



1. Project Data

Project ID P127725	Project Name Bihar Kosi Basin Development Project		
Country India	Practice Area(Lead) Urban, Resilience and Land		
L/C/TF Number(s) IDA-56960	Closing Date (Original) 31-Mar-2023	Total Project Cost (USD) 169,311,285.72	
Bank Approval Date 08-Dec-2015	Closing Date (Actual) 27-Mar-2025		
	IBRD/IDA (USD)	Grants (USD)	
Original Commitment	250,000,000.00	0.00	
Revised Commitment	169,311,285.72	0.00	
Actual	169,311,285.72	0.00	
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2. Project Objectives and Components

a. Objectives

According to the PAD (p. ix) and the Financing Agreement of (January 20, 2016) (p. 5) the objective of the project was “to enhance resilience to floods and increase agricultural production and productivity in the targeted districts in the Kosi River Basin, and to enhance Bihar’s capacity to respond promptly and effectively to an eligible crisis or emergency.”

The original objective will be parsed as follows:



- i. to enhance resilience to floods in the targeted districts in the Kosi River Basin;
- ii. increase agricultural production and productivity in the targeted districts in the Kosi River Basin;
- iii. to enhance Bihar's capacity to respond promptly and effectively to an eligible crisis or emergency.

During the 2020 restructuring, the objective of the project was modified to “enhance resilience and connectivity to minimize impacts from floods in the targeted districts in the Kosi River Basin and to enhance Bihar's capacity to respond promptly and effectively to an eligible crisis or emergency” to reflect the rescoping of component 2 on agricultural productivity and competitiveness.

The revised objective will be parsed as follows:

- i. enhance resilience to minimize impacts from floods in the targeted districts in the Kosi River Basin;
- ii. enhance connectivity to minimize impacts from floods in the targeted districts in the Kosi River Basin;
- iii. enhance Bihar's capacity to respond promptly and effectively to an eligible crisis or emergency.

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

Yes

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

Yes

Date of Board Approval

01-Jun-2020

c. Will a split evaluation be undertaken?

Yes

d. Components

The project included five components:

Component 1: Improving Flood Risk Management (appraisal estimate US\$ 66.67 million, actual US\$65.1 million): This component included two subcomponents:

Subcomponent 1.1 – Reinforcement of flood control infrastructure: This subcomponent was to strengthen and reinforce the existing weak and vulnerable flood control infrastructure in the Kosi River Basin. Investments were to primarily include: i) restoration/strengthening critical stretches of Eastern and Western Kosi embankments, approximately 45 km; ii) strengthening existing spurs that were severely damaged and protecting critical erosion-prone riverbanks; and iii) procurement of dredgers for management of silt deposits in the river system.

Subcomponent 1.2 – Support to strengthen institutional capacity to manage flood risk: This subcomponent was to strengthen and complement state-level capacity to understand, and manage, flood risks. The subcomponent was to finance the establishment of Center of Excellence, procurement of RTDAS (Real Time Data Acquisition System) and institutional strengthening.



Component 2: Enhancing Agricultural Productivity and Competitiveness (US\$ 50 million, actual US\$10.80 million): This component included three subcomponents:

Subcomponent 2.1: Intensification and Diversification of Agricultural Production Systems: This subcomponent was to promote agricultural intensification through: i) technology demonstration and diffusion; ii) increased water availability and efficiency via irrigation and other climate-smart approaches; and iii) improved agricultural inputs and practices packages.

When the project was restructured in 2020, this subcomponent was revised to provide matching grants to farmer interest groups for financing their business plans for increased agricultural productivity, intensification, diversification and competitiveness, through: i) demonstration and dissemination of use of new technologies; and ii) improved agricultural inputs and practices

Subcomponent 2.2: Strengthening of Agricultural Value Chains: This subcomponent was to facilitate produce aggregation and value-added activity through Agricultural Business Centers (ABCs) which were proposed, owned and operated by Producer Organizations with support from service providers.

When the project was restructured in 2020, this subcomponent was revised to: i) mobilizing farmer interest groups to form producer organizations; and ii) providing matching grants to producer organizations for establishing ABCs, including financing the respective ABC business plans for produce aggregation and the development of value-added activities.

Subcomponent 2.3: Institutional Development for Market-led Extension: This subcomponent was to promote and strengthen the Agriculture Technology Management Agency (ATMA) in each of the five targeted districts as well as strength farmer interest groups (FIGs) through technical support, training and financing of business plans.

When the project was restructured in 2020, this subcomponent was revised to: strengthening the institutional capacity of the Animal and Fisheries Resource Department (AFRD) in the targeted districts in order to promote the: i) convergence among state- and centrally-sponsored interventions in the agricultural sector; ii) inter-departmental coordination at district, block and village levels; iii) sectoral transformations from production-centered extension systems to market-oriented ones; iv) field-tests and scale-up of climate-resilient agricultural practices; v) analysis of value chains, market conducts and farmers' commercial options; and vi) establishment of partnerships with allied services such as financial institutions and insurance providers.

