Report Number: ICRR0023194

1. Project Data

Project ID P131235	**Project Name** IN: Uttarakahand Decen Watershed Dev II
Country India	**Practice Area(Lead)** Agriculture and Food

L/C/TF Number(s)	Closing Date (Original)	Total Project Cost (USD)
IDA-53690	30-Sep-2021	107,280,860.56
Bank Approval Date	**Closing Date (Actual)**	
31-Mar-2014	31-Jan-2022	

	IBRD/IDA (USD)	Grants (USD)
Original Commitment	121,200,000.00	0.00
Revised Commitment	118,218,988.81	0.00
Actual	107,280,860.56	0.00

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2. Project Objectives and Components

a. Objectives

The Project Development Objective (PDO) of the Uttarakhand Decentralized Watershed Development II Project as articulated in the Financing Agreement (FA, page 5) was identical to the one stated in the Project Appraisal Document (PAD, paragraph 12) and aimed to:

"increase the efficiency of natural resource use and productivity of rainfed agriculture by participating communities in selected micro-watersheds of the State of Uttarakhand."

Parsing the PDO. The PDO will be parsed into the following two objectives:

1. To increase the efficiency of natural resource use of rainfed agriculture by participating communities in selected micro-watersheds of the State of Uttarakhand to be referred to in Section 4 as Objective 1.

2. To increase the productivity of rainfed agriculture by participating communities in selected micro-watersheds of the State of Uttarakhand to be referred to in Section 4 as Objective 2.

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

No

c. Will a split evaluation be undertaken?

No

d. Components

The PDO was supported by the following four components:

1. Social Mobilization and Participatory Watershed Planning (appraisal cost: US$30.00 million, actual cost: US$22.33 million). This component financed goods works and services to support: (i) mobilization of Gram Panchayat (GPs) to prepare integrated and coordinated Gram Panchayat Watershed Development Plans (GPDWPs), including, among other things, the identification of specific interventions to increase effective land use and water resource management and develop agriculture and income-generation activities; and (ii) development of watershed treatment plans.

2. Watershed Treatment and Rainfed Area Development (appraisal cost: US$90.30 million, actual cost: US$87.99 million). This component financed sub-projects and associated goods, works, and services to support the implementation of the GPWDPs through two sub-components:

2.1. Watershed treatment and water source sustainability. This would finance the implementation of (i) construction and rehabilitation of recharge pits, ponds, vegetative structures, and other soil conservation structures; (ii) perimeter rehabilitation with Napier and other grasses; (iii) forestry activities (e.g., plantations and nursery development); and (iv) promotion of alternate energy sources (e.g., biogas plants, solar cookers, water mills, and pine briquette production).

2.2. Rainfed area development to support both irrigated and rainfed areas. This would be through providing improved seeds, demonstrating new technologies, and horticulture and livestock production.

3. Enhancing Livelihood Opportunities (appraisal cost: US$18.70 million, actual cost: US$17.06 million). This component financed sub-projects and associated goods, works, and services to Farmer Federations (FFs) to develop agribusinesses in high-value crops through three sub-components:

3.1. Agribusiness Support. This financed facilitation of agribusiness development in high-value vegetable crops for targeted farmers through the formation of Farmer Interest Groups (FIGs) and their Farmer Federations (FFs), building on project-supported water user groups and others.

3.2. Support for Vulnerable Groups. This supported entrepreneurial activities for vulnerable groups in the targeted GPs, including landless, vulnerable women, and transhumance, who will not directly benefit from the major project investments under component 2.

3.3. Consolidation of Gramya I Activities. This focused on repairing the damaged assets created in Gramya I and strengthening the business planning and management capacity of 27 FFs formed under Gramya I.

4. Knowledge Management and Project Coordination (appraisal cost: US$31.00 million, actual cost: US$26.08 million). This financed goods, works, services, and incremental operating costs to support through two sub-components:

4.1 Knowledge Management. This financed strengthening the institutional capacity of the Project Implementing Entity, GPs, and FFs for the implementation and management of the project.

4.2. Project Coordination. This supported management and supervision of project implementation, including (i) incremental expenditures incurred by the Project Implementing Entity for project implementation, management, and supervision; (ii) financial management and annual internal and external audits; (iii) incremental contractual staff salaries (other than consultants), excluding salaries of civil servants, deputed to the project; and (iv) dissemination of project-related information.

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

Project Cost. The total project cost was estimated at US$170.0 million. According to the ICR Data Sheet (page 2), the actual cost was US$153.44 million or 90% of the appraisal estimate. The difference was mainly from lower IDA loan disbursement followed by slightly lower borrower contribution (see below).

Financing. The project was financed through an IDA credit worth US$121.00 million equivalent over a seven-year implementation period. The actual amount disbursed was US$107.28 million (88.6% of the estimated credit). According to the ICR (paragraph 38), "during the implementation due to fluctuation in the SDR: US$ exchange, the total cost of the project was reduced."

Borrower Contribution. The Borrower was expected to contribute US$45.80 million, and the project beneficiaries were expected to contribute US$3.00 million (the total amount was US$48.80 million). The actual amounts were US$38.33 million, and US$7.83 million for the borrower and beneficiaries (total amount of US$46.16 million), respectively (ICR, Data Sheet, page 2).

