.

Based on a high rating for Relevance of Objectives, and a marginally substantial rating for Overall Efficacy, and substantial Efficiency, the project experienced moderate shortcomings in its efficacy and therefore its Overall Outcome was rated Moderately Satisfactory.

a. Outcome Rating

Moderately Satisfactory

7. Risk to Development Outcome



The ICR (paragraph 93) discussed the following risks that could potentially impact the development outcome:

- 1. The risk that the lack of markets for the water-efficient crops would discourage farmers from their production.** The project created new markets for more water-efficient crops, and farmers are more likely to produce crops with an assured market.
- 2. The risk related to the sustainability of the project-supported community institutions.** According to the ICR (paragraph 93) community institutions show promising signs of sustainability with FPC sales totaling 662 metric tons (MT) in the rabi (winter) season post-project support suggest promising financial sustainability, and 44% of the Water User Associations are collecting water charges. Also, the line departments and the Rajasthan State Agriculture Marketing Board are committed to provide on-going technical support to the community institutions and FPCs. District line department coordination will also continues post-project, demonstrating commitment to extend RACP's integrated approach.
- 3. The risk related to the long-term maintenance of the project-procured technologies provided to the farmers.** These technologies include two years of contractor maintenance for farmers. However, it was not clear what maintenance arrangements would be in place after the expiration of the first two years.
- 4. The risk related to policy reforms that are needed to bolster post-project sustainability.** The ICR (paragraph 93) noted that reducing irrigation power subsidies would increase incentives to adopt water-efficient crops and practices. Also, policy reforms to strengthen water sector governance would further bolster post-project sustainability. However, it was not clear whether irrigation power subsidies were reduced and the nature of the policy reforms that the ICR mentioned.
- 5. The risk related to the impact of the COVID-19 pandemic.** According to the ICR (paragraph 94) the pandemic "is likely to have negative effects of unknown magnitude on sustainability in the short-term."

8. Assessment of Bank Performance

a. Quality-at-Entry

The project objectives were in line with Government of Rajasthan (GoR) policies, in particular the State Water Policy (2010) and Policy for Promotion of Agro-Processing and Agri-Business (2010). Objectives were also in line with the Bank strategies (see section 3 for more details). The project design featured a comprehensive approach that sought to address multiple challenges simultaneously. Specifically, the project was the first intervention in India to explicitly target improved crop water productivity in crop production. The project's design featured improved water management and agricultural practices, and the development farmer organizations and marketing under a single integrated agricultural development approach. The project was also designed to accommodate three sources of agricultural water: canal (surface) water, groundwater, and rainfed (ICR, paragraph 8). Design also emphasized gender through explicitly targeting female livestock herders and value chain activities to benefit women and landless farmers (ICR, paragraph 60). Design benefited from the experience of other Agriculture Competitiveness Projects (ACP) in India namely, in the states of Assam and Maharashtra. Notable lessons reflected in the RACP design included: adopting a value chain approach to improve marketing,



and outsourcing of service provision (and support to front-line service providers) is central to delivering quality implementation support activities.

While the project design was technically and operationally complex, activities were well-sequenced based on the operational logic of the ToC and the local state context (ICR, paragraph 62). The project was prepared in just eight months, and the implementing arrangements could have been better elaborated with more time and greater PMU capacity (ICR, paragraph 62). A notable shortcoming was the incomplete implementation and staffing arrangements at approval.

Most risks were accurately identified and assessed in the PAD. The potential lack of coordination among PIAs was identified as a Substantial risk, and fiduciary and governance risks as Medium risk. However, the PMU was insufficiently staffed during preparation and early implementation project implementation to adequately handle a technically complex project. Implementation arrangements were insufficient to address risks related to inter-institutional coordination and state-level service provider availability, which initially stalled implementation (ICR, paragraph 63). The risk related to the availability of qualified service providers (SPs) to implement a multi-sectoral project across all clusters was underestimated and identified as a Low risk. This required restructuring to allow individual line departments to hire qualified SPs at the district level. The risk that farmers would have little policy incentive to use less water (identified as a Substantial risk) was successfully mitigated through the project's promotion of more water-efficient technologies and better linking of farmers to markets (ICR, paragraph 63).

