



1. Project Data

Project ID
P105311

Project Name
IN: WB Minor Irrigation Project

Country
India

Practice Area(Lead)
Water

L/C/TF Number(s)
IBRD-80900,IDA-50140

Closing Date (Original)
31-Dec-2017

Total Project Cost (USD)
130,785,908.63

Bank Approval Date
04-Oct-2011

Closing Date (Actual)
20-Dec-2019

	IBRD/IDA (USD)	Grants (USD)
Original Commitment	250,000,000.00	0.00
Revised Commitment	145,193,004.28	0.00
Actual	130,785,908.63	0.00

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2. Project Objectives and Components

a. Objectives

The Project Development Objective (PDO) of the West Bengal Accelerated Development of Minor Irrigation Project (ADMIP) as articulated in the Project Appraisal Document (PAD, paragraph 16) was identical to that in the Financing Agreement (page 4) and aimed to:

"enhance agricultural production of small and marginal farmers in the project area."



This would be achieved through accelerated development of minor irrigation schemes, strengthening community-based irrigation management, operation and maintenance, and support to agricultural development, including provision of agricultural services, encouraging crop diversification and use of new technologies, and creating income generating opportunities.

The total area to be developed under the project was about 139,000 ha, benefiting an estimated 166,000 farm families in the Indian state of West Bengal.

The outcome of this project will be assessed based on a split evaluation because the project's scope and ambition decreased through a downward revision of PDO targets and a corresponding reduction in commitments.

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?

Yes

d. Components

The PDO was supported by the following four components:

1. Strengthening Community-based Institutions (appraisal cost: US\$8.10 million, actual cost: US\$5.18 million). This component aimed to enable community-based institutions, mainly Water User Associations (WUAs), to assume responsibilities for management, operation (MOM), and maintenance of the minor irrigation schemes to be constructed under the project. The development of WUAs would be achieved by their formation and strengthening through various training and support activities. The support to WUAs would mainly focus on training and capacity building in key areas such as preparation and implementation of MOM plans; setting and collection of irrigation service fees; maintenance of records and accounts; improved and equitable water-sharing and utilization; and participatory monitoring, learning, and evaluation (MLE)

2. Irrigation System Development (appraisal cost: US\$235.00 million, actual cost: US\$110.77 million). This substantial reduction between appraised and actual cost (US\$124 million or 53%) was due to the cancellation of US\$95 million of the IBRD loan and the downward revision of outcome targets. This component aimed to improve availability of water for agriculture and fisheries by developing new minor surface and ground water irrigation schemes on areas that were cultivated under rainfed conditions. The activities would include construction of about 2,400 minor surface flow irrigation systems (command area varying from 5 to 50 ha), comprising river lift schemes, gravity-fed schemes, and detention structures, and construction of about 2,260 minor ground water irrigation schemes (command area varying from 20 to 36 ha), comprising shallow tube wells, light and medium duty tube wells, and pump dug wells. The total area to be developed under the project was about 139,000 ha, benefiting an estimated 166,000



farm families. The component would also introduce, through pilots and demonstrations in close cooperation between the Department of Water Resources Investigations and Development (DWRID) and the Departments of Agriculture and Food Processing Industries & Horticulture, water saving technologies and would expand on the ground water monitoring program in project areas.

3. Agricultural Support Services (ASS) (appraisal cost: US\$22.10 million, actual cost: US\$14.75 million). The component aimed to enhance agriculture-based rural livelihoods by increasing production of agriculture, horticulture, and fisheries. This would be achieved through adoption of improved production technologies and water management practices and more efficient and effective delivery of key support services. The project would finance improvement of production and post-harvest technologies, field demonstrations of modern agricultural technologies and practices, and more effective farm advisory services.

4. Project Management (appraisal cost: US\$34.80 million, actual cost: US\$22.43 million). This component would support a State Project Management Unit and District Project Management Units to take charge of coordination and management of the implementation of all project activities including M&E related activities.

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

Project Cost. The total project cost was estimated at US\$300 million. This amount was revised down to US\$175.19 million. The actual cost according to the ICR Data Sheet (page 2) was US\$153.16 million (87% of the revised amount). Reasons for the downward revisions are indicated in the next section.

Financing. The project was financed through a mix of IBRD loan and IDA credit of US\$125 million each (83% of the project costs). The split between IDA and IBRD was requested by the Department of Economic Affairs (DEA) as part of its efforts to promote sustainable irrigation development in less performing states (PAD, paragraph 14). According to the ICR Data Sheet (page 2) the IBRD amount was revised down to US\$20.19 million. This downward revision was a part of the 2016 restructuring where US\$95 million from the IBRD loan proceeds were cancelled following a request of the Department of Economic Affairs. "The objective of the partial loan cancellation was to adjust the project funding to the capacity of the project management team and the state institutions (ICR, paragraph 15)." The actual amounts disbursed were US\$20.19 million and US\$110.59 million for the IBRD loan and IDA credit, respectively. The total disbursed amount was US\$130.79 million compared to a revised amount of US\$145.19 million (90%). An undisbursed balance of US\$9.8 million was cancelled from IBRD loan as of June 26, 2020 (ICR, Annex 3). The ICR attributed the cancellation to exceptional circumstances created by COVID-19 situation in the country which made processing expenditures to document the spending of part of the US\$9.8 million to the IBRD loan challenging.

Borrower Contribution. The Government of West Bengal was expected to provide US\$50 million of counterpart funds. This amount was revised down to US\$30 million. The actual amount was US\$22.30



million (ICR Data Sheet, page 2). The ICR did not provide an explanation/reasons for the downward revision.