Dates. The project was approved on March 31, 2014, and became effective 3.5 months later on July 15, 2014. The Mid-Term Review (MTR) was conducted on September 23, 2019. While the PAD did not specify a date for the MTR, this project conducted the MTR about 5.5 years after effectiveness, which was beyond the mid-point of the implementation period and would therefore be considered late relative to other Bank-financed projects. The project closed on January 31, 2022 which was four months later than the original closing date on September 30, 2021. According to the ICR (paragraph 15) the four months extension was needed to accommodate delays in project implementation due to COVID-19 related disruption. The project was restructured once on August 24, 2021, when the amount disbursed was US$90.19 million, in order to extend the loan closing date by four months as noted above.

3. Relevance of Objectives

Rationale

Context at Appraisal. In the State of Uttarakhand, about 80% of the population living in the hills depends on agriculture. Only 9% of land in the valleys surrounded by hills is cropped; of this, 81% is rainfed. Implementation of sound watershed development strategies is therefore critical for conserving and sustaining the natural resource base and enhancing agricultural productivity.

Previous Bank Experience. This project is the second phase after the Bank-financed Uttarakhand Decentralized Watershed Development Project (Gramya I). The Gramya I project supported the Government of Uttarakhand (GoUK) in improving agricultural productivity and rural livelihoods in the hill areas by enhancing natural resource management and strengthening the administrative capacity of the targeted GPs. This project would build upon the implementation experience of Gramya I. The Bank also has had a rich experience in watershed management in other states in India and other countries, including Pakistan, China, and the Balkan region, among others.

Consistency with the Bank Strategies. At appraisal, the PDO aligned with Bank's Country Partnership Strategy for India (CPS, FY2013-FY2017). The project supported all three strategic engagement areas of the CPS, which were: (a) integration, (b) transformation, and (c) inclusion. First, Gramya II contributed to integration in that the State of Uttarakhand was classified by the Government of India (GoI) as a particular category state due to its hilly terrain and low population density. Second, Gramya II would also support spatial transformation by promoting efficient water usage and natural resource management through watershed treatment, enhancing agricultural production and productivity. Third, the project would support inclusion by enhancing rural livelihood opportunities through agribusiness development and vulnerable group activities.

At completion, the PDO continued to align with Bank's Country Partnership Framework for India (CPF, FY2018 – FY2022) focus area 1: resource-efficient growth. The CPF aimed to support the improvement of the welfare of rural populations, consistent with increasing farmers' incomes. The project directly addressed the CPF's priority of increasing and diversifying income-generating opportunities while improving efficiency in using natural resources in agriculture. The project directly promoted more resource-efficient, inclusive, and diversified growth in the rural sector (CPF, objective 1.1). The PDO also aligned with the Bank's cross-cutting theme to support the GoI's climate mitigation and adaptation efforts.

Consistency with the Government Strategies/Priorities. At appraisal, the PDO aligned with the Government of Uttarakhand's (GoUK) Perspective and Strategic Plan (2009-2027) for scaling up the participatory watershed development model. GoUK planned to treat an additional 537 micro-watersheds in the hills, covering about 1.9 million ha by 2027.

At completion, the PDO continued to align with the Government of India's priorities, with the goal of doubling farmers' income by 2022. The project also provided direct lessons for the government's priority national missions to address climate change and disaster risks. The PDO also aligned with State priorities outlined in the GoUK Perspective and Strategic Plan (2009-2027) for scaling up the participatory watershed development model.

Summary of Relevance of Objectives Assessment. The PDO statement was pitched at a high level of ambition, namely "improving the efficiency of natural resource use," which involves multiple factors and requires an extended time frame to be fully realized. The PDO also could have referred to irrigated agriculture and increasing livelihood activities to comprehensively reflect the project's scope of activities and capture, to some extent, its poverty reduction impact. Nevertheless, at project completion, the PDO continued to align with the Bank's CPF and the Government's priorities at the national and state levels. Therefore, the Relevance of Objectives is rated Substantial.

Rating
Substantial

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1
Objective
To increase the efficiency of natural resource use of rainfed agriculture by participating communities in selected micro-watersheds of the State of Uttarakhand.

Rationale
Theory of Change (ToC). To achieve the stated objective, the project would support evidence based and inclusive watershed planning through social mobilization and participatory watershed planning including developing plans for land use and water resource management and agriculture; and watershed treatment. The project would also strengthen the institutional capacity and knowledge management of the Project Implementation Entity, Gram Panchayats (GPs) and Farmer Federations (FFs) training and dissemination; project supervision MIS; hydrology monitoring stations; and social accountability. The project would support watershed treatment and water source sustainability through developing recharge pits, ponds, and vegetative structures. The project would also support forestry activities and the use of alternative energy sources. The expected intermediate outcomes for the afore-mentioned activities included: rejuvenation of water sources, and adoption of natural resource conservation techniques. The expected outcomes included: increase in water discharge, increase in biomass (reflecting watershed condition), and an increased rainfed area under irrigation.