Component 3: Augmenting connectivity, US\$173 million (appraisal estimate US\$115.33 million, actual US\$90.3 million): This component included three subcomponents:

Subcomponent 3.1: Construction of roads: This subcomponent was to finance the construction of linking roads to major roads and the upgrading of rural roads to provide small villages (population less than 500) greater access to local markets. The sub-component was to be implemented in the targeted districts.

Subcomponent 3.2: Institutional strengthening activities at Rural Works Department (RWD): This subcomponent was to finance training in technical skills and management information systems for the staff of the RWD.



Subcomponent 3.3: Construction of bridges: This subcomponent was to finance the construction of small and medium bridges to provide greater access to local markets.

When the project was restructured in 2021, activities for institutional strengthening at RWD were cancelled and resources were re-allocated to physical works. Also, the total road length financed under the project was reduced to 330 kms from the original target of 400 kms.

Component 4: Contingent Emergency Response, US\$0 million: In case of an adverse natural event, this component was to draw resources from the unallocated expenditure category and/or allow the government to request the World Bank to re-categorize and reallocate financing from other project components to partially cover emergency response and recovery costs.

Component 5: Implementation Support (appraisal estimate US\$ 18.0 million, actual US\$3.1 million): This component would finance activities required for project implementation that would include incremental operating costs of Bihar Aapda Punarwas Evam Punarnirman Society (BAPEPS) and the Implementing Agencies (IAs).

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

Project Cost: The project was estimated to cost US\$629.50 million. Actual cost was US\$267.86 million. A total amount of US\$72.0 million was cancelled and US\$8.69 million remained undisbursed due to exchange rate savings and the inability to close some contracts financially.

Financing: The project was financed by IDA credit in the amount of US\$250.0 million of which US\$169.31 million was disbursed.

Borrower Contribution: Local communities were to contribute US\$1.50 million. Actual contribution was US\$14.87 million. The Borrower was to provide financing in the amount of US\$125.0 million. Actual contribution was US\$83.68 million.

Dates:

The project was restructured four times:

- On June 1, 2020, the project was restructured (level 1) to: i) modify the PDO to “enhance resilience and connectivity to minimize impacts from floods in the targeted districts in the Kosi River Basin and to enhance Bihar’s capacity to respond promptly and effectively to an eligible crisis or emergency” to reflect the rescoping of component 2 on agricultural productivity and competitiveness.; ii) drop several investments under component 2 including improving irrigation technologies, farm-based inputs and practices, crop related FIGs and strengthening Agriculture Technology Management Agency’s (ATMAs) for market-led extension; iii) revise the PDO indicators (drop two and add one) to reflect the changes in component 2 and revise one intermediate outcome indicator into one PDO indicator; and iv) cancel US\$44.0 million to respond to the government’s request which had implemented schemes under component 2 through its own financing.
- On December 24, 2021, the project was restructured (level 2) to: i) cancel institutional strengthening of the Rural Works Department (RWD); ii) reduce target by about 70 kms (for roads under component 3) since the government the completed 120 kms of the initially planned road length (400



kms) using its own resources; iii) cancel US\$24.0 million due to exchange rate savings that were not to be utilized; iv) modify the Results Framework to reflect those changes (i.e. reduce targets and add indicators to better capture the impact of project activities).

- On March 11, 2023: the project was restructured (level 2) to extend the implementation period by 15 months due to delays as a result of lacking coordination between the Project Management Unit (PMU) and the AFRD (Project Implementation Unit (PIU)) and to COVID-19 pandemic.
- On June 3, 2024, the project was restructured (level 2) to: i) cancel US\$4.0 million due to change in exchange rate savings against the US Dollar; ii) extend the project's closing date by nine months to allow for the completion of project activities under components 1 and 2 which had been delayed. The project paper did not state the reason for the delay.

The project was approved on December 8, 2015, and became effective on March 17, 2016. The project's original closing date was March 31, 2023, and its actual closing date was July 27, 2025.

3. Relevance of Objectives

Rationale

Country/region and sector context. According to the PAD (para. 1), at the time of appraisal, Bihar had 103 million inhabitants and a per capita income at a quarter of national average (US\$360 in Bihar, compared to US\$1,477 in India). Bihar lagged behind other Indian states in human and economic development with a poverty rate of 56 percent among the rural population, one of the highest in the developing world. Literacy rates were at 73 percent among men (82 percent at national level) and 53 percent among women (53 percent at national level), the lowest in India. While agriculture and related activities employed approximately 80 percent of Bihar's total labor force, the sector only contributed 20 percent of the State's Gross Domestic Product (GDP).