M&E design reflected a comprehensive Results Framework (RF) with most indicators clearly aligned to PDOs. However, the original PDO was later clarified and some indicators amended to enabled a more accurate measurement of the project's contribution to increasing productivity and incomes (See section 9 for more details).

Overall, Quality at Entry is rated Moderately Satisfactory due to moderate shortcomings related to implementation readiness/arrangement, risk identification and M&E design weaknesses. According to the ICR (paragraph 90) "the quality of the implementation arrangements, risk assessment and mitigations, and RF were negatively affected by the rushed preparation of this technically complex project, which was delivered in just eight months to meet the agreed Board date."

Quality-at-Entry Rating

Moderately Satisfactory

b. Quality of supervision

Ten full supervision missions were conducted over the implementation period, including every 3-6 months from MTR until the COVID-19 lockdown in March 2020. The Bank team also made short (1-2 day) missions every 2-3 months to resolve issues using tight supervision budgets. According to the ICR (paragraph 91) Bank missions included an appropriate mix of technical, fiduciary, and safeguards specialists. The Bank team provided timely, detailed technical support between missions to help resolve implementation issues.

The project implementation benefited from stability among the Task Team Leadership, with one Task Team Leader (TTL) overseeing implementation from the first restructuring till completion. The multi-disciplinary, India-based task team mostly stayed in place and included agriculture/agribusiness and water expertise.



The Bank missions identified relevant innovations (e.g., solar pilots, locust response, community goat breeding) and worked with lagging project implementation agencies (PIAs) to establish monthly milestones. Project implementation also benefited from detailed technical, fiduciary, and safeguards reviews and recommendations that enabled the project to overcome issues ranging from infrastructure design to inclusive targeting and timely resolution of audit issues (ICR, paragraph 91). Project implementation rate improved in 2017 through working with a responsive, solutions-oriented PMU that worked closely with the Bank team to achieve the project outcomes. The Bank team also worked to ensure post-completion sustainability through: promoting line department convergence; encouraging Agricultural Produce Marketing Committee (APMC) Act reforms; and (iii) increasing the IDA financing proportion to maximize disbursement and free up GoR resources for implementation after closing (ICR, paragraph 91).

Overall, the Quality of Supervision is rated Satisfactory. The Bank team overcame initial implementation delays and design shortcomings and steered the project with the PMU towards achieving its envisioned outcomes.

Overall, Bank Performance is rated Moderately Satisfactory.

Quality of Supervision Rating

Satisfactory

Overall Bank Performance Rating

Moderately Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

- The Project Appraisal Document (PAD) did not require a Theory of Change (ToC) or results chain. Nevertheless, the ICR included an ex-post ToC that was constructed based on the PDO and the results indicators of the PAD. Overall, the ToC in the ICR was sound and reflected the relation between the project inputs, outputs, outcomes and long-term outcomes.
- The original statement of objectives was lengthy and included a description of causal pathways. Also, the term "*to establish feasibility*" was vague and complicated the PDO as it was not clear how establishing feasibility would be assessed.
- The PDO was to be assessed through five PDO level results indicators. Objective #1 (Farmers' agricultural productivity sustainably increased) was measured through Indicator #1: Reduction in water used in agriculture; Indicator #2: Increase in WUE in agriculture; and Indicator #3: Increase in agricultural productivity. Objective #2 (Farmers' incomes sustainably increased) was measured through Indicator #4: Increase in gross margins from crops and livestock products; and Indicator #5: Increase in the share of producer price in wholesale price. These indicators were aligned with the two objectives. However, this Review is in agreement with the ICR (paragraph 79) that Indicator #5 was pitched at the intermediate results level rather than the outcome level.
- The Results Framework (RF) included nine intermediate results indicators. Most of which were adequate to capture the contribution of the operation's activities and outputs toward achieving PDO-level outcomes. However, as noted in the ICR, Intermediate Result indicator #3 (Increase in volume



of runoff captured for recharge and for recycling) had an attribution concern because recharging ground water depends on hydrogeological factors and a landscape scale beyond the project area (paragraph 79).