The stated activities were directly linked to the outputs, intermediate outcomes, and outcomes in a plausible causal chain. However, the ToC did not include the critical assumptions underpinning the achievement of the stated objective. In addition, the ToC also mentioned that the project would support forestry activities and alternative energy sources, but the connection between those two activities and the expected outcomes was not clearly outlined.

Outputs/Intermediate Results

The results below were reported in the ICR (Annex 1). However, no targets were provided.

Social Mobilization and Participatory Watershed Planning:

1. 527 GPWDP plans were prepared.
2. 79 MWS Plan prepared and implemented
3. 25,560 Training/Workshops/ Exposure Visits conducted covering 96,2676 trainees.
4. 53.90 % of households, of which 32.2% were women, participated in Aam Sabha meetings which were below the target of 80% and 60, respectively. The ICR (Annex 1) noted that at mid-term the target was exceeded with 88% participation (63% women). However, participation declined in the second half of the project due to Covid19 restrictions on meetings. Also, in total, 3,014 local Institutions were established under the project support (Water & Watershed Management Committees 527; Revenue village committees 999; User Groups 1,381; Farmer Interest Groups 1,488).

Watershed Treatment and Rainfed Area Development:

1. 13, 777 ha afforestation area was covered (no target).
2. 1,078 ha covering plantation activity (no target).
3. 30,812. 3 ha of inter-GP areas were treated (no target)
4. 2,054 water sources were identified and treated (no target).
5. Construction of range of structures: 2,50,272 dry-stone check dams; and 4,32357 crate wire check dams (no targets)
6. Drainage Line Treatment & River / Nala training work: 1,331 construction of spur; 289,610; 481 construction of cross barrier; and 7,257 protections of walls (no targets).
7. Soil Conservation measures: 16,052 vegetative check dams were constructed; 69,227 square meters of vegetative treatment and 96,243 roadside erosion control and soil conservation work were conducted; 76,921 landslide treatment and 30 km diversion of the drain (no targets).
8. Water harvesting measures: 281 km irrigation channel; 1,717 irrigation tanks; 12,145 roof water harvesting tanks; 890 LDPE tanks; 24 solar water lifting pumps with solar panels; 676 km of HDPE irrigation pipeline; 288 prefabricated geo membrane water harvesting tanks; 80 village irrigation ponds and 90 demonstrations of water conservation activities (no targets). Source sustainability measures: 1,186 village ponds; 110,736 recharge pits; 879,284 digging of trenches, and 10,830 renovations of existing Tal/Naula/Khaula (no targets).

9. 8 Hydrological monitoring systems were fully installed and functional in sample MWS (target fully achieved).

Outcomes

As noted in the ICR (paragraph 21), the efficiency of natural resource use is "conceptually about achieving the same or more agriculture, economic and social benefits, while at the same time reducing negative pressures on natural resources, and or increasing natural resource flows while improving environmental services." The following elements are discussed in the ICR about the achievement of this objective:

- **Increased water discharge (PDO indicator 1).** The project achieved an average 21% increase in water discharge from perennial water sources based on a sampling of micro-watersheds, against the target of 25% (84% achievement). Water discharge was separately assessed during the pre-monsoon and post-monsoon periods across two major natural resources, springs, and streams. According to the ICR (paragraph 23), the project intervention resulted in 30% of natural resources achieving an increase in water discharge in the pre-monsoon period. In comparison, the remaining 70% observed an increase of about 17-18%.

- **Increase in biomass (PDO indicator 2).** The increase in biomass was a result of more efficient management of watershed forests, rehabilitation of degraded land, reduced pressure from grazing, planting of trees in the form of orchards, conversion of fallow land to productive land, more integrated agricultural systems on arable land (ICR, paragraph 24). Also, on-farm adoption of soil and water conservation practices on rainfed land supported more ecosystem integrity, accompanied by more intensive and diverse agriculture due to better access to water. The project achieved a cumulative increase of 21.3% in biomass, slightly exceeding the target of 20%. The increase in biomass was measured using Normalized Difference Vegetation Index (NDVI) remote sensing data, comparing the baseline to end-line situation (ICR, paragraph 24). NDVI data were further validated through conducting ground truthing for the increase in biomass in 12 villages of 6 development blocks located within six districts. The ICR (paragraph 24) noted that at the micro-watershed level, "this meant a reduction in soil loss and in the case of extremely heavy rainfall events such as in the year 2017, anecdotally less extensive landslides or loss of land, compared to areas, not under treatment."
- **Increase in the area under irrigation (PDO Indicator 3).** This was achieved through increasing water availability, combined with putting in place community and on-farm water harvesting and storage as well as rainwater harvesting systems (ICR, paragraph 25). The data on the efficiency of the rainwater harvesting systems were derived from a geospatial analysis and a walk-through survey, which showed a realistic expansion of the use of 'Gull' (gravity-based irrigation channel) within each micro-watershed. The area under irrigation increased to an additional area of 5,359 ha against target of 7,800 ha (about 69% achievement, no baseline provided) by converting lands from rainfed and previously fallow arable areas to irrigated areas. The ICR (paragraph 25) noted that these outcomes were achieved despite the topographic constraints that made it challenging to bring land under irrigation.