Dates. The project was approved on October 4, 2011 and became effective five months later on March 19, 2012. The mid-term review (MTR) was conducted on August 18, 2014 compared to an expected date on March 1, 2014. The project closed on December 20, 2019, two years after the original closing date on December 31, 2017. The project was restructured three times (all level 2) as follows:

1. On February 18, 2016, when the amount disbursed was US\$38.09 million, in order to change components and costs, cancel US\$95 million from the IBRD loan proceeds, and revise the project's financing plan.
2. On June 30, 2017, when the amount disbursed was US\$72.95 million, in order to revise the results framework (RF).
3. On November 10, 2017, when the amount disbursed was US\$72.95 million, in order to introduce changes to the implementing agency, revise the results framework, extend the Loan Closing Date to December 20, 2019, and revise the implementation schedule.

According to the ICR (paragraph 17) "the Changes in the indicators and their targets were justified by the need to simplify the Result Framework considering the capacity of the state and the reduced financing. The closing date was extended to allow completion of ongoing activities (ICR, paragraph 17)." The ICR (paragraph 18) also stated that "the restructurings did not affect the theory of change." This review agrees with the afore-mentioned rationale for changes which were logical and needed.

3. Relevance of Objectives

Rationale

Context at Appraisal. Agriculture accounted for about 20% of West Bengal's Gross Domestic Product (GDP) and provided employment to over 55% of workers in the state. Since agriculture was the backbone of the rural economy, it was evident that broad-based rural growth and reduction of poverty cannot be achieved without increasing the income generating potential of the agriculture sector. Over 25% of the state's population lives below the poverty line. This population belonged primarily to the rural agricultural sector. The main constraints to alleviation of their poverty were small land holdings and uncertainties of rainfall, including periodic occurrence of long dry spells, but also heavy cyclones and floods during the monsoon season. Agriculture was hardly possible during the non-monsoon season without irrigation facilities.

Previous Sector Experience. The Bank has a long history in supporting irrigation developments that have promoted stakeholder involvement in rural infrastructure development and transferred improved agricultural technologies to farmers. The Bank has been an important partner in India with support to large-scale irrigation rehabilitation/modernization programs and broad-based water sector reform in various states. The Bank also funded community-based rural development projects focusing on small irrigation structures and



agricultural technologies for improvement of irrigated agriculture in such states as Assam, Karnataka, Andhra Pradesh, and Orissa. ADMIP was a continuation of this initiative to expand such programs to other states, in this case West Bengal.

Relevance to Government Strategies. At appraisal, the PAD did not include information on the relevance of objectives to the Government of India nor the state of West Bengal. Also, at completion the ICR did not discuss relevance of objectives with regards to the priorities of the Government of India and the state of West Bengal.

Relevance to Bank Assistance Strategies. At appraisal, the PDO was in line with the Bank's Country Assistance Strategy (CAS, FY09-FY12) for the Republic of India, which focused on the development of infrastructure, including water resources, and support for the poorer states. The PDO was in line with the priorities of the CAS by supporting the development of irrigation infrastructure and increasing agricultural productivity in one of India's economically weaker states. The PDO was also in line with the strategic principles underlying the Bank's work in India by supporting reforms and by bringing in the best international knowledge for project development and implementation. The PDO was also in line with the Bank's water resources strategy that recognized: (a) water resources management and development are central to sustainable growth and poverty reduction; (b) the Bank needs to assist countries in developing and maintaining appropriate stocks of well-performing hydraulic infrastructure; and (c) the Bank's water assistance must be tailored to a country's specific circumstances and be consistent with the overarching country strategy.

At completion, objectives continued to be in line with the current Bank's Country Partnership Framework (CPF, FY18–FY22) for India. Specifically, the PDO was in line with focus areas 'Resource Efficient Growth' and 'Enhancing Competitiveness and Enabling Job Creation'. Under the focus area 'Resource Efficiency Growth', the project contributed to "promote more resource efficient, inclusive and diversified growth in rural sector" by enhancing agricultural productivity and supporting diversification of income sources through various income-generating activities including horticulture and aquaculture. The project also ensured inclusiveness by targeting women, poor, and tribal communities. It promoted the efficient use of water resources through multiple channels: (a) different productive activities undertaken in conjunction with the same water resources resulting in more value per volume; (b) promotion of water-efficient technologies and management systems including drip, sprinkler, and system of rice intensification; (c) formation and trainings of WUAs in advanced water management approaches including water resources assessment and irrigation water budgeting; (d) promotion of less water-intensive and high-value horticultural crops in the project areas. Under the focus area 'Enhancing Competitiveness and Enabling Job Creation', the project contributed to "Increase access to market-relevant skill development" by emphasizing market-driven agricultural diversification and generating good practices and innovations that were being institutionalized by the state. Good practices and innovations included included Short Message Service (SMS)-based advisory systems to enable access to day-to-day market information, especially crop prices and WUA-to-WUA services.

Overall, Relevance of Objectives is rated Substantial. The statement of objectives was clear, outcome oriented and focused. However, it lacked a connection to higher level objectives, namely, sustainable economic growth and reduction of poverty. Also, there was no information on the relevance of the PDO with regards to the Government priorities at both the country and state levels.



Rating

Substantial

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective

Pre-Restructuring: To enhance agricultural production of small and marginal farmers in the project area.

Rationale

Theory of Change (ToC). To achieve the stated objective (to enhance agricultural production of small and marginal farmers in the project area) through the development of minor irrigation (MI) schemes, strengthening of community-based irrigation management, and support to agricultural development, including provision of agricultural services and use of new technologies, encouraging crop diversification, and creating income generating opportunities. Supporting these activities was expected to increase the area under irrigation, yields of main agricultural crops, WUAs would become operational and sustaining schemes, and farmers would have increased knowledge of water management and agricultural technologies and products. The expected outcome would be enhanced agricultural production. Anticipated longer term outcome was increased rural incomes increased; and improved food security.

Key Assumptions. According to the ICR (paragraph 5) the achievement of the PDO was underpinned by the following assumptions: "communities are willing to participate in water user associations (WUAs) and follow established guidelines and protocols including pay fees on time and in full; WUAs successfully maintain new schemes, damage from natural disasters (droughts, floods) and pests is minimized; and farmers use knowledge gained through the project to enhance production."