According to the ICR (para. 2), Bihar was India's most flood-prone state, with 76 percent of the total population living under a recurring threat of floods. In 2008, Bihar experienced devastating floods from the Kosi river, affecting over 3.3 million people and caused over US\$1.2 billion in damage. According to the Post Disaster Needs Assessment, more than 330,000 houses, 1,800 km of paved and unpaved roads, and 1,100 bridges and culverts were damaged. Approximately 600,000 acres of crops were ruined, impacting close to 500,000 farmers. As a result, the government of Bihar requested the World Bank's assistance to: i) address the short-term needs of the flood-affected population, and ii) tackle the longer-term challenges of enhancing capacity to manage floods and investing in economic development. This project is one of two projects including the Bihar Kosi Flood recovery project which became effective in 2010 and aimed to address immediate recovery needs and to start building long-term resilience.

Alignment with the Government strategy. The objectives of the project were in line with the government's Agricultural Road Map (2012-2017), which focused on food and nutrition security, increase in the income of farmers, employment generation and control on migration of workers, inclusive human base of agricultural development and extensive participation of women, and conservation of natural resources and their sustainable use. The roadmap also emphasized increasing productivity through improvements in power and road infrastructure.



According to the PAD (para. 8), following the 2008 Kosi River Flood, the government of Bihar requested assistance from the Bank: i) to address the short-term needs of the flood-affected population, and ii) to tackle the longer-term challenges of enhancing capacity to manage floods and investing in economic development.

Alignment with the World Bank strategy. The objectives of the project were in line with the World Bank's most recent Country Partnership Framework (FY2018-25) and Focus area 1 "resource efficient growth" especially under objective 1.5 "to create resilient infrastructure, build state and local level Disaster Risk Management (DRM) institutions, and build capacity for disaster risk reduction and emergency preparedness". Furthermore, the Systematic Country Diagnostic for India (2024) indicated increasing water stress as a key emerging problem requiring improved water and disaster risk monitoring. The World Bank was experienced in enhancing capacity to manage floods and investing in economic development in India through a previous project in this operational area (Bihar Kosi Flood Recovery Project Ganges River Basin Project, Ganges River Basin Study, National Rural Livelihoods Project).

The original and revised objectives addressed key development issues and were pitched at the outcome level, which was appropriate.

Rating

High

4. Achievement of Objectives (Efficacy)

OBJECTIVE 1

Objective

Enhance resilience to floods in the targeted districts in the Kosi River Basin

Rationale

Theory of Change: The project's theory of change stated that project activities/inputs such as strengthening and reinforcing the existing weak and vulnerable flood control infrastructure in the Kosi River Basin, strengthening and complementing state-level capacity in flood risk management, setting up a flood forecast system, and constructing roads and bridges would lead to several outputs. These outputs included embankment stretches and spurs reinforced, Water Resource Department (WRD) staff trained, a flood forecast system established and functional, and roads and bridges constructed. These outputs in turn would lead to the outcome of enhanced resilience to floods in the targeted districts in the Kosi River Basin.

The theory of change was sound and did not have any logical gaps. According to the ICR (figure 1), the project made the following assumptions that applied to all objectives: i) no high intensity disaster event affects project operations and if, its impact can be timely addressed through CERC; ii) contractors with sufficient capacities to undertake the flood protection works with improved designs would be available and interested;



and iii) farmers and farmer collectives would be willing and able to provide matching grants for implementing their business plans.

The project used the following PDO indicator to measure the achievement of this objective:

- Area protected by improved flood protection measures (hectares).

The project used the following intermediate outcome indicators:

- km of embankment strengthened;
- WRD staff trained to use flood management technologies.

While these indicators were appropriate, they did not measure all outputs delivered under this objective.

Outputs:

- 28.14 km of embankment were strengthened, not achieving the original target.
- 150 WRD staff were trained to use flood management technologies, not achieving the original target of 200 staff.

The following outputs were not included in the Results Framework:

- The Mathematical Modelling Center was established. A flood forecast system was installed to monitor river dynamics, forecast floods, and make evidence-based investment decisions.
- The Physical Modelling Center was constructed at Birpur. The Center is responsible for water resource management and hydrology in Eastern India, focusing on flood forecasting, silt management, and providing training for Water Resources Department (WRD) officials.

Outcomes:

- 99,414 hectares of area were protected by improved flood protection measures, exceeding the original target of 4,500 hectares.

The following outcome was not included in the Results Framework:

- The flood forecast has improved its forecasting from generating three-day to five-day flood forecasts. Furthermore, breach scenario simulations and planform prediction tools were developed to assess embankment risks and river channel shifts. This output lacked a target.

While the project was able to improve flood protection measures for a significantly larger area than originally planned, it was not able to improve/build infrastructure such as embankments, as originally planned, making it difficult to attribute the outcome under this objective entirely to activities financed by the project.

Therefore, achievement of this original objective is rated **Substantial**.