Summary of Efficacy Assessment. The project exceeded its target for PDO indicator 2 and achieved 84% and 69% of the targets for PDO indicator 1 and 3, respectively. While the project fell short of achieving two of its outcome indicators, the ICR noted the challenging topographical nature of the project area. This Review also finds that the PDO target for the increase in area under irrigation might have been too ambitious-given the challenging topographic nature of the project area. Therefore, the Efficacy with which this objective was achieved is rated Substantial, with moderate shortcomings.

Rating
Substantial

OBJECTIVE 2
Objective
To increase the productivity of rainfed agriculture by participating communities in selected micro-watersheds of the State of Uttarakhand.

Rationale
Theory of Change (ToC). To achieve this objective, the project supported rainfed area development through the provision of improved seeds for rainwater conservation, CSA, and integrated crop management. Also, in the irrigated areas, the project would promote diversification to high-value off-season horticulture crops and orchards, and support the livestock sector through improved breeds. The expected intermediate outcomes

were: the adoption of natural resource conservation techniques, and farmers adopting soil moisture conservation and improved crop production technologies technologies aimed at increasing the efficiency of natural resource use in Uttarakhand's watersheds. The expected outcomes were: (i) increased area of originally rainfed cropped area under irrigation; and (ii) increased productivity for irrigated and rainfed crops.

The project also supported the following activities which were not directly related to Objective 2 but benefitted small-scale farming households: facilitate agribusiness development in high-value vegetable crops, with the formation and building capacity of farmer interest groups (FIGs) and their farmer federations (FFs); and marketing support; repair of the damaged assets created in Gramya I and strengthened capacity of 27 FFs formed under Gramya I; and support entrepreneurial activities for vulnerable groups. The expected intermediate outcomes were: farmers organized into FIGs, self-sustained FFs, and vulnerable households were covered and benefitted.

The stated activities were directly linked to the outputs, intermediate outcomes and outcomes in a plausible causal chain. The ToC did not include the critical assumptions that underpinned the achievement of the stated objective. While the support to marketing and agribusiness development was logical, given the expected increment in productivity, but the ToC lacked a causal chain to connect these activities to the stated outcomes.

Outputs/Intermediate Results

The results below were reported in the ICR (Annex 1). Targets were provided when available.

1. 2,530 ha fallow land conversion was done (no target).
2. 60,000 demonstrations of crop production technologies for higher adoption (no target).
3. 91,043 farmer received adoption support (e.g. replacement of traditional seeds with region specific, hill suitable, high yielding varieties) (no target).
4. 930 cluster identified for support (no target).
5. 8,179 poly tunnels for seedlings nursery were established (no target).
6. Animal husbandry interventions: Cattle sheds constructed: 12,724; mangers: 6113; watering troughs: 3,349; artificial insemination:10,000 were done with a 55% success rate; and 1,132 natural breeding centers were established (no targets).

7. 17,488 farmers (69% of them were women) were organized into farmer interest groups (FIGs) exceeding the target of 10,660 (ICR, paragraph 32).
8. 85.7% farmer federations (FFs) were self-sustained exceeding the target of 30%.
9. 14,148 vulnerable HHs were covered by the vulnerable group activities under GPWDPs exceeding the target of 8,895 (ICR, paragraph 33).

Outcomes

Increasing productivity in irrigated and rainfed crops.

- The project contributed to increments in productivity of selected crops (garlic, cauliflower, cabbage, green pea, and tomato) through greater water availability that enabled the expansion of irrigation supply in rainfed areas. The project also supported the adoption of natural resources conservation and soil moisture conservation and crop production techniques, combined with the provision of quality seeds, and developing a local seed production and replacement systems (ICR, paragraph 30).

- The project achieved a 60.2% increase in productivity in irrigated crops exceeding the end target of 50% and 33% in rainfed crops exceeding the end target of 20% (PDO indicator 4). The project almost doubled the rainfed area under irrigation from around 5,262 ha at baseline to 10,621 hectares at completion and improved cropping intensity from 171% to 227% (ICR, paragraph 29).
- Productivity of selected crops was assessed through a sample survey of farmers as well as crop cutting exercises done during the project implementation period. The Difference-in-Difference (DiD) indicated that average change in productivity was 41.7% and 20.8% increase in productivity for irrigated crops and rainfed crops, respectively. According to the ICR (paragraph 29) these increments could be directly attributed to the project interventions.
- The project doubled the number of livestock per household. The project-supported genetic improvements and produced 9,286 improved breed milch animals and 5,313 improved goats. The ICR (paragraph 31) claimed that the project reduced open grazing combined with fodder development, better animal husbandry and shelters, and health practices, which collectively improved the contribution of livestock to household economy and watershed performance. However, there was no evidence reported in the ICR to verify the contribution of livestock to household economy and watershed performance.
- By project completion 50,866 farmer households were reached with agricultural assets or services exceeding the end target of 45,000, of which 8,817 were female (PDO indicator 5). This included a successful development of 1,488 FIGs with 17,488 members, exceeding by 164 percent of the target of 10,600 farmers (69 percent of them were women).