Overall, the ToC reflected clear links between the project activities, outputs and expected outcomes. The key assumptions were logical and reflected realities on the ground (see table below for a comparison between original and revised indicators, end targets and achievements).

Outputs

The following outputs were reported by the ICR (Annex 1) unless referenced otherwise.

- 67,594 ha of irrigated land were developed (revised target: 75,000 ha, achievement rate: 90%).
- 202,800,000 cubic meters of water were harnessed with new/improved irrigation services (revised target: 250,000,000 cubic meters, achievement rate 81%).
- Cropping intensity in areas provided with new/improved irrigation services reached 192% compared to a baseline of 122% and a revised target of 170% (target exceeded).



- 2,277 WUAs were formed and 1,657 formally registered (original target: 4,200; revised target: 2,000, target exceeded).
- 111,203 members of the WUAs were provided with new irrigation services (original target: 166,000, revised target: 100,000, target exceeded).
- 22,336 women members of WUAs formed and 17,099 were formally registered (original target: 30,000, revised target: 12,000, target exceeded).
- 4,000 beneficiaries of development of orchards.
- Guidelines for the construction of tube wells and the construction of water detention structures in place.
- Guidelines for implementation of small-size schemes by WUAs established.
- Online tools including remote sensing-based MIS and GIS.
- 7,068 ha of demonstration area for agriculture (original target: 5,040 ha, target exceeded).
- 2,841 ha of demonstration area for horticulture (original target: 252 ha, target exceeded).
- 1,151 ha of demonstration area for fisheries (original target: 600 ha, target exceeded).
- 98 plastic greenhouses with drip irrigation to 50 WUAs and 110 users (no target provided).
- 40 ha of direct seeded rice in 40 ha (no target provided).
- 270 ha of hybrid rice promotion and system of rice intensification (no target provided).
- Bio-village program implemented in 48 villages of 8 districts covering 372 ha (no target provided).

Outcome

The PDO (to enhance agricultural production of small and marginal farmers in the project area) was achieved through three main elements: (a) the development of minor irrigation (MI) schemes, (b) strengthening community based irrigation management, and (c) support to agricultural development, including provision of agricultural services, encouraging crop diversification and use of new technologies, and creating income generating opportunities. The project reached 124,700 beneficiaries, out of whom 111,203 (89%) were small and marginal farmers and sharecroppers, compared to an original target of 166,00 (target not achieved by 25%).

(a) Development of minor irrigation (MI) schemes. The project enhanced access to irrigation water by supporting the development of different types of water retention infrastructure in diverse terrains of the state, ranging from coastal lands to hilly areas. The water harvesting structures installed by the project included ponds, check dams, and excavated creeks. However, there was no account provided by the ICR on the number and breakdown of these water harvesting structures. In a further communication, the project team explained that "the broader project M&E system did track all the water harvesting structures both quantitatively and spatially through the GIS mapping." The team also shared with IEG a summary of the structures built under project financing.

The project developed 2,291 irrigation schemes. By project completion, the area provided with new/improved irrigation or drainage services reached 67,594 hectares (ha) compared to an original target of 139,000 (about 49% achievement). Water users provided with new/improved irrigation and drainage services (PDO outcome indicator #3) reached 111,203 (67% of the original target value of 166,00, target not achieved). The project developed 2,291 irrigation schemes. According to the ICR (Annex 4) the gross cropping areas before and



after the project for the 19 districts showed a 27% increase in cropped area for treatment farmers compared to 17% for control farmers. Also, the treatment farmers experienced a 35.5% increase in cropping intensity while the control farmers saw a 21.5% increase in cropping intensity. The better access to irrigation water had a positive impact on the yield of main agricultural crops where rice yield reached 4.3 metric ton per hectare (MT/ha) compared to an original target of 4.2 MT/ha, and oilseed yield reached 1.4 MT/ha compared to original target of 0.9 MT/ha. However, vegetable yields achieved 14.6 MT/ha slightly lower than the end target of 15.3 MT/ha. While these yield improvements were encouraging, there was no baseline data and no control areas reported in the ICR.

(b) Strengthening community-based irrigation management. The project supported the creation and/or strengthening of 2,277 operational WUAs (54% of original target value of 4,200) throughout the project area to carry out O&M of irrigation infrastructure (PDO outcome indicator #1). WUA performance was assessed against a management system which involves ratings based on different sets of criteria governance, representativity, and adoption of appropriate water and agricultural management practices (ICR, paragraph 25). According to the ICR (paragraph 23) "more than 50% of the WUAs have been operational for more than three years and have performed well in managing delivery of irrigation water to their members." Also, 73% of the WUAs (target 70%, barely exceeded) were generating at least 80% of resources required to manage, operate, and maintain the developed schemes. The WUAs created under the project were inclusive organizations with women membership exceeding target (17,099 against a target value of 12,000), tribal farmers represented 12% of water users almost achieving its target value of 13%, and the majority of members (about 90%) were small and marginal farmers (ICR, paragraph 25).

(c) Support to agricultural development, including provision of agricultural services, encouraging crop diversification and use of new technologies, and creating income generating opportunities. By project completion resources generated by user groups to manage, operate, and maintain the developed schemes (as percentage of required resources, PDO outcome indicator #4) reached 62% compared to an original target of 90% (69% achieved). The ICR (paragraph 25) stated that "agricultural support services contributed to set up more than 20,000 small-scale demonstrations to promote crop diversification and adoption of new technologies." However, the ICR did not discuss how the project provided agricultural services, encouraged crop diversification and promoted the use of new technologies, and created income generating opportunities, and most importantly how these activities contributed to enhancing agricultural production of small and marginal farmers. There was no information on the number of technologies adopted or the adoption rate. The ICR (footnote #27) briefly mentioned that different technologies demonstrated on more than 6,000 ha by the project included drip irrigation, greenhouses, sprinklers. The ICR (paragraph 27) also stated that "the provision of agricultural services in the form of improved seeds, access to mechanization, and access to markets boosted production beyond initial expectations." However, there was no record in the ICR on the amount of seeds provided, the number of beneficiaries who benefitted from mechanization, and how access to markets was improved. This creates an attribution problem since the claims reported in the ICR could not be attributed to the project activities without evidence. In a further communication, the project team explained that "agricultural support services contributed to set up more than 20,000 small-scale technology demonstrations to promote crop diversification and adoption of new technologies" and "high-value crops including vegetables (for example, eggplant or brinjal, potato, cauliflower); oilseeds; and pulses now represent a significantly larger portion of cropped area." Regarding fisheries, the team explained that the "impact assessment found that increased support for fisheries under the project was associated with increased production and greater income through various channels including increase in fish variety, increase in area under fisheries, modern practices, and improved access to markets." While for market access, the



