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Report No: PAD4841

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US\$148 MILLION

TO

INDIA

FOR A

WEST BENGAL ACCELERATED DEVELOPMENT OF MINOR IRRIGATION PROJECT - PHASE II

MAY 18, 2023

Water Global Practice
South Asia Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2023)

Currency Unit = Indian Rupee (INR)

INR 82 = US\$1

FISCAL YEAR
April 1 to March 31

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ABBREVIATIONS AND ACRONYMS

AM	Accountability Mechanism
AWP	Annual Work Program
CAG	Controller and Auditor General
CPF	Country Partnership Framework
CPHS	Consumer Pyramid Household Surveys
CQS	Selection based on Consultant's Qualifications
DLIC	District-Level Implementation Committee
DPMU	District Project Management Unit
DS	Direct Selection
DWRID	Department of Water Resources Investigation and Development
E&S	Environmental and Social
EA	Economic Analysis
ENPV	Economic Net Present Value
ESCP	Environment and Social Commitment Plan
ESF	Environmental and Social Framework
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FBS	Selection under a Fixed Budget
FM	Financial Management
FPO	Farmer Producer Organization
GBV	Gender-Based Violence
GCRF	Global Crisis Response Framework
GDP	Gross Domestic Product
GeM	Government e Marketplace
GHG	Greenhouse Gas
GIS	Geographic Information System
GoI	Government of India
GoWB	Government of West Bengal
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
GSDP	Gross State Domestic Product
ha	Hectare
IA	Implementing Agency
IFMS	Integrated Financial Management System
IPF	Investment Project Financing
IUFR	Interim Unaudited Financial Report
LCS	Least-Cost Selection
M&E	Monitoring and Evaluation
MIS	Management Information System
NDC	Nationally Determined Contribution
O&M	Operation and Maintenance
PDO	Project Development Objective
PP	Procurement Plan
PPP	Purchasing Power Parity

PPSD	Project Procurement Strategy for Development
QBS	Quality-Based Selection
QCBS	Quality- and Cost-Based Selection
RFB	Request for Bids
RFQ	Request for Quotations
SCDMP	Scheme Cluster Development and Management Plan
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SH	Sexual Harassment
SHG	Self-Help Group
SLTSC	State-Level Technical Steering Committee
SO	Support Organization
SPMU	State Project Management Unit
STEP	Systematic Tracking of Exchanges in Procurement
WDS	Water Detention Structure
WUA	Water User Association

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
India	West Bengal Accelerated Development of Minor Irrigation Project - Phase II	
Project ID	Financing Instrument	Environmental and Social Risk Classification
P177876	Investment Project Financing	Moderate

Financing & Implementation Modalities

<input type="checkbox"/> Multiphase Programmatic Approach (MPA)	<input type="checkbox"/> Contingent Emergency Response Component (CERC)
<input type="checkbox"/> Series of Projects (SOP)	<input type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Performance-Based Conditions (PBCs)	<input type="checkbox"/> Small State(s)
<input type="checkbox"/> Financial Intermediaries (FI)	<input type="checkbox"/> Fragile within a non-fragile Country
<input type="checkbox"/> Project-Based Guarantee	<input type="checkbox"/> Conflict
<input type="checkbox"/> Deferred Drawdown	<input type="checkbox"/> Responding to Natural or Man-made Disaster
<input type="checkbox"/> Alternate Procurement Arrangements (APA)	<input type="checkbox"/> Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
09-Jun-2023	29-Jun-2029

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The PDO is to augment water availability and strengthen water user associations for improved irrigated agriculture in Project Areas of West Bengal.

Components

Component Name	Cost (US\$, millions)



A. Strengthening Community-based Institutions	14.00
B. Minor Irrigation Services	120.00
C. Agricultural Support Services	36.00
D. Project Management and Technical Support	41.00

Organizations

Borrower: India

Implementing Agency: DWRID, Government of West Bengal

PROJECT FINANCING DATA (US\$, Millions)

SUMMARY

Total Project Cost	211.00
Total Financing	211.00
of which IBRD/IDA	148.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	148.00
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Non-World Bank Group Financing

Counterpart Funding	63.00
Borrower/Recipient	63.00

Expected Disbursements (in US\$, Millions)

WB Fiscal Year	2023	2024	2025	2026	2027	2028	2029
Annual	0.00	10.00	20.00	25.00	30.00	30.00	33.00
Cumulative	0.00	10.00	30.00	55.00	85.00	115.00	148.00



INSTITUTIONAL DATA

Practice Area (Lead)	Contributing Practice Areas
Water	Agriculture and Food

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	● Low
2. Macroeconomic	● Moderate
3. Sector Strategies and Policies	● Low
4. Technical Design of Project or Program	● Moderate
5. Institutional Capacity for Implementation and Sustainability	● Substantial
6. Fiduciary	● Moderate
7. Environment and Social	● Moderate
8. Stakeholders	● Moderate
9. Other	
10. Overall	● Moderate

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[] Yes [✓] No

Does the project require any waivers of Bank policies?

[] Yes [✓] No

**Environmental and Social Standards Relevance Given its Context at the Time of Appraisal**

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Not Currently Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Relevant
Cultural Heritage	Relevant
Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description

The Project Implementing Entity shall, (a) no later than three months after the Effective Date, prepare, adopt, and thereafter maintain, throughout the implementation of the Project, the Project Operations Manual in form and with substance satisfactory to the Bank; and (b) carry out the Project in accordance with the Project Operations Manual.