Other benefits not attributed to PDO outcome

- The impact assessment report showed that the increase in volume of marketed produce was exceeded by 431% reaching 9,651 tons compared to a baseline value of 218.7 tons. The ICR (paragraph 34) explained that the baseline value on the volume traded was the mid-term value as there was no baseline recorded at the beginning of implementation.
- The project helped develop 1,488 FIGs with 17,000 members to contribute to collective marketing. An aggregate analysis of all the FIGs showed that the production volume of the FIGs reached 62,275 tons for the project duration of 7 years of which 50,384 tons were sold through the FIGs. This demonstrated that FIGs engaged in production and marketing traded at about 6 tons per FIG over a period of 7 years, with annual incremental increase in traded volume (ICR, paragraph 34).

Summary of Efficacy Assessment. The evidence provided in the ICR point to the success of the project in increasing the productivity of rainfed and irrigated agriculture by participating communities. The project exceeded its target on the two PDO outcome indicators. The project activities also had a positive impact on improving marketing of agricultural products through the project-supported farmer interest groups. Based on the project's activities and achievements, this Review concludes that the expected outcomes among targeted beneficiaries were: increased agricultural productivity, improved marketing of agricultural products, improved farmers' livelihoods, and reduced poverty among vulnerable households. Therefore, the efficacy with which Objective 2 was achieved is rated Substantial.

Rating
Substantial

OVERALL EFFICACY

Rationale

Overall Efficacy is rated Substantial with moderate shortcomings. The project exceeded the end targets for three out of five PDO outcome indicators, and achieved 84% on PDO indicator 1 and 69% on PDO indicator 3. The project also met or exceeded target values for nearly all intermediate indicators. The ICR (paragraph 36) pointed out that the project achieved additional resilience benefits including increased carbon stock through soil carbon sequestration as a result of watershed treatments. Finally, the evidence provided in the ICR points to the success of the project to effectively exploit synergies between key components of the micro-watersheds to generate increased benefits in natural resources use in an inclusive manner.

Overall Efficacy Rating

Substantial

5. Efficiency

Economic and Financial Analysis (EFA)

ex-ante

- In the PAD, the Economic Rate of Return (ERR) for this project was estimated at 21.6% with a net present value of INR6.6 billion calculated with a discount rate of 12% over a 30-year timeframe. The Financial Rate of Return (FRR) was estimated at 22.7%.
- A cost-benefit analysis was conducted assuming a 30-year project life. Annual incremental financial benefits (undiscounted) from the project interventions were estimated at INR 3.3 billion and distributed as follows: (a) watershed treatment (15%); (b) plantations (44%); (c) irrigated and rainfed agriculture (23%); (d) animal husbandry (5%); (e) agribusiness (10%); and income generation activities by vulnerable groups (3%).
- Sensitivity Analysis. Project costs were increased up to 25% above the base level, and the three sources of benefits were decreased up to 25% below their base levels. Sustainability impacts were captured through reduced flows of project benefits by up to one-third of the project life, and a delay in project implementation of up to two years was considered. The different scenarios showed that the ERR varied between 13.4% and 19.7%. The risk model predicted a 0.83 probability of the ERR exceeding 15% (PAD, paragraph 38).

ex-post

- The economic and financial analysis (EFA) at completion used the same methodology at appraisal, which was expected to ensure methodological consistency and comparability. The ERR was estimated at 22.7%, slightly higher than the appraisal estimate of 21.6%, with an NPV of Rs10384 million at a 12% opportunity cost of capital for 30-year project life. The Benefit-Cost Ratio (BCR) and the financial rate of

return (FRR) for the project as a whole were respectively 2.59 (no BCR was calculated at appraisal) and 26.67% (compared to 22.7% at appraisal).

- The ex-post ERR and FRR were higher relative to the ex-ante estimates, despite a lower irrigated area because the ex-post analysis applied a more realistic reflection of crops grown in the project area, including an increased share of high-value crops (ICR, Annex 4). The ICR (Annex 4) also noted that the project increased the income levels of beneficiary households by an estimated Rs.40,268 per annum.
- Sensitivity Analysis. Sensitivity analyses were conducted by testing the robustness of the ERR to changes in the projected benefits. Increasing costs by 20% and decreasing benefits by 20% reduced the ERR from 22.75% to 19.95% and 19.28%, respectively; a combination of the cost increase and benefit reduction caused the ERR to decrease to 16.88%. Limiting the project's benefits from arable and non-arable land to 75% reduced the ERR to 21% and 20.33%, respectively.
- Implementation Efficiency. The project closed with a four months delay, which was acceptable given the COVID-19 disruption. The average project cost per beneficiary household was US$ 3,016.95 (US$ 603.39 per beneficiary), corresponding to 79.86% of the cost per beneficiary household estimated at appraisal. The total project cost was 90.27% of the project cost estimated at appraisal.

Summary of Efficiency Assessment. The ex-post ERR at 22.7% slightly exceeded the ex-ante at 21.6%. The evidence also showed that the project was efficiently implemented within a reasonable timeframe and without cost overruns. Finally, the ex-post analysis was comprehensive and included enough evidence of benefits to justify the project investments. Therefore, Efficiency is rated Substantial.