Rating

Substantial

OBJECTIVE 1 REVISION 1

Revised Objective

Enhance resilience to minimize impacts from floods in the targeted districts in the Kosi River Basin

Revised Rationale

Theory of change: The theory of change under the revised objective remained the same except that one activity was added, acquiring dredgers (which was dropped in 2018). However, while the original Objective 2 “increase agricultural production and productivity” was dropped from the PDO statement, the activities under that objective were implemented after the restructuring under this objective. Also, while under the original objective “enhancing resilience” only referred to strengthening infrastructure, under the revised objective, it referred to infrastructure and livelihoods.

The project used the following PDO indicator to measure the achievement of this objective:

- Area protected by improved flood protection measures (hectares);
- Rural households that have diversified ad/or strengthened their livelihood portfolio.

The project used the following intermediate outcome indicators:

- Farmers organized in FIGS;
- Producers/Reres supported directly to build livestock and fishery assets;
- Women/marginal producers directly supported to build livestock and fishery assets.

Outputs:

- 27,005 farmers were organized in FIGs, exceeding the target of 13,000 farmers. Of those farmers, 9,170 were female, exceeding the target of 6,000 farmers being female. This output was more relevant to Objective 2 (which was however revised, post-restructuring).
- 7,557 producers/rearers were directly supported to build livestock and fishery assets, not achieving the target of 14,000 producers/rearers.
- 6,024 women/marginal producers were directly supported to build livestock and fishery assets, not achieving the target of 10,000 women/marginal producers.

The following outputs were not included in the Results Framework:

- The project established 15 Farmer Producer Companies (FPCs) which had a cumulative turnover of US\$4.0 million within 1.5 years.
- The project established:
 - 874 broiler poultry units
 - 782 goat farms
 - 2,864 dairy units
 - 1,186 integrated fish farms



Outcomes:

- 99,414 hectares of area were protected by improved flood protection measures, exceeding the revised target of 92,000 hectares.
- 29,876 households were able to diversify and/or strengthen their livelihood portfolio, exceeding the target of 25,000 households. The project established 874 broiler poultry units, 782 goat farms, 2,864 diary units, and over 1,186 integrated fish farms which enabled 7,705 households to generate regular incomes from non-farm activities. Also, the project provided training to 20,000 producers.
- The project benefitted 4,375,977 beneficiaries, exceeding the target of 3,700,000 beneficiaries.

The project was able to improve flood protection measures and support households in diversifying and/or strengthening their livelihoods portfolio. However, the project was not able to support producers through livestock and fisheries assets to the extent planned. Also, it is not clear to what extent the achievement of farmers being organized in FIGs or establishing FPCs impacted the outcome. Overall, achievement of the revised objective was **Substantial**.

Revised Rating

Substantial

OBJECTIVE 2

Objective

Increase agricultural production and productivity in the targeted districts in the Kosi River Basin

Rationale

Theory of Change: The project's theory of change stated that project activities/inputs such as mobilizing farmer interest groups (FIGs) and providing matching grants for their business plans as well as mobilizing FIGs into producer organizations (POs) would result in several outputs. These outputs included: farmers having access to better technologies and other inputs and POs and agriculture business centers being established, as well as farmers being trained. These outputs were intended to result in the outcome of agricultural production and productivity in the targeted districts in the Kosi River Basin being increased.

The theory of change was sound and did not have any logical gaps. However, the investments with the Department of Agriculture were cancelled during the first restructuring, in 2020, due to reprioritization by the government, partly because similar schemes were being executed at the time by the government through use of other resources. According to the Restructuring Project Paper, 2020 (para. 5), under Subcomponent 2.1 (Intensification & Diversification of Agricultural Production Systems), the allocated financing had not been committed mainly due to reprioritization by the Government. Under subcomponent 2.2 (Strengthening of Agriculture value chains) and subcomponent 2.3 (Institutional development for market-led extension), the department was able to provide farmers alternate livelihoods like goat rearing, broiler farming and fish farming. However, by the time of project restructuring, implementation progress had proved to be very slow, and less than 2 percent of Component 2 financing had actually been spent.

Based on this, achievement of this objective is rated **Negligible**.



Rating
Negligible

OBJECTIVE 2 REVISION 1

Revised Objective

Enhance connectivity to minimize impacts from floods in the targeted districts in the Kosi River Basin

Revised Rationale

Theory of change: The project's theory of change stated that project activities/inputs such as building bridges and roads as well as training RWD staff in technical skills and management information systems were to result in several outputs. These outputs were to include all-weather bridges and roads being built and RWD's capacity being strengthened resulting in the outcome of enhanced connectivity to minimize impacts from floods in the targeted districts in the Kosi River Basin.

The theory of change was sound and did not have any logical gaps. The key assumptions stated under Objective 1 also applied to this objective. However, it is not absolutely clear why this objective was so drastically modified. According to the Restructuring Paper (para. 15), the changes were on account of the cancellation of allocation to component 2. This is however an incomplete explanation of the reasoning behind this change.