Sections and Description

The Project Implementing Entity shall, no later than March 31, 2024, or such other time as agreed to in writing by the Bank, establish and thereafter maintain, throughout the Project implementation period, the WUA Cell within its DWRID with a composition, resources and mandate satisfactory to the Bank, as set forth in the Project Operations Manual.

Sections and Description

The Project Implementing Entity, through DWRID, shall maintain, at all times during Project implementation: (a) the



SPMU within DWRID's regular structure (Section I.B.2(a) of the Schedule to the Project Agreement); (b) District Level Implementation Committees (Section I.B.2(c) of the Schedule to the Project Agreement); (c) DPMUs at the district level (Section I.B.2(d) of the Schedule to the Project Agreement); and (d) the SLTSC (Section I.B.2(e) of the Schedule to the Project Agreement).

Sections and Description

(a) Prior to procurement and/or use of drones under the Project, the Project Implementing Entity shall: (i) notify the Bank of such proposed procurement and/or use, and afford the Bank a reasonable opportunity to assess any risks related to such procurement and/or use and to recommend appropriate mitigation measures; and (ii) develop a risk mitigation plan for the procurement and use of drones, if applicable, in form and substance acceptable to the Bank; (b) no drones shall be procured and/or used under the Project unless the Project Implementing Entity has implemented the risk mitigation measures in accordance with paragraph (a) above; and (c) no drones procured under the Project shall be used for any purpose other than those set out in Schedule 1 to the Loan Agreement.

Conditions

Type Disbursement	Financing source	Description
	IBRD/IDA	No withdrawal shall be made for payments made prior to the Signature Date, except that withdrawals up to an aggregate amount not to exceed US\$15,000,000 may be made for payments made prior to this date but on or after July 1, 2022, for Eligible Expenditures, following an environmental and social audit and implementation of corrective action plan(s), as applicable, both satisfactory to the Bank, showing that the pertinent obligations set forth in this Agreement and the Project Agreement, as applicable to each Eligible Expenditure, have been complied with.



I. STRATEGIC CONTEXT

A. Country Context

1. **India's growth is expected to moderate in FY23/24 to 6.3 percent, from an estimated 6.9 percent in FY22/23, due to easing consumption growth and global growth spillovers.** Despite the global growth slowdown, real gross domestic product (GDP) is expected to have expanded by 6.9 percent in FY22/23.¹ This robust growth was underpinned by buoyant private consumption in the first half of FY22/23 and strong expansion in investment activity supported by a sustained increase in public capital spending. In contrast, government consumption growth moderated due to the central government's commitment to reduce current spending. Robust domestic demand and elevated food prices kept headline inflation above the Reserve Bank of India's tolerance range of 2–6 percent in FY22/23. The growth momentum eased in the second half of FY22/23 as high inflation, higher borrowing costs, and global spillovers weighed on domestic demand and dampened exports growth. Real GDP growth is expected to moderate further to 6.3 percent in FY23/24. Consumption is likely to be constrained by rising borrowing costs, slower growth in incomes, and continued fiscal consolidation. The government's sustained investment push, healthy corporate profits, and a reduction in bank nonperforming loans will likely buoy investment despite reduced risk appetite and elevated input costs. Slowing imports growth and ongoing strength in services exports is expected to contribute to a narrowing of the current account deficit to 2.1 percent of GDP in FY23/24. Despite the increased public investment, the government is likely to continue pursuing fiscal consolidation. The general government deficit will decline to 8.7 percent in FY23/24 (9.4 percent: FY22/23), due to lower current spending and modest revenue growth, reflecting the withdrawal of pandemic-related support programs. The current level of the fiscal deficit stabilizes the debt-to-GDP ratio around 83 percent. The current level of the fiscal deficit stabilizes the debt-to-GDP ratio around 83 percent.
2. **India has made remarkable progress in reducing extreme poverty over the past two decades.** The share of the population living below US\$2.15 per person per day (2017 purchasing power parity [PPP]), or in extreme poverty, is estimated to have halved between 2011 and 2019.² However, the pace of poverty reduction has slowed in recent years, with key welfare indicators being slow to improve.³ These recent estimates suggest that the pandemic-induced spike in extreme poverty, of up to 4 percentage points, moderated in 2021/22. Facilitated by widespread access to vaccines, extreme poverty rates are estimated to have declined to 13.8 percent in 2021/22, although not as low as pre-pandemic levels. More than 40 percent of India's population lived below the lower-middle income poverty line (US\$3.65 per capita per day, 2017 PPP) even before the pandemic. Inequality in consumption has remained stable, with a Gini index of around 35 over the past two decades. Child malnutrition has remained high, with 35.5 percent of children under the age of 5 years being stunted and 67 percent of children aged 6–59 months

¹ World Bank real GDP forecasts published in India Development Update, April 2023.

² Estimates are based on the methodology documented in a World Bank Policy Research Working paper by Roy and van der Weide (2022), which relies on imputed consumption from the Consumer Pyramid Household Surveys (CPHS) implemented by the Centre for Monitoring the Indian Economy, a private data company. The CPHS sample is reweighted to make it more nationally representative. The series has been revised to incorporate recent survey years (Macro Poverty Outlook, Spring 2023). In 2004, India's extreme poverty rate was 39.9 percent using the same international poverty line. In 2011, this rate was 22.5 percent.