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	✓	21.60	100.00 ☐ Not Applicable
ICR Estimate	✓	22.70	100.00 ☐ Not Applicable

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

6. Outcome

Relevance of Objectives was rated Substantial. Overall Efficacy was rated Substantial but with moderate shortcomings. The project exceeded the end targets for three out of five PDO outcome indicators, although it achieved 84% on PDO indicator 1 and 69% on PDO indicator 3. The project also met or exceeded target values for nearly all intermediate indicators. The project achieved additional resilience benefits, including carbon stock through soil carbon sequestration due to watershed treatments. Efficiency was rated Substantial. The ex-post

ERR at 22.7% slightly exceeded the ex-ante at 21.6%. The evidence also showed that the project was efficiently implemented within a reasonable timeframe and without cost overruns.

Based on the assigned ratings for the project's relevance, efficacy, and efficiency, the project had minor shortcomings, and its Outcome is therefore rated Satisfactory.

a. Outcome Rating
Satisfactory

7. Risk to Development Outcome

The ICR discussed one main risk that could potentially impact the Development Outcome:

Institutional risk. The decentralized micro-watershed management systems and community-based institutions are critical factors in mitigating risk to sustaining the development outcomes, as they secure deep bottom-up ownership of the institutional improvements introduced under the project. While the project demonstrated effective watershed management approaches to increase the efficiency of natural resources use and productivity, sustaining the outcomes achieved with respect to institutional capacities and critical productive assets created by the project will need further support (ICR, paragraph 75). This includes support through continued investments in natural resources protection, delivery of environmental services, adoption of productivity-enhancing technologies, and access to markets and related services to grow agribusinesses.

This Review considers there could also be the following risk:

Environmental risk. The micro-watersheds that received support under the project could still be vulnerable to extreme weather events that result from climate change. A comprehensive mitigation plan that emphasizes climate mitigation and adaptation efforts may therefore be appropriate to address climate change and associated disaster risks.

8. Assessment of Bank Performance

a. Quality-at-Entry

- **Strategic relevance and approach.** The project was strategically relevant and aligned with Bank strategies and Borrower priorities (see section 3 for more details). Watershed development continues to be a primary tool of the Government of India (GoI) to increase agricultural productivity and reduce rural poverty.
- **Technical, financial, and economic aspects.** The project design featured two types of broad interventions: (a) technical assistance; and (b) Gram Panchayat (GP) level investments through Gram Panchayat Watershed Development Plans (GPWDPs) that aimed to demonstrate efficiency in water and agricultural productivity. The project incorporated available technologies for improved

watershed management with particular emphasis on rainfed agriculture development backed by local hydrological monitoring systems. The project would also support farmer field schools (FFS) to showcase the various water management techniques and improved crop production technologies.

- **Poverty, gender, and social development aspects**. The project directly contributed to reducing poverty and promoting shared prosperity among the targeted beneficiaries. The project also promoted inclusiveness by ensuring the participation of vulnerable Groups (e.g., women, landless, scheduled castes, and tribal people) in GPWDP preparation and implementation.
- **Environmental and Fiduciary aspects.** The project design included appropriate environmental and social risk assessments with adequate mitigation strategies. Fiduciary aspects were also covered comprehensively in the PAD (Annex 3). Overall, financial management and procurement arrangements were adequate.
- **Implementation arrangements.** The project implemented an implementation mechanism with multidisciplinary teams, participatory facilitation, and comprehensive watershed planning. At the decentralized level, the project put in place the technical people at the divisional level, emphasizing staffing with strong agricultural backgrounds, drawing on the state's two agricultural universities and experience from the previous project. Overall, the project had adequate implementation arrangements.
- **Risk assessment.** Seven risks were identified at appraisal related to three main areas: stakeholders, implementation agency, and project-specific risks. The overall risk in project implementation was Moderate since this project was a repeater project of the well-performing Gramya I. Overall, risks were comprehensively assessed, and adequate mitigation measures were included at the design stage.
- **M&E arrangements.** M&E design built on the system established under Gramya I. M&E design reflected an adequate results framework, a Management Information System (MIS), a participatory M&E system, and third-party impacts assessments. However, assessing the efficient use of natural resources could have benefited from a more informed indicator. Also, the PDO indicators did not capture cumulative benefits from livelihood enhancement activities (ICR, paragraph 71).

Summary of QAE Assessment. The project was strategically relevant with a clear PDO. The project design benefited from the experience and lessons under the predecessor project (Gramya I). Design featured adequate environmental and fiduciary aspects. Implementation arrangements facilitated a smooth start after effectiveness. Risk assessment was thorough, with adequate mitigation measures. Finally, M&E arrangements were adequate but with minor shortcomings. Overall, Quality at Entry is rated as Satisfactory.

Quality-at-Entry Rating
Satisfactory

b. Quality of supervision

- The Bank conducted 16 implementation support missions (including two virtual missions during COVIDCOVID-19cording to the ICR (paragraph 72), "supervision of the project was continuous,

comprehensive, and responsive to the needs of the borrower, and contributed to the project team at critical points to adapt to the comprehensive development of rainfed areas."

- The Bank provided technical and operational support that focused on the project outcomes and expected impact. The project also benefited from timely Bank-support on procurement, financial management, and safeguards. The continuity of the Task Team Leader (TTL) throughout implementation provided stability throughout the implementation period. The project also benefited from the Bank's deployment of experienced and technically capable specialists, contributing to high-quality technical and scientific inputs (ICR, paragraph 73).