team explained that the ICR "did not include this as attribution of this outcome to the project intervention as it proved to be particularly complex and did not provide a robust basis for inclusion in the ICR."

Overall, the efficacy of achieving this outcome is rated Modest. The project fell short on several PDO outcome targets, most notable, the area provided with new/improved irrigation or drainage services reached 67,594 hectare (ha) compared to an original target of 139,000 (about 49% achievement). There were also attribution concerns as claims reported in the ICR regarding provision of agricultural services and their impact on boosting production were not supported by evidence.

Rating

Modest

OBJECTIVE 1 REVISION 1

Revised Objective

Post Restructuring. To enhance agricultural production of small and marginal farmers in the project area.

Revised Rationale

Theory of Change (ToC). The same rationale applies since the PDO was not revised only the outcome targets were revised and new indicators introduced to the RF.

Outputs

The same outputs mentioned above pertain to the post restructuring objective.

Outcome

The following table reflects the project achievements against the original and revised PDO indicators:

Original PDO Indicators	End Target	Actual values	% Achieved	Revised PDO Indicators	End Target	Actual values	% Achieved
Increase in yield of main agricultural crops (MT/ha)				Relative change in value of outputs measured as ratio between post to pre-project values (percentage)	140	282	201
Rice	4.2	4.3	102	Rice	95,000	85,696	90
Oilseeds	0.9	1.4	156	Oilseeds	8,800	14,406	164
Vegetable	15.3	14.6	95	Vegetables	2,500	2,970	119



Operational WUAs created	4,200	2,277	54	Operational WUAs created and/or strengthened (number)	2,00	2,277	114
Number of female and male water users (defined as member of the WUA) provided with water delivery services	166,000	106,963	64	Water users provided with new/improved irrigation and drainage services (number)	100,000	111,203	107
Resources generated by user groups to manage, operate, and maintain the developed schemes (as percentage of required resources)	90	62	69	Water user associations that are generating at least 80% of resources required to manage, operate and maintain the developed schemes (percentage)	70	73	104

As shown in the table above the project met or exceed most of its PDO outcome indicator targets post-restructuring, including those for the revised indicators. The project reached 124,700 beneficiaries, out of whom 111,203 (89%) were small and marginal farmers and sharecroppers, exceeding the revised target of 100,000. The project also contributed to yield improvements for major crops, improvement in cropping intensity (192% against a target value of 170% and a baseline of 122%), and diversification in favor of higher-value crops. While the project fell short on achieving the target for the area with improved irrigation/drainage services which reached 67,584 ha compared to a revised target of 75,000 ha, the target was 90% achieved. Based on this information the efficacy of achieving the project development outcome post restructuring is rated Substantial.

Revised Rating
Substantial



OVERALL EFFICACY

Rationale

Overall efficacy pre-restructuring is rated Modest. The project fell short on several PDO outcome targets, most notably, the area provided with new/improved irrigation or drainage services reached 67,594 hectare (ha) compared to an original target of 139,000 (about 49% achievement). Also, the operational WUAs reached only 54% of the original target (2,227 compared to 4,200). There were also attribution concerns as claims reported in the ICR regarding provision of agricultural services and their impact on boosting production were not supported by evidence

Overall Efficacy Rating

Modest

Primary Reason

Low achievement

OVERALL EFFICACY REVISION 1

Overall Efficacy Revision 1 Rationale

Overall efficacy post restructuring is rated Substantial. The evidence provided in the ICR showed that the project met or exceed most of its PDO outcome indicator targets post-restructuring, including those for the revised indicators. The project also contributed yields improvements for major crops, improvement in cropping intensity (192% against a target value of 170% and a baseline of 122%), and diversification in favor of higher-value crops. Based on this information the efficacy of the achieving the outcome post restructuring is rated Substantial despite falling short on achieving the target for the area with improved irrigation/drainage service.

Overall Efficacy Revision 1 Rating

Substantial

5. Efficiency

Economic and Financial Efficiency

ex-ante

- Economic rate of return (ERR) analysis for the project as a whole revealed that irrigated area expansion alone produced an ERR of 13.5% which goes up to 25.1% with the inclusion of benefits from other sources like diversification with crops and fisheries, and efficient water management. Financial rate of return (FRR) for the project as a whole was 21.6%.
- Quantified benefits. Expected benefits from irrigated area expansion and intensification as the project led investments in minor irrigation (MI) schemes were estimated to develop additional irrigated area of about 139,000 ha, with a cropping intensity of around 200%, benefits from diversification and high value crops on 19% of the newly developed area, benefits from fisheries development in an estimated 1,270 ha of water spread area; and benefits from the adoption of efficient resource use technologies covering 10% of the irrigated area.