³ World Bank Poverty and Inequality Platform. <https://pip.worldbank.org/country-profiles/IND>.



being anemic during 2019–21.⁴ Headline employment indicators have improved since 2020, but concerns about job quality and real wage growth remain.⁵

3. West Bengal is India's second most densely populated state, and, with 96 million people, its fourth most populous. The state is the sixth largest contributor to India's net domestic product. The annual average growth rate of real gross state domestic product (GSDP) for the state was 6.4 percent in the five years between FY15/16 and FY19/20, in line with the national average. Despite the COVID-19 outbreak and the impact of Cyclone Amphan, the state's economy did not contract in FY20/21 and growth recovered in FY21/22. According to the provisional accounts for FY21/22, published by the Office of the Comptroller and Auditor General (CAG), the fiscal deficit moderated to 3.3 percent of GSDP, from 3.4 percent in FY20/21, owing to a recovery in revenues and lower-than-budgeted spending. The percentage of the population below the poverty line is 20 percent. However, there is significant variation within the state, with some districts showing much higher poverty rates in the range of 31 to 38 percent, especially in rural areas which remain much poorer than the cities. Due to the large size of the state's population, West Bengal also harbors the fourth largest absolute number of poor people among India's states.⁶

4. West Bengal is facing significant vulnerabilities to current and future climate change.⁷ Over the past decades, most of the districts in West Bengal have experienced increasing annual temperatures and decreasing annual precipitation, albeit with high spatial variability characterized by opposite trends in neighboring districts. By 2030, the state is likely to experience maximum and minimum temperature rises at different rates, leading to warmer weather with smaller diurnal differences. The weather pattern is expected to become more erratic, with heavy precipitation events and an increasing frequency of floods, cyclones, and droughts. The overall amount of water available from precipitation is expected to decline by 8–22 percent by 2030⁸, while the rate of evapotranspiration will increase, further exacerbating water scarcity.

B. Sectoral and Institutional Context

5. West Bengal's agricultural sector contributes an estimated 20 percent to the GSDP and employs over 40 percent of the workforce, but the average income of agriculture-dependent households is one of the lowest in India. The state's main crops in terms of area under cultivation include rice (65 percent), oilseeds (11 percent), pulses (6 percent), jute (6 percent), and potato (4 percent). It is one of the most important food-producing states in India, accounting for nearly 15 percent of rice (about 16 million tons per year) and 23 percent of potato production (about 11 million tons per year). It is also one of the largest vegetable-producing states (with a national share of 20–40 percent) and the second largest fish-producing state. Its strategies for economic growth, poverty reduction, and employment creation thus depend to a large extent on the agricultural sector. However, the state has large tracts of under-developed districts and tribal-dominated areas where small (with land size of one-two hectare (ha)) and marginal (land size less

⁴ Government of India, Ministry of Health and Family Welfare. 2022. National Family Health Survey 5, 2019–21 Report.

⁵ World Bank Macro Poverty Outlook. Spring 2023. Estimates from the periodic labor force survey data.

⁶ World Bank, West Bengal Poverty, Growth and Inequality, June 20, 2017.

⁷ Government of West Bengal, West Bengal State Action Plan on Climate Change 2017–2020.

http://www.environmentwb.gov.in/pdf/WBSAPCC_2017_20.pdf

⁸ NITI Ayog. 2019. Composite Water Index. http://social.niti.gov.in/uploads/sample/water_index_report2.pdf



than one ha) farmers⁹ have to rely on low-income sustenance farming. About 95 percent of the agricultural workforce in the state consists of small and marginal farmers, and the average income of agriculture-dependent households is INR 3,980 (US\$48) per household per month, significantly below the national average of INR 6,426 (US\$78).¹⁰

6. Improving farmer income through multi-seasonal crops and diversification will require development of water resources and suitable irrigation systems. West Bengal is richly endowed with water resources, with a large infrastructure development potential to harness water for irrigation and inland fisheries. The state has around 56 million ha cultivable land that could utilize more than 70 billion cubic meters (BCM) annually in irrigation. While the state's annual rainfall averages at 1,740 mm (or 113 BCM), accounting for 7.5 percent of India's total, as much as 76 percent falls in the three to four monsoon months. This necessitates surface storage structures, and so far, the state has developed 19.8 BCM capacity. In addition, it has relied heavily on groundwater potential of 30 BCM, particularly in the northern and southern regions where alluvium aquifers are prevalent. In general, this intense groundwater abstraction has increased the cost of cultivation and undermined sustainability of the underlying water resources.¹¹ Further, 15 million ha (or 26 percent of the cultivable area) remains rain-fed due to a lack of irrigation systems, especially in the dry western regions where groundwater potential is low.

7. Climate change is expected to amplify these challenges, posing threats to the state's natural resources and communities. Decreasing precipitation and increasing evapotranspiration are expected to have an impact on plant physiology and productivity with significant consequences for agriculture. Climate change is also expected to have a negative impact on key stages of horticultural production and increase the vulnerability of the fisheries sector. Further, working in hotter weather can increase incidences of morbidities due to climate change-exacerbated extreme heat for farmers, given that they work extended hours in the field.