The project used the following PDO indicator to measure the achievement of this objective:

- Increased access of the population to markets by roads and bridges that are in good and fair condition.

The project used the following intermediate outcome indicators:

- New bridges constructed.
- Rural roads constructed.
- 59 bridges were constructed, exceeding the original target of 58 bridges.
- 324 km of roads were constructed, not achieving the original target of 400 km.

Outcomes:

- 3,903,949 people had increased access to markets by roads and bridges that were in good and fair condition, exceeding the target of 3 million people. Of those people, 1,868,522 women and socially excluded farmers had increased access to markets by roads and bridges that were in good and fair condition.
- The project was able to increase access to markets, educational facilities, health facilities and railways/bus stations even though the planned length of roads was not constructed. Overall, achievement of this objective was **Substantial**.

Revised Rating



Substantial

OBJECTIVE 3

Objective

Enhance Bihar’s capacity to respond promptly and effectively to an eligible crisis or emergency

Rationale

This objective was to be financed through the Contingent Emergency Response Component (CERC), which was not triggered since no eligible crisis or emergency occurred during project implementation. This component would have drawn resources from the unallocated expenditure category and/or allow the government of Bihar to request the World Bank to re-categorize and reallocate financing from other project components to partially cover emergency response and recovery costs.

Rating

Not Rated/Not Applicable

OVERALL EFFICACY

Rationale

Original objective: Achievement of the first original objective was rated Substantial, while achievement of the second original objective was rated Negligible, resulting in an overall Efficacy rating of Modest.

Overall Efficacy Rating

Modest

Primary Reason

Low achievement

OVERALL EFFICACY REVISION 1

Overall Efficacy Revision 1 Rationale

Revised objective: Achievement of both objectives was Substantial resulting in an overall Efficacy rating of Substantial.

Overall Efficacy Revision 1 Rating

Substantial



5. Efficiency

Economic efficiency:

The PAD and the ICR conducted an economic analysis. The PAD (para. 45) identified the quantifiable benefits of the project as: i) reduced flood damage to infrastructure in the Kosi River Basin due to flood control investments; ii) increased movement of people and goods due to transportation investments; and iii) increased annual output and productivity due to irrigation and agriculture investments. Quantification for the above benefits was based on: i) value of assets in areas flooded, as measured by data gathered by the government of Bihar on the frequency of occurrence and historical damages related to flood events; ii) savings in operational costs, time, and commercial gains achieved by all-weather roads built in good and fair condition, as measured by the data gathered through the government of India and a World Bank-financed Rural Roads Project; and iii) increase in agricultural productivity due to greater availability of water and seed-input packages, as measured by data gathered through World Bank-financed projects in nearby Assam and West Bengal.

Applying a discount rate of 12 percent, the Net Present Value (NPV) was calculated at US\$65.19 million and an Economic Rate of Return (ERR) of 22.4 percent, indicating that the project was a worthwhile investment.

The ICR (para. 39) conducted an economic analysis that focused on infrastructure investments in components 1 and 3 which comprised 87 percent of the project costs. The analysis was based on the assumptions that the economic life of the infrastructure built under the project was 25 years after the end of the project and the operation and maintenance costs after the project completion was to be 1 percent of the project component costs. The analysis applied a five percent and 10 percent discount rate resulting in an NPV in the range of US\$349.7 to US\$770.4million, an Economic Internal Rate of Return (EIRR) for the infrastructure assets built under the project of 42 percent, and a benefit-cost ratio in the range of 3.1 and 4.7 indicating that the project was a worthwhile investment.

The ICR (p. 31) stated that the difference in results between PAD and ICR were due to earlier than expected accumulation of benefits.

Administrative and Operational efficiency:

The project's implementation period was extended twice by a total of 24 months due to delays as a result of lacking coordination between the PMU and the AFRD (PIU) and to COVID-19 pandemic. During the project restructuring, the government requested the World Bank to cancel US\$44 million of World Bank financing since the government had implemented schemes under component 2 through its own financing. Furthermore, according to the ICR (para. 50), the project experienced significant issues in regards to safeguards compliance, resulting in higher transaction costs and delayed contracts closures in some sub-projects. Also, even though component 2 only accounted for one fifth of the project cost at appraisal, its implementation issues resulted in overall inefficiencies that continued until project closure. It took the project five years after effectiveness to have staff and technical agencies in place to start the implementation of activities under this component.

Under Component 5, project management only needed 16 percent of the financing allocated at appraisal. This was partly a result of this project overlapping with the Bihar Kosi Flood Recovery project and sharing the same PMU as the Bihar Kosi Basin Development project.

Despite the project's implementation issues, the ERR calculated in the PAD and in the ICR indicate that the project was cost effective. The ahead-of-schedule realization of benefits from the project's infrastructure



investments had a positive impact on the ERR calculated at completion. As such, the project's overall 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	✓	22.40	100.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	42.00	87.00 <input type="checkbox"/> Not Applicable

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

6. Outcome

Original objective: Relevance of the objective was High. Efficacy was rated Modest and Efficiency was rated Substantial resulting in an overall outcome of Moderately Unsatisfactory.