- Sensitivity Analysis. The analysis considered key risk variables like reduced developed irrigated area, institutional inefficiencies, cost escalation, and implementation delays. Simulated ERR, by considering jointly 25% increase in costs and 25% decrease in benefits on the relevant risk variables, based on multiple runs, ranged from 12.7 to 22.6% with a coefficient of variation of 9%.

ex-post

- The ex post economic and financial analysis (EFA) closely followed the appraisal methodology while accounting for the closing date extension of nearly 24 months, the actual project benefits, and the cancellation of funds (US\$95 million). Benefits were estimated over 15 years and a 10% discount rate was used in the analysis.
- The economic analysis showed that the project generated an economic internal rate of return (EIRR) of 22.8% and an ENPV of US\$52.7 million at a discount rate of 10%. The benefit-to-cost ratio was estimated at 4.26. The Financial internal rate of return (FIRR) was estimated at 20.5% and the FNPV estimated at US\$46.8 million at a discount rate of 10%. Benefit-to-cost ratio was estimated at 4.12.
- Sensitivity Analysis. A sensitivity analysis was performed on key variables, including cropping intensity in the project areas. The EIRR was estimated when a decrease in benefits ranged from 10% to 50%, the EIRR ranged between 21.3% and 13.6%. The economic results were robust to changes in the cropping intensity (or overall benefits). The project remained economically justified (at 13.6%) even for a cropping intensity reduced by 50%.
- The costs of project management represented about 14% of total project costs, which was relatively high. The ICR (footnote 28) explained that the reason for higher costs was due to capacity building for the whole Water Department that included more than 600 staff.
- The ex-post EFA was robust and reflected logical assumptions and the estimated rates of return were reasonable for the project's investments.

Administrative and Institutional Efficiency

The project experienced implementation delays and slow disbursement. At MTR disbursement was only 6% (ICR, footnote #43). To accommodate implementation delays and allow time to complete activities, the closing date was extended by twenty four months beyond the original closing date. Delays started after effectiveness when the project experienced difficulties in human resources and organizational capacity. This resulted in implementation lags in delivering irrigation schemes to the farmers (ICR, paragraph 16). According to the ICR (paragraph 37) "the project experienced various capacity challenges, which resulted in slow implementation, particularly in processing procurement and financial reporting." There were delays related to the approval procedures for bids which resulted in delays in scheme implementation (ICR, paragraph 54). There were also delays in the submission of interim unaudited financial reports. This affected the project's ability to draw down on the loan/credit on a timely basis (ICR, paragraph 74). The project had an undisbursed amount of about US\$9.8 million because of technical difficulties in filing financial records due to COVID-19 (ICR, footnote#29).

Overall, efficiency is rated Substantial, despite implementation delays. While the ex-post ERR was slightly lower than the appraisal ERR (22.8% compared to the maximum *ex-ante* estimate of 25.1%), it was still significantly higher than the discount rate at 10%.



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	✓	25.10	100.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	22.80	100.00 <input type="checkbox"/> Not Applicable

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

6. Outcome

Pre-Restructuring

Relevance of Objectives was rated Substantial. Overall efficacy was rated Modest. The project fell short on several PDO outcome targets, most notable, the area provided with new/improved irrigation or drainage services reached 67,594 hectare (ha) compared to an original target of 139,000 (about 49% achievement). Also, the operational WUAs reached only 54% of the original target (2,227 compared to 4,200). Efficiency was rated Substantial. The ex-post ERR was slightly lower than the appraisal ERR (22.8% compared to 25.1%), yet it was still significantly higher than the discount rate at 10%.

With a Substantial rating for both Relevance of Objectives and Efficiency and a Modest rating for Efficacy, Outcome is rated Moderately Unsatisfactory.

Post-Restructuring (the second restructuring on June 30, 2017)

Relevance of Objectives was rated Substantial. Overall efficacy was rated Substantial. The evidence provided in the ICR showed that the project met or exceed most of its PDO outcome indicator targets post-restructuring, including those for the revised indicators. The project also contributed yields improvements for major crops, improvement in cropping intensity (192% against a target value of 170% and a baseline of 122%), and diversification in favor of higher-value crops. Efficiency was rated Substantial.

With a Substantial rating for the three criteria (Relevance of Objectives, Efficacy and Efficiency), Outcome is rated Satisfactory.

Split Rating:



At the same time as resource commitments to the project were reduced, some post-second restructuring targets were decreased as compared with pre-restructuring targets (see table in Efficacy section). These changes indicate that the restructuring resulted in a reduction in the level of ambition of the project. Therefore, per the IEG Guidelines, a split rating was applied at the major second restructuring, which resulted in a substantial reduction in resource commitments and changes in PDO targets and indicators (*IEG Evaluator Guidelines* (p. 49). Note that the ICR also split the Outcome rating at the same juncture (pp.18-20).

	Against Original PDO Targets	Against Revised PDO Targets after the second restructuring
Relevance of objective	Substantial	Substantial
Efficiency	Substantial	Substantial
Efficacy	Modest	Substantial
Outcome ratings	Moderately Unsatisfactory	Satisfactory
Numerical value of the outcome ratings on a 1 to 6 scale	3	5
Disbursement	US\$72.95 million	US\$57.84 million
Weight (% disbursed before/after change)	55.78% (US\$72.95/US\$130.79)	44.22%
Weighted value of the outcome rating	$0.56 \times 3 = 1.68$	$0.44 \times 5 = 2.20$
Final outcome rating	Moderately Satisfactory ($1.68 + 2.20 = 3.88$ rounding to 4.0)	Moderately Satisfactory ($1.68 + 2.20 = 3.88$ rounding to 4.0)

a. Outcome Rating

Moderately Satisfactory

7. Risk to Development Outcome

The ICR discussed three main risks that could potentially impact the development outcome.

1. The risk that the project-supported activities are unsustainable. The risk associated with activities continuity remained Low at the project completion for the following reasons: (a) the beneficiaries largely took



ownership of the various activities promoted by the project, (b) the communities were able to adopt favorable business models which allowed them to reap the full benefits of the water storage options, and (c) the diversification of activities and crops offered the opportunity for greater adaptation in the face of changes in market conditions (ICR, paragraph 83).