8. The Government of West Bengal (GoWB) has successfully completed the World Bank-supported West Bengal Accelerated Development of Minor Irrigation Project (Phase I, P105311) in 2019, which developed replicable models for delivering minor irrigation schemes to enhance agricultural production.¹² Considering challenges associated with the development of large-scale irrigation systems, farmer-led, small-scale irrigation development can be more efficient and effective in terms of time and impact.¹³ In line with this approach, Phase I delivered irrigation services mainly through small storage structures (such as ponds and check dams) and tube wells, strengthened community-based irrigation by establishing 2,277 water user associations (WUAs) to promote ownership and ensure better operation and maintenance (O&M), encouraged crop diversification¹⁴ and use of new technologies, and created new income-generating opportunities such as floriculture and fisheries. Overall, Phase I developed 40,000 ha command

⁹ Mandala, S., D. Burmana, U. K. Mandala, T. D. Lamaa, B. Majia, and P.C. Sharmab. 2017. "Challenges, Options and Strategies for Doubling Farmers' Income in West Bengal – Reflections from Coastal Region." *Agricultural Economics Research Review* 30: 89–100.

¹⁰ Mandala, Burmana, Mandala, Lamaa, Majia, and Sharmab. "Challenges, Options and Strategies".

¹¹ The state currently uses about 42 percent of the total annual net replenishment of groundwater. Between 2005 and 2017, the number of semi-critical blocks increased from 5 to 19 (out of a total of 41 blocks). A semi-critical block is one where the groundwater table has on average been declining by over 0.2 m per year over a five-year period.

¹² In India, minor irrigation refers to the structures that serve irrigation to a command area of less than 2,000 ha.

¹³ World Bank. 2021. *The Farmer-led Irrigation Development Guide: A What, Why and How-to for Intervention Design*.

¹⁴ Crop diversification in the project areas resulted in farmers growing different types of vegetables such as brinjal, cauliflower, leafy vegetables, onion, pumpkin, and ridge gourd. Mustard cultivation increased 7.5 times and area under potato cultivation increased 4 times in the project areas.



area of irrigation and reached 125,000 beneficiaries of which more than 100,000 were small and marginal farmers. A post-completion analysis of Phase I showed that it generated an incremental median income of INR 7,000 (US\$85) per household¹⁵ in drought-prone areas, compared to schemes that did not benefit from project interventions. Given Phase I's accomplishments, the GoWB continued replicating its model after Phase I's closure, developing additional 600 WUAs and 15,000 ha command area of irrigation with its own funding but using systems and guidelines developed in Phase I.

9. Some of the successful models of Phase I have also been scaled up through the state's flagship programs. The Jaltirtha Program launched in 2014–15 has invested around US\$80 million in the arid western districts to construct check dams, water harvesting structures, and surface flow minor irrigation schemes, aiming to provide year-round irrigation to the communities. This program has been further strengthened by the Matir-Sristi Program, which was launched in 2020 by the GoWB in the face of the COVID-19 pandemic. It aims to increase rural household incomes through horticulture, fisheries, and animal husbandry development and has now scaled up the mixed fruit plantation model introduced in Phase I.

10. The proposed West Bengal Accelerated Development of Minor Irrigation Project - Phase II (the Project) builds on the success of Phase I particularly to streamline innovative approaches including community-based participation and technology-based planning and monitoring, as well as further developing the capacity of institutions dealing with minor irrigation. Despite the achievements of Phase I and state programs, there remains a vast unmet irrigation demand. Therefore, like Phase I, the Project will mobilize farmers to form and strengthen WUAs and deliver irrigation and agricultural services to unserved, climate-vulnerable farmer communities in the state. Moreover, given that many state-run schemes, including Jaltirtha, did not incorporate community-based approaches and are, therefore, facing challenges in O&M of schemes, the Project will focus on helping the GoWB institutionalize gender-sensitive community-based participation at the Department of Water Resources Investigation and Development (DWRID), along with other Phase I accomplishments.

11. Despite efforts made in Phase I,¹⁶ women in West Bengal continue to be significantly underrepresented in decision-making bodies related to water management. In India's eastern region, including West Bengal, women's participation in WUAs remains below 10 percent.¹⁷ As per the guidelines for WUAs, representation in decision-making committees is only open to landowners. This makes it particularly challenging for women to join such positions because only a small proportion (10 percent) of women in India own land, with West Bengal having a similar percentage¹⁸. Notwithstanding this obstacle, the activities put in place in Phase I—including communications, outreach, and targeted training for women—led to women making up seven percent of decision-making positions and 15 percent of general members in WUAs¹⁹. Women members of WUAs (irrespective of their position and role) have contributed immensely in collection of water charges which is very critical to ensure financial sustainability of WUAs. However, women continue to face challenges in bringing relevant issues and priorities to the table. Building on previous learnings from Phase I, the project will promote women's effective participation in

¹⁵ This increment was earned from an average area of 0.3 ha.

¹⁶ Phase I prioritized women's participation in WUAs and over 17,000 WUAs with women members were formally registered.

¹⁷ Khandekar, V. 2020. "Gender Perspective in Water Management: The Involvement of Women in Participatory Water Institutions of Eastern India". *Water Journal*.

¹⁸ In India, land ownership by women is less than 13 percent according to 2011 census, and recently released National Family Health Survey (2021) reported a drop in Indian women's land ownership patterns to less than 10 percent.