Revised objective: Relevance of the revised objective was High. Efficacy and Efficiency were rated Substantial resulting in an overall outcome of Satisfactory.

Given that the objective of the project was changed during implementation, a split rating is required.

	Original PDO	Revised PDO
Relevance of Objective	High	High
Efficacy	Modest	Substantial
Objective 1	Substantial	Substantial
Objective 2	Negligible	Substantial
Efficiency	Substantial	Substantial
Outcome rating	Moderately Unsatisfactory	Satisfactory
Numerical value of outcome rating	3	5
Disbursement % at time of restructuring	50.5%	49.5%
Weighted value of the outcome rating	3x0.50=1.50	5x0.49=2.45
Final outcome rating	1.560+2.45=3.95 Moderately Satisfactory	



Based on the table above, the overall outcome rating of the project is Moderately Satisfactory.

a. Outcome Rating
Moderately Satisfactory

7. Risk to Development Outcome

The project's risks to development outcomes can be classified into the following categories:

Government commitment: According to the World Bank team (December 19, 2025), the government continues to remain committed to the objective and to deepening and expanding the achievements of the project, both through government-funded schemes and the recently negotiated Bihar Water Security and Irrigation Modernization Project, which will expand the work related to embankment strengthening and Mathematical Modelling Center undertaken in this project, including other river basins as well as other hazards such as drought.

Financing: According to the ICR (para. 70), the sustainability of the project faces financing risks because fully operationalizing the PMC will require dedicated and ongoing funding, and no budget had been allocated for TSAs at project closure. Without secured financial resources, key project structures may not be maintained, potentially undermining long-term outcomes.

Technical: The long-term success of producer organizations and FPCs depends on continued access to technical support. Without sufficient human resources or ongoing technical assistance, these groups may struggle to maintain their operations and sustain the progress achieved during the project. According to the ICR (para. 44), while the construction was completed, the Physical Modelling Center at Birpur was not operational by the time of project closure and training of WRD staff on physical modelling had not taken place yet.

8. Assessment of Bank Performance

a. Quality-at-Entry

According to the PAD (para. 32), the project was built on lessons learned from a report by the Independent Evaluation Group (IEG) on World Bank engagement at the state level in Brazil, India, Nigeria and Russia (2010), which found that multi-sector lending is most effective for targeting state-level objectives. Also, the report found that close engagement with other multilateral/bilateral institutions was a critical success factor. The report found that multi-sector projects face considerable design risks given the high number of activities and geographic scope. To address this challenge, the project's targeted physical investments were situated in a confined geographic area, resulting in more tangible impact. Further, the number of activities was limited to ensure that institutional and capacity challenges are addressed through initiatives that promoted management of complex systems.



The PAD (para. 43-44) stated that the World Bank team identified relevant risks and rated the following as Substantial: i) technical design of project or program, due to project's complex and multisectoral design; ii) fiduciary, due to the PMU's limited fiduciary capacity; and iii) environmental and social, due to the potential impact of sub-projects. The project mitigated these risks by promoting the coordination between line departments and identifying a nodal officer to interact with the PMU (Bihar Aapda Punarwas Evam Punarnirman Society (BAPEPS)), build capacity within the PMU as well as establishing safeguard management measures. However, the World Bank team rated the risk "Institutional capacity for implementation and sustainability" only as Moderate, despite issues related to weak capacity in the previous project. Also, the mitigation measures for the environmental and social risks were not sufficient, resulting in significant safeguards compliance issues during implementation. In addition, there seems to have been a disconnect in project design between what the World Bank team wanted to do versus what the government was interested in doing. This disconnect was demonstrated through the government using other financial resources to implement most of the schemes, that were included in the project's original design under Component 2, resulting in the cancellation of US\$34 million (13.6 percent of total World Bank financing).

According to the ICR (para. 48), the project's readiness for implementation was high for Components 1 and 3 but not for Component 2, where staffing or institutional arrangements for the complex implementation arrangements were not in place by the time the project became effective.

The Results Framework had several shortcomings including the revised objective and theory of change not being sufficiently clear (see section 9a for more details).

Quality-at-Entry Rating Moderately Satisfactory

b. Quality of supervision

The World Bank team conducted 17 supervision missions throughout the project's nine-year implementation period. According to the ICR (para. 68), the World Bank team reported implementation bottlenecks such as delays in the appointment of internal auditors and Financial Management staff, and delays in the implementation of component 2 as well as progress towards achieving the project's objective effectively.