Summary of Quality of Supervision Assessment. The Bank team successfully guided the project implementation toward a successful outcome. However, the Bank Supervision should have attempted to address some M&E design shortcomings to measure the project outcomes comprehensively. Overall, the Bank supervision is rated as Satisfactory.

Based on the assigned Quality at Entry and Supervision ratings, Bank Performance is rated Satisfactory.

Quality of Supervision Rating
Satisfactory

Overall Bank Performance Rating
Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

- The PAD did not include a Theory of Change (ToC), which the Bank did not require at the time of appraisal. Nonetheless, the ICR included a retrospective ToC based on the project activities, outputs, and outcomes described in the PAD. However, the ToC did not include the underlying assumptions underpinning the achievement of the PDO. Also, while the ToC described activities that supported marketing and agribusiness, it lacked explicit connections between activities and the project’s expected outcomes.
- The achievement of the PDO was assessed by measuring five PDO outcome indicators; (i) increase in water discharge; (ii) increase in biomass; (iii) increase in rainfed area under irrigation; (iv) increase in productivity in irrigated and rainfed crops; and (v) direct project beneficiaries and the percentage of which are female. These indicators were directly associated with the PDO, measurable, most had reasonable targets, and included a baseline where relevant. However, the target for the increase in water discharge by 25% over seven years might have been too ambitious, considering that the target for year 6 was an increase of 15%,h jumped to 25% the following year (a 66% increase).
- The Results Framework also included ten intermediate results indicators (IRIs) to track and measure the different activities supported by the project. The IRIs were measurable and directly connected to the supported activities.
- Overall, the M&E design was adequate. However, the RF could have benefited from including indicators to assess the project's support of marketing and agribusiness activities, as well as

enhancing livelihood opportunities. Moreover, as the ICR noted, "a more informed indicator definition of efficient use of natural resources could have been established (paragraph 60)."

b. M&E Implementation

- M&E implementation was the responsibility of the Project Management Unit (PMU) at the Watershed Management Directorate (WMD). The project established and operated the M&E system at an early implementation stage. This was facilitated by building on the existing system from the Gramya I project, benefiting from the experience and capacity in WMD, and hiring third-party agencies for social, agriculture, economic, and hydrological aspects (ICR, paragraph 61).
- The project built up and expanded the WMD online MIS system and linked it to GIS, adding tools such as the Geotagging app, uploading all the GPWDP plans, and connecting direct reporting from eight divisions. Remote sensing imagery was also used for tracking interventions' progress. The MIS system incorporated the grievance redressal mechanism (GRM) linked to the state's project webpage for full disclosure (ICR, paragraph 62).
- The project relied on a third-party socio-economic team for data gathering and analysis for economic and financial analysis. Also, a third-party hydrological agency monitored a sample of GWDPs and micro-watersheds. Remote sensing imagery was also used for tracking interventions' progress.
- The project applied Participatory Monitoring and Evaluation (PME), encompassing the entire GPWDP planning and implementation. This process was checked every six months at the GP level in a participatory manner to assess: awareness about the project; inclusiveness and equity; transparency of process and benefits; financial management; grievance redressal; and physical verification of assets (ICR, paragraph 63).
- Overall, M&E implementation was effective and benefited from building on the established systems under the Gramya I project.

c. M&E Utilization

- The M&E system generated data that enabled the project management to track the progress of project activities. The project used the MGIS, Geotagging, and PME for accurate and up-to-date tracking of progress.
- Geo-tagging was also used to determine which project activities and other Government schemes contributed to local watershed and agriculture interventions. The PME helped build community ownership (ICR, paragraph 63).
- According to the ICR (paragraph 64), "the impact assessment and hydrological monitoring methods and their impact surveys were of high quality and done with considerable buy-in from project leadership."

Summary of M&E Quality. M&E design was adequate but had minor shortcomings. M&E implementation was effective and generated enough data to assess the achievement of the project outcomes. Utilization was demonstrated by using the project data to assess the impact of the project interventions on local watershed systems. Overall, M&E Quality is rated Substantial.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

The project was classified as an environmental Category B. It triggered the following environmental safeguard policies: Environmental Assessment (OP 4.01), Pest Management (OP 4.09), Forests OP/BP 4.36, Natural Habitats (OP/BP 4.04), and Physical Cultural Resources OP/BP 4.11. Also, one social safeguard policy was triggered: Indigenous Peoples (OP 4.10). Overall, the project activities were expected to have positive environmental and social impacts if planned, implemented, and designed with environmentally and socially sound practices. The project did not include any land acquisition or involuntary resettlement. All project investments, such as water harvesting structures, were implemented on private land. The Environmental and Social Management Framework (ESMF) of the Gramya I project was reviewed and updated and included an Environmental and Social Systems Assessment (ESSA). The ESSA was a tool for decision-making to promote environmental sustainability and equity, both of which are project outcomes.

Compliance with Environmental Safeguards. The ICR did not explicitly state the project's compliance with the Bank's environmental safeguards. The ICR (paragraph 67) stated that "environmental screening and training for all GP watershed development plans was carried out as per the provisions of the ESMF, revealing positive impacts on soil and water conservation and climate resilience."