¹⁹ Phase I prioritized women's participation in WUAs and over 17,000 WUAs with women members were formally registered.



decision-making roles by aiming at doubling the percentage of women in decision making committees in WUA from 7 to 15 percent.²⁰

C. Relevance to Higher Level Objectives

12. **The Project is aligned with the India Country Partnership Framework (CPF) FY18-22 discussed by the Executive Directors of the World Bank Group (Board) on September 20, 2018 (Report No. 126667-IN),²¹ and all its components are tagged to the pillars of the World Bank's Global Crisis Response Framework (GCRF).²²** By promoting more resource-efficient, inclusive, and diversified growth in the rural sector, the Project directly supports two key areas of the CPF: "Resource Efficient Growth" and "Enhancing Competitiveness and Enabling Job Creation." The Project is also aligned with the engagement area of the CPF results framework on "Transformation by increasing agricultural productivity in targeted areas". The Project is designed to bolster "climate resilience, water efficiency, sustainable productivity increases, and greater value capture and income for the rural population from agriculture" as targeted in the CPF. As for the GCRF, Components B (US\$84 million IBRD) and C (US\$25 million IBRD) are tagged to the "Responding to Food Insecurity" pillar because they help small and marginal farmers increase agricultural production by improving irrigation and agricultural services. Components A (US\$10 million IBRD) and D (US\$29 million IBRD) strengthen community and government institutions and build their capacity to maximize the benefits from Components B and C, so they are tagged to the "Strengthening Policies, Institutions, and Investments for Rebuilding Better" pillar.

13. **The Project supports the proposed greenhouse gas (GHG) emission reduction goal of India's Nationally Determined Contributions (NDCs).**²³ India approved an updated NDC in August 2022, translating its climate action 'Panchamrit'²⁴ announced at COP-26 into enhanced climate targets, ushering in low emission growth pathways in the country. The Project's contribution to India's NDC mainly comes from climate change mitigation measures embedded in the design of Components B and C, including the use of solar power for irrigation water abstraction and distribution.

14. **In line with the World Bank's Gender Equality Strategy, the Project addresses gender gaps specific to the sector.** Building on learning from Phase I, the Project will promote women's participation in WUAs by providing dedicated training to women members, including leadership skills. The training program will be designed to make women more confident about voicing their concerns and priorities in WUA meetings so that they are addressed by WUAs. The Project aims to increase the percentage of women in decision-making positions in WUAs from 7 to 15 percent.

15. **Citizen engagement is an integral part of the Project.** Mobilizing and strengthening WUAs, one of the key Project activities, is aimed at bringing together farmers so that they are actively empowered through planning and operating a shared irrigation system, exchange experience and knowledge, and enable economies of scale in accessing the market. The Project will continue using the grievance redress mechanism (GRM) set up in Phase I that worked satisfactorily through a tracking and monitoring system

²⁰ The Project design includes targeted awareness creation and training for women to aim at achieving this target.

²¹ The CPF for India expired at the end of FY22. The World Bank is currently preparing a Performance and Learning Review, which will seek to extend the CPF through mid-FY24.

²² World Bank Group. 2022. *Navigating Multiple Crises, Staying the Course on Long-term Development: The World Bank Group's Response to the Crises Affecting Developing Countries*. Washington, DC: World Bank Group.

²³ India committed to reduce the emission intensity of its GDP by 45 percent by 2030.

²⁴ It refers to India's climate action, consisting of five nectar elements. <https://pib.gov.in/PressReleseDetail.aspx?PRID=1768712>



managed by the State Project Management Unit (SPMU). The system had several modes of communication, including dedicated telephone line and online system. Citizens' feedback through the GRM will be regularly monitored, reported, and acted upon under the Project. The GRM will be grouped in major categories by issues that will be reviewed on a regular basis and updated as needed. Further, an indicator on beneficiary/user feedback will measure beneficiary/user satisfaction at least three times during Project implementation.

II. PROJECT DESCRIPTION

A. Project Development Objective (PDO)

16. **The PDO is to augment water availability and strengthen water user associations for improved irrigated agriculture in Project Areas of West Bengal.** This will be evaluated against the following PDO-level indicators:

- (a) Water harnessed through new irrigation schemes (cubic meters per year)
- (b) Beneficiaries provided with improved irrigated agriculture and allied services (number)
 - Of whom are small and marginal farmers (percentage)
 - Of whom are farmers belonging to tribal communities (percentage)
 - Of whom are female farmers (percentage)
- (c) Well performing WUAs operating and maintaining irrigation schemes successfully (percentage)
- (d) Value-weighted index²⁵ for agricultural outputs (fixed base price) (percentage).

B. Project Components

17. **To achieve the PDO, the Project will invest in strengthening WUAs, irrigation and agricultural service improvements, and technical support.** Community-based irrigation will be strengthened through WUAs, which will nurture community ownership and ensure operational and financial sustainability of irrigation assets. Irrigation investments include about 1,100 minor irrigation scheme clusters that will serve about 21,000 ha of agricultural land presently under rainfed cultivation. Vulnerable farmers living in areas that rely on rainwater or experience water stress will be targeted. Farmer incomes are expected to rise through crop intensification, crop diversification, use of new micro irrigation and farming technologies, and better farm-to-market links. Ponds with a combined surface area of about 500 ha that will be developed as part of the minor irrigation schemes will be also used for fisheries, which would further enhance farmer incomes. The Project will institutionalize community-based management and operation of irrigation services by establishing a WUA cell at the DWRID staffed by multisectoral specialists.²⁶

²⁵ This composite indicator will account for intensification, diversification to high-value crops, and productivity, estimated as the ratio of the composite value at post implementation and baseline. The unit price of each commodity will be fixed at base price so that price inflation will not affect the indicator.