According to the ICR (para. 52), between 2019 and 2023, the project faced serious safeguards non-compliance issues (see section 10a for more details). The World Bank team identified these issues and the lack of a functioning Grievance Redress Mechanism only during the Mid Term Review (MTR) in 2019. The World Bank team addressed these issues by providing intense technical support and was able to resolve these issues by the time the project closed. During the MTR, the World Bank team also took corrective actions to revise the Results Framework, ensure payments to project affected persons and started to prepare for the first project restructuring.



Quality of Supervision Rating

Moderately Satisfactory

Overall Bank Performance Rating

Moderately Satisfactory

9. M&E Design, Implementation, & Utilization

a. M&E Design

The project's original objective was clearly specified. However, while under the original objective "enhancing resilience" only referred to strengthening infrastructure, under the revised objective it referred to enhancing infrastructure and livelihoods. Also, while the original theory of change was clear on how key activities and outputs were to lead to the intended outcomes, the revised theory of change did not state how agricultural production and productivity related activities were to lead to the revised objective that had dropped the sub-objective to "increase agricultural production and productivity". The original Results Framework included PDO level indicators to assess "enhance resilience" and "increase agricultural production and productivity" while the revised Results Framework included PDO level indicators to measure "enhance resilience" and "enhance connectivity".

The intermediate outcome indicators were adequate to reflect the project's outputs toward achieving the objective. While most indicators were sufficiently specific, measurable, achievable, relevant and timebound, most indicators lacked a baseline. Also, for example, PDO indicator 1 "area protected by improved flood protection measures" or PDO indicator 2 "rural households that have diversified and/or strengthened their livelihood portfolio" would have benefited from also providing a comparison in terms of a percentage out of total area/households in the targeted area. Also, the Results Framework did not include an intermediate outcome indicator to measure achievements under subcomponent 2.3 (institutional strengthening activities at RWD) and would have benefitted from measuring e.g. number of RWD staff trained as well as under the first objective "number of reliable flood forecast days".

According to the PAD (para. 38), the project's M&E activities were to include process reviews, accounting audits, social audits, reporting of outputs, and maintenance of records.

b. M&E Implementation

According to the ICR (para. 58), after the Mid-Term Review (TR), the project's M&E activities improved significantly. For example, the Project Management Unit (PMU) started delivering progress reports on a monthly basis identifying implementation bottlenecks. Also, the project implemented third-party monitoring processes in place including the audits of works, financial audits, as well as safeguard audits. While the PMU was responsible for the consolidation of progress reports and coordinating with the Implementing Agencies (IAs), third party monitoring provided data from field observations.

The ICR (para. 59) stated that while AFRD developed a highly functional excel-based monitoring tool for monitoring implementation progress of component 2, the project would have benefited from a web based



real-time Management Information System (MIS). Furthermore, the project had planned to conduct baseline surveys for component 2. However, they were never conducted.

According to the World Bank team (December 19, 2025), some inconsistencies in reporting were found during the supervision missions, which were addressed through the efforts of the PMU and the World Bank team. At closure, the M&E data was found to be very detailed and consistent (for example, the project had detailed monthly progress review reports since 2019 documenting the status of every contract and previously agreed actions).

The World Bank team stated (December 19, 2025) that the M&E processes and functions related to overall project management will not continue after project closure as the project management unit was constituted for the purposes of this project alone. However, the individual assets and activities of the IAs (embankments, roads, bridges, livelihoods assets and producer collectives) will continue to be monitored under the regular programs of WRD and AFRD.

c. M&E Utilization

According to the ICR (para. 60) the project's M&E data informed project management and decisions. For example, M&E data were used for selecting embankment stretches for strengthening based on emerging vulnerabilities as well as including livestock insurance based on emerging instances of goat and cattle life loss.

M&E Quality Rating

Substantial

10. Other Issues

a. Safeguards

The project was classified as category A and triggered the World Bank's safeguard policies OP/BP 4.01 (Environmental Assessment), OP/BP 4.04 (Natural Habitats), OP/BP 4.09 (Pest Management), OP/BP 4.12 (Involuntary Resettlement), OP/BP 4.11 (Physical Cultural Resources), OP/BP 7.50 (Project on International Waterways) and OP/BP 17.50 (Policy on disclosure of Information). According to the ICR (para. 62), the project designed an Environmental and Social Management Framework (ESMF) which identified specific measures for managing impacts such as soil erosion, water quality, and biodiversity. Also, the project developed a Pest Management Plan and a Resettlement Policy Framework.