2. The risk relating to the sustainability of institutions. According to the ICR (paragraph 84) this risk was Moderate. Community-based institutions were strengthened and benefited from convergence with other agencies and government departments. While the project continues to enjoy high support of government and grassroot stakeholders, Water User Associations (WUAs) are new institutions that need support and hand holding. WUAs were expected to benefit from Government support. According to the ICR (paragraph 84) "at completion, staff remained deployed at the district level to ensure extension services to irrigation schemes."

3. The Risk to sustainability of infrastructure. According to the ICR (paragraph 85) this risk was Moderate. The sustainability of infrastructure is largely a factor of proper and regular O&M. The project supported adequate provision for O&M using a flexible approach that considered the need of communities. Communities are in control of the O&M of small-scale storage facilities including ponds. According to the ICR (paragraph 85) preliminary evidence showed that farmers could also maintain larger infrastructure such as check dams to some extent.

8. Assessment of Bank Performance

a. Quality-at-Entry

The project objective was aligned with the Bank's Country Assistance Strategy (CAS) for the Republic of India (FY09–FY12) which focused, among others, on development of infrastructure, including water resources, and support for poorer states (see section 3 for more details). It was the first Bank-financed project in West Bengal that brought together three line departments: Department of Agriculture, Food Processing Industries, and Horticulture and Fisheries to work closely with the Department of Water Resources Investigations and Development (DWRID) (ICR, paragraph 46).

The project design featured the integration of structural measures (minor irrigation system development) and innovative non-structural solutions (institutional strengthening and agricultural support services). The project design benefited from the experience and lessons of Bank financed projects in India, namely, Assam Agricultural Competitiveness Project, Karnataka Community- Based Tank Management Project, and Maharashtra Water Sector Improvement Project. Notable lessons reflected in the design included: WUA empowerment, meaningful community participation, strong agricultural support services, concurrent and independent evaluation, and implementation arrangements built on multilevel Project Management Units (ICR, paragraph 47). Design featured new concepts to the State of West Bengal such as community-level irrigation management, efficient irrigation technologies including drip and sprinkler systems, and crop diversification. However, implementation capacity was a concern as DWRID lacked the specific expertise needed to operationalize the proposed concepts. The project also faced readiness issues resulting in implementation delays. Implementation could have benefited from intensive capacity development during the preparation stage, -given the level of ambition of the original project (ICR, paragraph 75).



Ten risks were identified at appraisal with an overall Moderate rating. While low capacity of implementing agencies was identified as moderate risk, it proved to be substantial and could have benefited from more substantive mitigation measures (ICR, paragraph 52). Finally, M&E design lacked relevant indicators to track project activities, notably, there were no indicators to track the physical infrastructure developed under the project. Also, the large geographical spread of project activities over several districts made coordination and monitoring a challenge (ICR, paragraph 49).

Based on the above-mentioned assessment, Quality at Entry suffered from significant shortcomings including an overly optimistic assessment of the implementation capacity, readiness issues, and M&E design shortcomings. Therefore, Quality at Entry is rated Moderately Unsatisfactory.

Quality-at-Entry Rating

Moderately Unsatisfactory

b. Quality of supervision

The project experienced start-up delays due to readiness issues. According to the ICR (paragraph 80) Bank supervision "offered regular, demand responsive, and thematic technical assistance besides regular missions." The Bank teams were multidisciplinary with expertise in procurement, financial management and project evaluation, among others. The ICR did not report on the number of supervision missions conducted by the Bank over the implementation period. The outcome of the project was positively influenced by three supervision inputs, first, the standardization of the design of specific types of schemes, second, preparation of protocols for quality assurance and quality control, and third, the use of modern survey and design techniques for more cost-effective and successful schemes (ICR, paragraph 80). The Bank also provided implementation support for fiduciary and safeguard aspects. The mid-term review (MTR, 2014) provided useful insights on the challenges that faced the project. The MTR recommended three corrective actions to achieve the PDO, first to increase the emphasis on poorer areas in western districts, second, to shift from scattered implementation to cluster-based approach, and to adopt a scheme development management plan (ICR, paragraph 77). According to the ICR (paragraph 79) "the Bank team, through its recommendations, oriented the project to establish partnership between farmers and private companies that created substantial network and social capital for farmer and fishery groups."

However, restructuring the project required lengthy negotiations between different levels of government. M&E design weaknesses could have benefitted from earlier intervention by the Bank to better track the project achievements. Despite three restructurings, M&E design continued to suffer from weaknesses (see section 9 a for more details).

Overall, Quality of Supervision is rated Satisfactory. Supervision took proactive steps to put the project on the right track and delays were beyond the control of the Bank.

Based on the above-mentioned assessment of Quality at Entry and Quality of Supervision, 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 include a Theory of Change (ToC) as it was not mandated at appraisal. Nonetheless, the ICR (page 8) included one which reflected the relation between the planned project activities, its outputs, outcomes and long-term impacts. The ToC in the ICR also reflected the critical assumptions that underpinned the achievement of the stated objective.

The M&E design featured collecting data through the implementing agencies (line departments, field level project staff, service providers contracted by the project). Also, an external M&E agency would collect primary data about project implementation and impact. The overall coordination of M&E activities would be under the State Project Management Unit (SPMU). These implementation arrangements were complex and proved to be challenging-given staffing issues and inexperience of the project team (ICR, paragraph 63).

To assess the achievement of the PDO (*to enhance agricultural production of small and marginal farmers in the project area*), the Results Framework (RF) included four PDO outcome indicators: #1. Increase in yield of main agricultural crops (rice, oil seeds, and vegetables, measured in MT/ha, with increases starting two years from the year of construction; #2. Operational water users associations created (cumulative, measured in number), #3. Resources generated by user groups to manage, operate, and maintain the developed schemes, and #4. Number of female and male water users (defined as member of the WUA) provided with water delivery services. Of these four PDO level outcome indicators, only indicator #1 was directly linked to the PDO and it was measurable, and had clear baseline data. Indicators #2 and # 3 and # 4 related to the water user associations created under the project and were indirectly linked to the PDO, since the WUAs played a critical role in managing and sustaining the micro-irrigation schemes supported by the project. These indicators were measurable, and included baseline data.