²⁶ A unit in DWRID headed by a Superintendent Engineer who reports to the Chief Engineer of the Department.

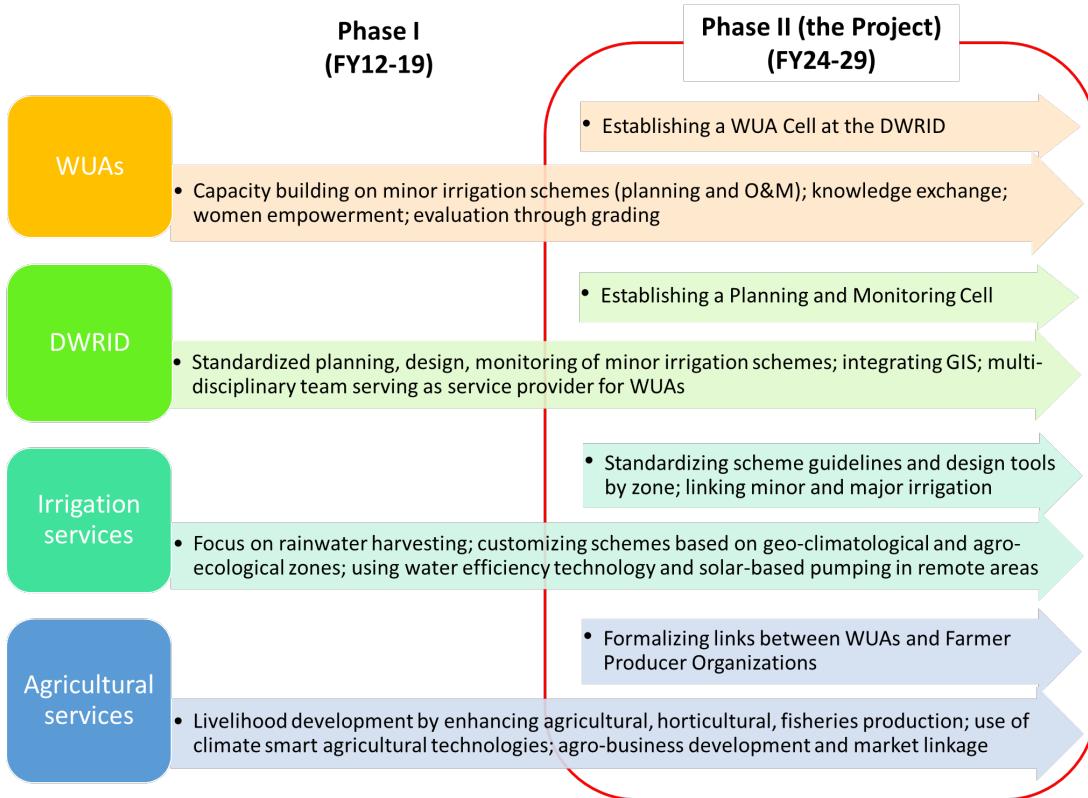


18. The Project expands and solidifies Phase I investments. As in Phase I, the Project will mobilize farmers and establish and strengthen WUAs so that they can plan, operate, and manage minor irrigation schemes with a command area up to 200 ha. Types of schemes to be supported include check dams, small-scale storage structures, creek rehabilitation, tube wells, and pump dug wells. The type of scheme will be determined based on geo-climatological and agro-ecological characteristics of a given location. Further, the Project will converge with the agriculture, horticulture, and fisheries sectors so that communities can embrace good, climate-resilient agricultural practices and integrate high-value crops and fisheries in their production patterns. The Project will not only create new WUAs but also work with existing WUAs. Those that perform well will be showcased in knowledge exchange activities, and those that perform poorly will be supported with capacity building to improve their O&M performance.

19. The Project aims to deepen the institutionalization of key approaches in the state to enhance sustainability, building on the achievements of Phase I (figure 1). Phase I worked on institutionalizing certain activities to ensure lasting impact after project closure (paragraph 28). Building on that, the Project aims to further reinforce institutionalization in five ways: (i) a multidisciplinary WUA cell will be created at the DWRID, which will include institutional and social experts performing mobilization and coordination functions; (ii) a planning and monitoring cell will be created at the DWRID, with a special focus on internalizing the site selection and clustering methodology and robust monitoring; (iii) standard scheme guidelines and design tools will be developed for each geo-climatological and agro-ecological zone to streamline the planning process; (iv) where possible, linking major and minor irrigation schemes will be encouraged so that farmers can use water when they need it, bolstering demand-driven irrigation; and (v) Phase I pilots that proved successful—including water efficiency technologies like micro irrigation, greenhouses, mixed fruit plantations, market linkage development, and solar-based pumping in remote areas—will be expanded and mainstreamed so that they officially become part of the DWRID and WUAs' toolbox. Hence, institutional development supported by the Project will influence how minor irrigation schemes in the state's villages are planned, designed, constructed, operated, managed, and monitored and how they can be converged with agricultural services.