- The RF could have benefitted from further gender disaggregation to better capture the results of the project activities with respect to women in the project areas.
- According to the ICR (paragraph 79) "M&E arrangements were supported with adequate budget and defined institutional responsibilities."
- Overall, the majority of the RF indicators were specific, measurable, achievable, relevant, and time-bound. Most indicators had clear targets and baselines were reflected in the RF. However, the ICR (paragraph 79) noted that the appraisal Results Framework was designed based on secondary data, some indicators were later clarified and/or had their baseline data updated (see below for further information). In conclusion, M&E design suffered from moderate shortcomings related to clarity and measurability of the PDO itself and some RF indicators.

b. M&E Implementation

- According to the ICR (paragraph 80) the "M&E Agency delivered high quality and timely baseline, six-monthly and final evaluation reports." Also, the project's digital management information system (PMIS) was updated using PIA monitoring data. The project established a data portal for monitoring implementation that was scaled up to state level.
- M&E implementation benefited from feedback provided by the PMU and the Bank to improve project monitoring. The Bank and the PMU used the project restructuring to "enhance the relevance, quality, clarity, and measurability of RF indicators based on implementation experience (ICR, paragraph 80)." The annual Cluster Agriculture Competitiveness Plan (CACP) and RF indicators were converted into monthly and weekly targets to track and address implementation issues.
- Participatory M&E featured a community scorecard approach that combined social audit, community monitoring, and citizen report cards. This helped communities form their own opinion and judgment on activity/output quality and implementation pace and recommendations for improvements (ICR, paragraph 81)
- Restructuring and RF amendments. Restructuring was used to enhance the relevance, quality, clarity, and measurability of RF indicators based on implementation experience. The PDO was clarified as part of the 2018 restructuring. Also, targets for (PDO indicators #s 1, 2, and 3) were revised, and baseline data for (PDO indicator # 4) was updated to reflect baseline household survey data. For PDO outcome indicator #3, a weighted average aggregate productivity indicator was added and commodity group sub-indicators (cereals, pulses, oilseeds, peas) were replaced with key crop-specific sub-indicators (bajra, barley maize, wheat, gram, mustard) to better reflect actual cropping practices based on the baseline survey. As part of the March 2019 restructuring PDO outcome indicator # 5: "Increase in the share of producer price in wholesale price" was dropped due to limitations in project attribution; and the indicator "Farmers adopting improved agricultural technology" was added to monitor a key results chain (ToC) outcome; and some intermediate indicators were clarified/updated to better reflect actual activities, PDOs, and the ToC. These changes were relevant and improved measurability of the revised indicators (ICR, paragraph 20).



c. M&E Utilization

- According to the ICR (paragraph 81) performance and results data had immediate, practical application with the project implementation progress closely followed. The Project Implementation Agency (PIA) monitoring data and six-monthly M&E agency reports were regularly reviewed and discussed in the cross-departmental coordination meetings.
- Also, the PIA and independent monitoring data were used to make course corrections, including to better target vulnerable beneficiaries, increase the project's digital management information system (PMIS) application, and identify popular and successful interventions for scaling-up through CACP revision (ICR, paragraph 81).
- External studies also supported the project implementation, for example, the project used the Groundwater-Energy-Agriculture (GEA) Nexus study to design solar pilots, and the GoR used the Agricultural Produce Marketing Committee (APMC) Act analysis to inform licensing requirement reforms (ICR, paragraph 81). In addition, and according to the ICR (paragraph 81) the project results encouraged the GoR to revise subsidy levels upwards under similar schemes.
- **Conclusion.** The Quality of M&E is rated Substantial, despite moderate design shortcomings. Moderate design shortcomings were later addressed through restructuring and RF revision. M&E quality benefited from adequately designed surveys, systematic and rigorous data collection and analysis. Also, the large sample size and frequent data collection and extensive disaggregation by cluster, water source, landholding size, social class (caste), and gender improved M&E data quality. This enabled the M&E system to provide rigorous and methodological tracking of implementation progress and PDO achievement. In addition, using Difference-in-Difference methodology with a well-defined control group accurately reflected the attribution of results to the project.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