The RF also included five intermediate outcome indicators to track the different activities supported by the project. This included an intermediate outcome indicator to measure adoption of improved production technologies, and another outcome indicator to measure the rice area under the System for Rice Improvement (SRI). These two intermediate level outcome indicators were relevant as they link directly to the PDO. All the five intermediate outcome indicators were measurable, and relevant to assess the supported activities.

However, the RF was deficient as it lacked indicators to assess the project's support to horticulture, fisheries and market creation. The RF also did not track the physical infrastructure investments related to irrigation schemes that the project supported.



M&E design was mixed, on one hand it included relevant measurable PDO level indicators with reasonable targets, but on the other hand, design reflected complex implementation arrangements and the RF lacked relevant indicators to track some activities.

b. M&E Implementation

According to the ICR (paragraph 63) "M&E implementation faced start-up challenges due to staffing issues and inexperience of the project team." Following the MTR, M&E implementation benefited from the introduction of different M&E tools such as GIS and remote sensing tools to monitor the visible impact on project implementation. The project monitoring also benefited from a web-based MIS, GPS-based photographs, and real-time updates using mobile-based applications (paragraph 63). WUAs supported the M&E team through the determination of crop types and cropped areas.

Restructuring and changes to the RF. The MTR mission (August 2014) recommended revising the targets of a few indicators in view of the time remaining for project implementation. These revisions did not affect the theory of change (ICR, paragraph 18). The 2017 restructuring saw the revision of four PDO outcome indicators with the reduction of the target values to three of them due to the cancellation of US\$95 million of the project funding.

M&E implementation improved especially following the MTR recommendations.

c. M&E Utilization

According to the ICR (paragraph 65) "the M&E system was highly useful during the evaluation as it allowed the capture of a vast amount of data thanks to the remote sensing technology combined with ground-truthing data." The system also integrated planning, design, and implementation with operation and service delivery. Transparency of investments was enhanced through the usage of Geotagging. Project management benefited from a synchronized M&E system with MIS and GIS support (ICR, paragraph 64). This facilitated management of various aspects of the project including: contract management, disbursements, financial management (FM), tracking of implementation status, and the implementation of safeguard instruments (ICR, paragraph 64). The usage of GIS technology allowed the project to focus on the poorer areas of the state that suffered from irrigation constraints. Preparation of the ICR benefited from the project's M&E data and evaluation studies (ICR, paragraph 64).

M&E utilization was adequate and informed the project management.

Overall, M&E Quality is rated Modest. This rating reflects design shortcomings, most notable the lack of indicators to track the physical investments and the project's support to some activities. Despite restructuring the project three times, these weaknesses were not addressed. Implementation of the M&E system started slowly, but improved, and utilization was adequate.



M&E Quality Rating

Modest

10. Other Issues

a. Safeguards

The Environmental Category for ADMIP was A (Full Assessment). The following six safeguard policies were triggered: Environmental Assessment OP 4.01; Pest Management OP 4.09; Indigenous People OP 4.10; Physical Cultural Resources OP 4.11; Safety of Dams OP 4.37; and Projects on International Waterways OP 7.50. The major sources of potential negative impacts that could potentially result from the project activities included: construction activities impacting flora; stream or riverside construction accelerating erosion of stream banks; increasing command areas resulting in conversion of unprotected natural habitats and wildlife corridors; lack of drainage, salinity increase, and health impacts of inundation; enhanced use of chemical and synthetic fertilizers and pesticides; and possibility of using industrial wastewater for irrigation in urban fringes. An Environmental Management Plan (EMP) was developed. It contained a set of procedures for environmental management that would be used during implementation. Overall, the environmental impact of the project was assessed as low to moderate, assuming that the environmental safeguard measures were implemented (PAD, paragraph 87).

Environmental Assessment (OP 4.01). Mitigation measures included: the avoidance of areas where groundwater abstraction was critical, the avoidance of contaminated areas, and assessment of water resources adaptability for irrigation. Environmental provisions were included in construction contracts and strictly monitored by the full-time Safeguards Unit. According to the ICR (paragraph 67) "mitigation measures were adequately implemented and progress reports regularly submitted for World Bank review. OP 4.01 was rigorously complied with."

Pest Management (OP 4.09). While the project did not procure or promote the use of pesticide, additional irrigation capacity could result in higher incremental use of pesticides. A pest management plan was therefore developed and integrated into the EMP to ensure compliance with this policy. According to the ICR (paragraph 68) "pest management plans were implemented in a satisfactory manner. OP 4.09 was complied with."

Indigenous Peoples (OP 4.10). A Tribal Development Plan was prepared. The project prepared a block-wise list of tribal dominated villages for all the districts of the state. Additionally, the project set aside up to 13% of the total financial envelope for tribal people, and 11% of the project beneficiaries were tribal farmers. According to the ICR (paragraph 69) "the project complied with OP 4.10."

Physical Cultural Resources (OP 4.11). While the project was not expected to affect any archaeological or protected sites, OP 4.11 was triggered as a precaution since an impact on physical cultural resources could not be ruled out. According to the ICR (paragraph 70) "no prominent physical cultural resources were discovered during implementation."

Safety of Dams (OP 4.37). While the project did not build any dam higher than 15 m, about 117 surface schemes in three districts were anticipated to include the construction of a bund. Structures followed state design standards and guidelines. Compliance was ensured through the assignment of an executive engineer of Department of Water Resources Investigations and Development (DWRID) and a qualified



design engineer at the State Project Management Unit (SPMU) with experience in implementing safety norms during design and construction of dams. According to the ICR (paragraph 71) "the project complied with OP 4.37."