Compliance with Social Safeguards. The ICR also did not explicitly state the project's compliance with the Bank's social safeguards. The tribal communities in two project districts were supported under Transhumant Action Plans (TAP) and as stipulated in ESMF. The grievance redressal process was "continuous, transparent, and participatory; overall, an integral part of the project's accountability and governance agenda (ICR, paragraph 68)."

b. Fiduciary Compliance

Financial Management (FM). According to the ICR (paragraph 69), "the project accounting systems worked efficiently and generated reports on a timely basis." Audit reports reported no negative observations in 7 years of project implementation, and the project did not experience cost overruns. The FM rating at project closing was Satisfactory.

Procurement. The ICR (Annex 5) reported that according to the Borrower, all procurement activities related to civil works were executed following the Bank's procurement guidelines. The ICR (paragraph 69) reported that all procurement contracts were completed by project completion. The procurement rating at project closing was Satisfactory.

c. Unintended impacts (Positive or Negative)

None.

d. Other

The project recognized the importance of institutionalizing services to farmer groups under clusters and, during implementation, encouraged the development of 10 agribusiness growth centers (ABGCs), which were not originally planned. The ABCGs were key for supporting groups in providing services and linkages to markets, promoting diversification and providing capacity-building assistance, branding recognized quality products from farmers (Gramyashree brand), assisting with quality control management, responding to market demands, and reducing logistics costs. The ABGCs were relatively new and were expected to need further support at the end of the project (ICR, paragraph 47).

11. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Satisfactory	Satisfactory	
Bank Performance	Satisfactory	Satisfactory	
Quality of M&E	High	Substantial	M&E design had minor shortcomings.
Quality of ICR	---	Substantial	

12. Lessons

The ICR included three lessons listed below. They have the potential for broader application in similar environments and are repeated with some adaptation of language:

1. Building climate change resilience through science-based planning can establish linkages and secure synergies between improved environment services and enhanced production systems. The project demonstrated the role of science-based planning in establishing linkages and securing synergies between improved environment services and enhanced production systems. Visible benefits accrued regarding expanding irrigation coverage while adopting new technologies to make the most of such services. Green technologies (such as solar pumps and micro-irrigation) reduced dependence on conventional fuels while sustaining water supplies under rainfed conditions.

2. Developing rainfed areas by applying an integrated watershed approach can create climate change mitigation and adaptation opportunities. By promoting the efficient use of natural

resources, the project improved the water's horizontal and lateral movements. It increased the area and production of biomass in both arable and non-arable areas. This led to carbon sequestration and reduced GHG emissions, which can be capitalized for improving rural livelihoods through payment for environmental services and linking with carbon credit markets.

3. Connecting agricultural surpluses with markets in a sustainable manner requires the promotion of agribusiness that involves incentivizing productivity and increasing income opportunities. While enhancing the system efficiencies, farmer-owned agribusiness ensures a platform for generating demand for local high-value products, maintaining sustained growth, diversity, and quality in production. The project experience demonstrated that Agri-Business Growth Centers (ABGC) is a promising model that provides services to farmers' groups (linkages to markets, promoting diversification and providing capacity building assistance, branding of recognized quality products from farmers, assisting with quality control management, and responding to market demands needs). ABGCs need to strengthen market intelligence to develop and expand producer-driven markets for diversified local production from rainfed areas.

13. Assessment Recommended?

Yes

Please Explain

A combined assessment of the two Gramya I & II phases is warranted. This would allow further verification of the effectiveness and sustainability of the project's approach to improving the efficiency of natural resource use and productivity of rainfed agriculture. Also, it would be an opportunity to generate further lessons that could be useful in informing similar Bank-funded operations.

14. Comments on Quality of ICR

Quality of Evidence. The ICR benefited from the data collected by the M&E system, which enabled tracking the progress of activities and assessing the achievement of the PDO.

Quality of Analysis. The ICR provided clear links between evidence and findings and used the evidence base to serve the arguments under the different sections, particularly the discussion on outcomes. However, the ICR included some claims related to livestock development that were not backed by evidence.

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

Results Orientation. The ICR included a comprehensive discussion on the achievement of the PDO. While the outcome discussion was slightly skewed towards achieving the PDO indicators, the ICR still adequately reported on what the project achieved on the ground.

Consistency with guidelines. The ICR used the available data to justify most of the assigned ratings. The ICR lacked an explicit statement on the project's compliance with the Bank's safeguard policies. Also, the discussion on safeguards did not cover all the triggered policies and nor did it assess whether all safeguard issues were adequately mitigated.

Conciseness. The ICR provided comprehensive coverage of project activities and candidly reported shortcomings in a concise and well-written 16 pages in the main body of the report.

Summary of the Quality of ICR Assessment. Overall, the ICR benefited from the evidence base generated through the project's M&E system, although targets for outputs were missing. It included a clear discussion on achieving outcomes and reflected relevant lessons. However, reporting on safeguard compliance was absent. Overall, the Quality of the ICR is rated Substantial, with minor shortcomings.

a. Quality of ICR Rating
Substantial