The project was classified as an environmental Category B. It triggered four safeguard policies: Environmental Assessment (OP/BP 4.01), Pest Management (OP 4.09), Indigenous Peoples (OP/BP 4.10) and Involuntary Resettlement (OP/BP 4.12). The project-supported activities aimed to promote sustainable climate resilient agriculture and sustainable water source augmentation and efficient use. Therefore, technically, the project should take up measures to halt and if possible reverse environmental degradation. The potential environmental issues are of a cumulative nature and included: soil degradation, over-extraction of groundwater, reduced downstream flows, build-up of pest resistance, and pollution of the ecosystem with agro-chemicals, pesticide-related safety issues and erosion of biodiversity. An Environmental Management Framework (EMF) was prepared and disclosed on the Bank's Infoshop on January 1, 2012 on the project's website, and at an in-country workshop on January 19, 2012. Also, a Social Management Framework (SMF), including Tribal Development Framework and Resettlement Policy Framework (RPF),



was prepared and disclosed on the Bank's Infoshop on February 17, 2012 on the project's website, and at an in-country workshop on January 19, 2012 (ICR, paragraph 84).

According to the ICR (paragraph 84) "the Project complied with triggered policies and applicable GoR and GoI regulatory requirements."

Compliance with Environmental Safeguards. According to the ICR (paragraph 84) "the project's environmental safeguards proactively promoted climate resilience and better NRM, resulting in a positive environmental footprint." Safeguards integration benefited from trainings and monitoring field visits, which were facilitated through a state-level Environment Specialist. Also, nodal persons in line departments provided field support Environment Management Plans with compliance requirements.

Compliance with Social Safeguards. Social safeguards faced initial implementation delays. According the ICR (paragraph 85) "the Project adopted a consultative approach in all districts to ensure members of Scheduled Tribes (ST) benefitted, resulting in 20% of beneficiaries belonging to STs, higher than their share of the state population (12.6%)." The ICR reported that "no one was displaced, and the project remained in compliance with World Bank social safeguard policies throughout implementation (paragraph 85)." A three-tier (village, district, and PMU) grievance redressal system with online and offline complaint receipt channels was successfully implemented. The project received and resolved 130 complaints, mostly on operational issues or benefit application.

b. Fiduciary Compliance

Financial Management (FM). FM arrangements were based on the use of country systems, whereby planning, budgeting, accounting, reporting and audit were undertaken using the existing GoR systems at the departmental and PMU level. FM performance was monitored through interim unaudited financial reports (IUFRs). While internal and external audit reports were of acceptable quality, there were delays in resolution of some of the audit paragraphs (ICR, paragraph 89). According to the ICR (paragraph 89) "the project generally complied with the FM Manual except for control issues leading to the identification of questionable expenditures." Bank supervision missions identified issues related to the collection of beneficiary contributions and lack of adequate documentation to support expenditures on various activities, such as construction of diggies and training and seeds distribution to the farmers. These finding were under discussion pending a forensic review and the documents shared by the GoR. The ICR (paragraph 89) noted that "ineligible expenditures identified in any of the reviews will be subject to refund to the Bank." The ICR did not report on the status of the final audit reports of the project.