Figure 1. Comparison between Phases I and II



20. The Project will invest US\$211 million in four components shown in table 1.

Table 1. Project Costs by Component and Financier (US\$, millions)

Project Component	Project Costs (100 percent)	IBRD Financing (70 percent)	Counterpart Funding (30 percent)
A. Strengthening Community-based Institutions	14	10	4
B. Minor Irrigation Services	120	84	36
C. Agricultural Support Services	36	25	11
D. Project Management and Technical Support	41	29	12
Total	211	148	63

21. **Component A: Strengthening Community-based Institutions.** The component aims to mobilize, engage, and empower farmers by establishing and strengthening transparent, inclusive, and self-sustaining WUAs. Small and marginal farmers, who are often poor, vulnerable, and dependent on rainfed, single-cropped subsistence farming in climatologically stressed areas, will be targeted. Gender aspects will be mainstreamed through: (a) systemic engagement of women as participants and decision-makers in WUAs through outreach and dedicated capacity building efforts, including targeted community-level behavior change initiatives to improve the acceptance of women's roles as water managers; (b) integration of clearly defined roles for women in planning, monitoring, and O&M; (c) targeted leadership and technical training for women on roles and accountabilities of WUAs; (d) mentorship for women WUA



members and leaders to support their active participation in decision-making; and (e) structured consultations with women groups as part of the baseline survey and O&M phases. Further, WUAs will serve as an important platform for two-way dialogues and participatory feedback processes as part of regular monitoring. The component is tagged to the “Strengthening Policies, Institutions, and Investments for Rebuilding Better” pillar of the GCRF, because it strengthens community institutions and build their capacity to maximize the benefits of project investments in irrigation and agricultural services. In particular, the component will support the following:

- (a) **Developing WUAs for new schemes.** The component will, among other things, sensitize, mobilize, and establish new WUAs and support them in developing their skills and competencies to plan, operate, and manage irrigation schemes. This will include establishing governance procedures and social accountability mechanisms, developing equitable and sustainable water sharing and utilization systems, developing as well as implementing their respective Scheme Cluster Development Management Plans (SCDMPs), and setting up a functional system for irrigation service fee collection, recording, and accounting for WUA membership. About 1,100 new WUAs are expected to be created in the project areas, chosen based on predetermined criteria (paragraph 34). The Project will continue to hire support organizations (SOs) to engage with farmers throughout the WUA development process.
- (b) **Strengthening WUAs for existing schemes.** The component will target about 2,700 existing WUAs, encompassing both those formed during Phase I and those established through state funding. It will, among other things, map and assess WUAs’ performance; recommend and implement organizational strengthening activities; and design and deliver core training modules on operationalizing women’s representation, leadership skills, decision-making in WUAs, and social audits tools. It will include capacity building activities on governance, O&M of irrigation services, systems building for accounting and record keeping, social accountability, and sustainable water sharing and utilization.
- (c) **Establishing internal and external links.** The component will, among other things, facilitate vertical integration of WUAs to function as collective; build capacity of WUAs on management and entrepreneurship through exposure visits, trade affairs, and structured training; provide targeted training and capacity building to strengthen management capabilities of women members in WUAs; and formalize links between WUAs and farmer producer organizations (FPOs)²⁷. Connecting WUAs both among themselves and with other entities can increase development impact and incomes through collective action and economies of scale. The Project will leverage existing community-based organizations such as FPOs and self-help groups (SHGs).²⁸ The Project will build WUAs’ internal links, for example, by facilitating peer-to-peer learning that showcases well-performing WUAs. External partnerships will be strengthened, for instance, with academia and the private sector to facilitate adoption of new agricultural technologies, improved understanding of

²⁷ An FPO is a legal entity formed by farmers in the form of a producer company, a cooperative society, or others, which provides for sharing of profits or benefits among the members.

²⁸ An SHG is a village-based financial intermediary committee, usually composed of 10–20 local women or men who make small regular savings contributions over a few months until there is enough to begin lending to the members or others in the village for any purpose. In India, many SHGs have links to banks for the delivery of microcredit.



market demand, marketing of produce, supply of inputs, and enhanced access to financial institutions for savings and loans.

22. Component B: Minor Irrigation Services. The component will improve access to water for irrigation, fisheries, and other livelihood activities through development of minor irrigation scheme clusters, including check dams (of less than 5 m in height across small streams), small-scale storage structures (ponds ranging from 400 to 4,000 m²), creek rehabilitation (typically up to 1.5 km creek length), open dug wells, and tube wells; and scaling up water efficiency technologies, such as improved conveyance and application systems and irrigation scheduling informed by soil moisture measurements. There will be about 1,100 new minor irrigation scheme clusters that consist of up to six schemes, and each cluster will be managed by a WUA. These schemes are expected to have a command area of 21,000 ha, while irrigation ponds with a total area of about 500 ha will be used for fisheries as well. As in Phase I, the schemes will be (a) tailored to the geo-climatological and agro-ecological zones of West Bengal (paragraph 35) and (b) clustered to focus on areas where support is most needed and avoid an inefficient scattering of schemes across the state. Schemes will be prioritized in water-stressed areas where climate change risks are high, exemplified by increasingly irregular rainfall, regular droughts, or temperature extremes, thus making the component climate adaptive. This component mitigates climate change as well because it aims to have solar-based irrigation pumping systems in about 30 percent of the new schemes and in about 3,000 ha of Phase I schemes. Further, the Project will scale up water-efficient technologies in about 10,000 ha of new and existing schemes combined. The developments will include improved conveyance and application systems that are more efficient with low-energy demand, such as flexible piped water supply, sprinkler, and drip irrigation systems. These will be used to incentivize WUAs to perform well because preference will be given to the schemes that already successfully practice irrigated agriculture, have multiple cropping seasons, and produce high value crops. Irrigation scheduling informed by soil moisture measurements will be expanded as well based on in situ and remote sensing-based advisory. The component is tagged to the “Responding to Food Insecurity” pillar of the GCRF, because it helps small and marginal farmers increase agricultural production by improving access to irrigation service.