Projects on International Waterways (OP 7.50). The project supported water development activities in sub-basins that could be classified as international waterways shared with Bangladesh, Bhutan, and India. The project design ensured that incremental water abstraction from any of the eight rivers was negligible. It also anticipated water abstraction in the Ganga River basin. According to the ICR (paragraph 72) "OP 7.50 was complied with."

b. Fiduciary Compliance

Financial Management (FM). FM arrangements were mainstreamed into the state's own accounting, internal controls, and financial reporting systems. Submission of interim unaudited financial reports were initially submitted with delays, which affected the project's ability to draw down on the loan/credit on a timely basis. The submission of annual audit reports was also delayed, except in the last two years and resulted in the application of World Bank remedies by way of discontinuation of disbursements. FM performance benefited from simplifications and consistent implementation support. However, financial planning remained a challenge through completion, leading to an undisbursed amount of about US\$9.8 million (ICR, paragraph 74). The project audit reports were qualified during the first years of implementation. By project completion, the FM capacity improved and audit reports and interim unaudited financial reports were timely submitted. According to the ICR (paragraph 74) "the project largely complied with World Bank FM policies albeit with difficulties."

Procurement. The State Project Management Unit (SPMU) was responsible for the overall procurement system while the District Project Management Unit (DPMUs) were in charge of procurement coordination and review at district levels using a procurement manual developed following Bank guidelines. Procurement benefited from trainings to familiarize staff with the Bank's procurement procedures. Starting from 2013, the SPMU had a permanent procurement specialist who submitted procurement plans to the Bank to reflect implementation. As the project team built their experience, procurement efficiency improved. According to the ICR (paragraph 73) "procurement policies were satisfactorily complied with."

c. Unintended impacts (Positive or Negative)

d. Other

According to the ICR (paragraph 45) "the project facilitated the generation of socioeconomic and sociocultural impacts that span beyond outcomes captured by the project's Result Framework. With improved access to water and diversification of activities, anecdotal evidence suggests that the overall resilience of socioecological systems increased. The wide range of vegetables, pulses, and fisheries contributed to increased access to diet diversity not only to direct beneficiaries but also to other villagers in the western districts. Additionally, innovative models have emerged among fishery communities including fee-based recreational angling targeting urban dwellers. The project contributed to improve the self-



confidence of communities who are now more inclined to engage in innovative undertakings. Emerging impacts include improved nutrition and education for children because families can afford school fees. Almost 82 percent of the members reported that, after the introduction of Accelerated Development of Minor Irrigation Project (ADMIP), their income improved which discouraged migration among their family members. Additionally, case studies in selected villages indicate increased expenditures on their children's education as reflected by improved school supplies and greater roles for private tutors."

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	Modest	M&E suffered from several design weaknesses that were unaddressed despite three restructurings.
Quality of ICR	---	Substantial	

12. Lessons

The ICR included five lessons. The following three are emphasized with some adaptation of language:

1. To ensure a successful outcome for an irrigated agriculture project, an integrated design of structural measures (irrigation infrastructure), and nonstructural measures (management institution development and agricultural support) is essential. While the project invested in infrastructure to improve water availability, agricultural support services and institution building were cornerstones of the project outcomes. These 'soft components' were absent in state-supported I&D programs and constituted major value added for ADMIP. Finding the right incentive mechanisms for WUAs through both agricultural service support and performance monitoring was a key nonstructural innovation. Such mechanisms that require multidisciplinary teams are showing results on the ground and can contribute to sustainability.

2. Complex projects that include many sub-projects scattered over large areas require active learning and adaptive change management with innovations. The first phases of project implementation allowed stakeholders to accumulate knowledge which proved crucial during successive phases. The experience enabled adjustments which contributed to the turnaround of the project. Owing to flexible approaches, the project capitalized on innovations such as MIS integrated into the GIS, the introduction of a cluster-based approach, and the adoption of an integrated landscape management model. Also, the project adopted a flexible approach by involving



communities to express concerns and derive suitable solutions. This approach boosted beneficiary satisfaction and improved poverty targeting.

3. Developing and implementing a sound human resources development strategy is a cornerstone of successful project implementation. While an adequate capacity assessment is a crucial step in project preparation, human resources development strategy should also include risks to appropriate staffing level and skills, staff retention, and bureaucratic hurdles. Adopting the right type of incentives to ensure staff motivation can substantially reduce detrimental and frequent turnover. In hindsight, a full-fledged strategy developed with key stakeholders and accounting for the constraints and risks could have limited the impact of human resources challenges that the project faced.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

Quality of Evidence. M&E suffered from design weaknesses related the lack of indicators to track some project activities. Overall, the M&E system was successful in collecting data on the main PDO indicators. However, it was not clear why the PDO indicator on yields was changed in 2017. Also, the methodology for calculating the new indicator was not clearly reported in the ICR. Annex 7 in the ICR provided important information and evidence on the impacts of the project, especially the inclusion of an illustration of impact of the project intervention through change in cropping area and cropping intensity.

Quality of Analysis. The ICR provided clear linking between evidence and findings and provided convincing arguments under the different sections, including the discussion on outcomes.

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

Results Orientation. The ICR included a good discussion on the achievement of the outcome. The discussion was well balanced between reporting on the achievement of the outcomes in relation to the indicators and what the project actually achieved on the ground. However, discussing the project's support to agricultural development was deficient due to the absence of relevant indicators to assess the supported activities.

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 comprehensive, and the efficiency analysis was robust.

Conciseness. The ICR provided comprehensive coverage of the implementation experience and candidly reported on shortcomings. There was enough clarity in the report's messaging. Discussion of safeguards was thorough, but the sections on M&E design and implementation could have benefited from more detail. Also, the



information regarding quality at entry was reported under different sections of the ICR and could have been consolidated under the designated section to discuss this topic. Finally, the ICR did not report on the relevance of objectives with regards to the Government and state priorities.

Overall, the Quality of the ICR is rated Substantial despite some shortcomings.

a. Quality of ICR Rating

Substantial