Procurement. The project used the Bank's Systematic Tracking and Exchange in Procurement (STEP) system to track procurement progress. PMU and PIA procurement officials were acquainted with Bank procurement procedures, and they benefitted from trainings to build capacity. There were no complaints received or brought to the Bank's notice regarding procurement plans cleared in STEP. The ICR (paragraph 88) reported that "procurement compliance was generally strong."

c. Unintended impacts (Positive or Negative)



d. Other

Several innovations piloted under RACP have now been scaled up by the GoR. First, the combination of diggies and MIS (with solar pumps also prioritized) has been mainstreamed into departmental programs, and the GoR Department of Agriculture has now received 10,000 applications for diggies. Second, FPCs are being promoted under other departmental schemes (by the former RACP nodal officer for FPCs, on deputation). Third, the project’s successful promotion of agro-processing by farmers and FPCs informed the 2019 Rajasthan Agro-processing, Agri-business and Agri-export Promotion Policy, which promotes FPCs, prioritizes agro-processing by farmers and FPCs, and aims to bring FPCs into the marketing business. Fourth, the RACP data portal has also been scaled up to state level for monitoring across departmental schemes (ICR, paragraph 58).

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Moderately Satisfactory	Moderately Satisfactory	
Bank Performance	Moderately Satisfactory	Moderately Satisfactory	
Quality of M&E	Substantial	Substantial	
Quality of ICR	---	High	

12. Lessons

The ICR included seven lessons. The following three are emphasized as having potentially broader application beyond this project. There has been some adaptation of language compared with the ICR:

1. In water-scarce situations the Bank and the Government can achieve greater sustainability of agriculture and climate change resilience by strengthening incentives for climate-resilient crops. This project demonstrates the feasibility of motivating voluntary adoption of low water-use crops and more water-efficient practices by subsidizing water-saving technologies and linking farmers to markets for those crops. Most farmers in this project area were profit-driven entrepreneurs and unlikely to make farming decisions only for environmental outcomes, especially if there is an additional a private cost involved.

2. Projects promoting climate-resilient agriculture need to emphasize community institutions that promote market linkages rather than exclusively water-focused institutions. Farmer institutions proved to be critical for achieving economies of scale, market access, and sustainable production. Organizing small-scale farmers into multi-task groups (MTGs) and collaborative farmer producer companies (FPCs) to aggregate input and output marketing for high value, water-efficient crops are also needed to motivate adoption of water-efficient production practices through improving



market linkages. Farmers' relatively higher interest in MTGs compared to community water institutions highlights their importance in promoting climate-resilient agriculture.

13. Assessment Recommended?

Yes

Please Explain

The project was the first intervention in India to explicitly focus on improved water use efficiency in association with the increased production of less water dependent crops and the elimination of power subsidies in irrigation systems. An ex-post assessment of this operation is warranted to assess its sustainable impacts on crop productivity and water savings in the project areas, given that the full outcome was not fully achieved by project completion. This would also be an opportunity to generate useful lessons to further inform the Bank work in this area.

14. Comments on Quality of ICR

Quality of Evidence. The project benefited from a robust M&E system. The M&E system relied on data generated from a large sample of high-frequency project and control household surveys and operationally relevant thematic studies. The ICR also clearly referenced the sources of information used to demonstrate the impact of the project.

Quality of Analysis. The ICR provided clear linking between evidence and findings and used the evidence base to serve the arguments under the different sections, in particular the discussion on outcomes.

Lessons. Lessons reflected the project experience and were based on evidence and analysis in the ICR.

Results Orientation. The ICR included a focused discussion on the achievement of the two PDOs. The discussion was well-balanced between reporting on the achievement of the PDO outcome indicators and what the project actually achieved on the ground.

Internal Consistency. Various parts of the ICR were internally consistent and logically linked and integrated.

Consistency with guidelines. The ICR successfully used the available data to justify the assigned ratings. Discussion of outcomes was adequate. Also, the efficiency analysis was robust.

Conciseness. The ICR was well-written and included detailed Annexes. It provided a thorough yet concise coverage of the implementation experience and candidly reported on shortcomings. The reporting on safeguards was detailed enough and included an explicit statement on compliance. The outputs reported in Annex 1 included their appraisal targets. However, the ICR did not report on the status of the final audit reports for the project.



Overall, the Quality of the ICR is rated High.

a. Quality of ICR Rating
High