According to the ICR (para. 52), the project did not comply with the World Bank's social safeguards during the 2019-2023 period due to civil works on bridges, roads and flood protection starting without the completion of Abbreviated Resettlement Action Plans (ARAPs) or payment of compensation to affected landowners at the construction sites. The Mid-Term Review (MTR) identified the weaknesses of the Grievance Redress Mechanism (GRM) and lack of coordination among the IAs in regards to safeguards. Also, until the MTR, the project had not complied with the legal commitments on staffing and conducting environmental and social safeguard audits. According to the World Bank team (December 19, 2025), the World Bank team addressed these issues by providing intense technical support. Furthermore, the World



Bank team pressed the client to commission a safeguards audit. This enabled a more granular identification of non-compliances across sub-projects, which were then tackled through a multi-pronged set of actions such as commissioning of a safeguards audit consultancy, on-boarding of a full-time social safeguard specialist, instating effective controls and influence of the PMU over PIUs with respect to safeguards, securing agreement from the government of Bihar regarding adoption of the national law which was aligned with OP/BP 4.12. Also, the project conducted extensive stakeholder consultations along the roads, bridges and embankment sites. The project was also able to resolve the issues related to OP/BP 4.12 (Involuntary Resettlement) by the time the project closed. However, according to the ICR (para. 52), the project only received seven grievances during its entire implementation period, indicating that beneficiaries might have lacked awareness about the GRM.

b. Fiduciary Compliance

Financial Management:

According to the ICR (para. 63) the project's Financial Management structure was based on lessons learned from the implementation of the Bihar Kosi Flood Recovery Project (BKFRP). The ICR further stated that the Interim Unaudited Financial Reports (IUFRs) and internal and external audit reports were satisfactory and submitted in a timely manner. However, until the MTR, the project faced Financial Management related issues due to limited staff, delay in appointing internal auditors, lack of convening meetings of the Executive Committee at BAPEPS (which was responsible for overall project oversight and enabled convergence between the project, BKFRP, Bihar Rural Livelihoods Mission (BRLM) and other schemes of the government of Bihar during implementation), and dispersed implementing units. According to the World Bank team (December 19, 2025), the World Bank team addressed these issues by intensifying its Financial Management support.

According to the World Bank team (December 19, 2025), the external auditor's opinions were unqualified.

When the project closed, Financial Management was rated Moderately Satisfactory.

Procurement:

According to the ICR (para. 64), the project complied with the World Bank's procurement guidelines. However, the project experienced issues due to limited availability of qualified contractors for carrying out flood protection works resulting in initial bidding delays. The project addressed these issues by adjusting the bidding documents in line with the procurement guidelines. Also, according to the World Bank team (December 19, 2025), in June 2018, the project's procurement performance was downgraded to Moderately Satisfactory due to the lack of uploading all documents on the World Bank's procurement program STEP. This issue was addressed appropriately and the procurement rating was Satisfactory in the last four Implementation Support Reviews (ISRs) before project closure.

When the project closed, procurement was rated Satisfactory.



c. Unintended impacts (Positive or Negative)

NA

d. Other

11. Ratings

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

12. Lessons

The ICR included several useful lessons learned (para. 71-74), which were adapted by IEG:

- **Effective institution building is most successful when pursued as a sustained, strategic, and long-term effort, as developing technical capacity, operationalizing systems, and embedding institutional processes takes time.** The Bihar Kosi projects demonstrated that iterative learning, continuous technical support, and collaboration across multiple initiatives—including BKFRP, BKDBP, SAWI, and NHP—enabled the MMC to advance from one-day to five-day flood forecasts. Building a skilled workforce and robust operational systems required patience and phased implementation, highlighting that state-capacity outcomes are strengthened through sequential projects. Additionally, post-disaster contexts can be leveraged to enhance resilience in underdeveloped regions, generating lasting impact beyond the project’s financing.
- **Flood forecasting resilience depends on strong forward and backward linkages.** The project improved forecasts by integrating multiple data sources (backward linkage), but early warning dissemination to communities and user agencies remained limited—only 16% of respondents received timely warnings. Maximizing impact requires ensuring risk information reaches all end-users, linking technical advances to practical use.
- **Rural livelihoods and poverty reduction are most effective when interventions actively include the poorest households and provide strong grassroots implementation support.** While matching grants can foster ownership, they may unintentionally exclude the poorest due to limited financial capacity, as seen in the low uptake of livelihoods sub-projects in the Kosi basin.
- **Multi-sectoral initiatives are most effective when supported by high-level government endorsement, strong inter-agency coordination, and dedicated staffing for key**



functions. In this project, the PMU- BAPEPS played a crucial role in coordinating activities and ensuring compliance with procurement, financial management, and safeguards requirements. However, its position outside core government departments limited its influence over sectoral priorities and cross-scheme convergence. Regular meetings of the Executive Committee with senior government representation were essential to resolve pending issues. This experience underscores that such initiatives should be either anchored within or overseen by influential government bodies to ensure cross-sectoral alignment and sustained ownership. Additionally, allocating dedicated staff for procurement, financial management, and safeguards from the outset helps prevent compliance gaps and supports proactive risk management.

13. Assessment Recommended?

No

14. Comments on Quality of ICR

The ICR included an adequate overview of project preparation and implementation as well as an Economic analysis. The ICR was internally consistent and included useful lessons learned that can be applied to similar projects in the future. Overall, the quality of the ICR is rated Substantial.

a. Quality of ICR Rating

Substantial