23. Component C: Agricultural Support Services. The component aims to improve agricultural, horticultural, and fisheries production, capitalizing on improved availability of water through Component B. The focus will be on reducing rice cultivation, instead promoting high-value crops that require less water, spreading the use of climate-smart agriculture technologies (including hydro informatics for farming decisions), and optimizing inputs and their reuse. Smallholder producers in the command area of irrigation schemes will be targeted, and WUAs and its vertical structure will serve as the institutional platform. This component is climate adaptive because it increases the resilience of farmers and WUAs by diversifying their income in the face of increasing water stress. It also mitigates climate change with activities that increase soil and vegetation carbon sequestration through targeted fruit tree plantations and soil health and fertility management practices. The component is tagged to the “Responding to Food Insecurity” pillar of the GCRF, because it helps small and marginal farmers increase agricultural production by improving access to agricultural service. The component will in particular focus on the following aspects:

- (a) **Agricultural crops.** The component will invest in providing demand-driven agricultural advisory services for various field crops. The activities will include promoting efficient water management, high-yielding crop varieties, better agronomic practices, integrated soil fertility and nutrient management, integrated pest management and organic farming techniques, and other good climate-smart agricultural practices.



- (b) **Horticulture.** The component will support farmers in participating in fruit, vegetable, and floriculture supply chains that are of higher value than field crops. It will include carrying out farmers' risk profiling, providing advisory services on good agricultural practices and innovative technologies, such as managing soil fertility and pests, formulating buyback arrangements and other contract farming in partnership with agribusiness companies, and promoting precision farming. It will also support WUAs in procuring critical inputs such as hybrid seeds and planting materials and piloting post-harvest facilities for grading, packing, branding, storing, and transporting produce to help meet market standards of produce quality and minimize losses.
- (c) **Aquaculture.** The component will promote aquaculture through demonstrating and distributing modern technology practices, such as use of fish feed formulated with locally available ingredients, fingerling production and supply, cage fish culture, and culture-cum-capture models. It will also promote fish storage, transportation, and marketing. Inland fish production in tanks, ponds, and other inland water bodies can provide alternate livelihood to landless and marginal farmers. Water storage structures, resulting from Component B investments, provide excellent opportunity to cater to the vast demand for fish in especially local markets.

24. **Component D: Project Management and Technical Support.** The component aims to strengthen the DWRID to spearhead project implementation at all levels and support technical manpower for executing Components A to C in an integrated manner. The latter will be significant because the Project supports both new and existing schemes, including those established by the state and Phase I. The component is tagged to the "Strengthening Policies, Institutions, and Investments for Rebuilding Better" pillar of the GCRF, because it strengthens government institutions and build their capacity to work better with community institutions, provide them with support, and disseminate knowledge, and learning. In particular, the component will support the following:

- (a) **Project implementation and coordination.** The component will provide technical assistance, carry out training, acquire equipment, and finance incremental operating costs to strengthen the existing State Project Management Unit (SPMU) and District Project Management Units (DPMUs) to implement the Project, including modern facilities for advanced planning and execution. Both the SPMU and DPMUs will continue to be staffed with more than 300 personnel, both civil servants²⁹ and consultants, including experts in community mobilization, gender, geographic information system (GIS), surveying for advanced planning, and agricultural support services (such as agriculture, horticulture, fishery, and marketing). The SPMU will continue to be supported by financial management (FM), procurement, safeguards, monitoring and evaluation (M&E), learning, and communications specialists. The expenditures for equipment and facilities include hiring of vehicles, office furniture and equipment, survey drones, computers, servers, software, and IT equipment. It will also support organizing the State-Level Technical Steering Committee (SLTSC) and District-Level Implementation Committees (DLIC), coordinating meetings and workshops, and offering technical assistance and other outsourced services, as needed for smooth project implementation.

²⁹ Project costing does not include salaries of civil servants.



- (b) **Organizational development.** The component will provide technical assistance to the DWRID to institutionalize best practices in implementation arrangements, processes, and design standards, including by establishing a cell for WUA development and support and a cell on planning and monitoring. In addition to mobilizing WUAs and building their financial and operational capacity for managing minor irrigation assets, the WUA cell will organize quarterly thematic learning forums at state and district levels to consolidate and scale up key lessons learned. A communication strategy will play a key role in disseminating good practices. Planning will be strengthened in part by internalizing site selection and clustering processes and standardizing scheme guidelines and design tools by zone. For monitoring, a management information system (MIS) based on GIS and remote sensing would enable digital documentation, impact mapping, and real-time monitoring of cropping patterns and soil moisture content.

C. Project Beneficiaries

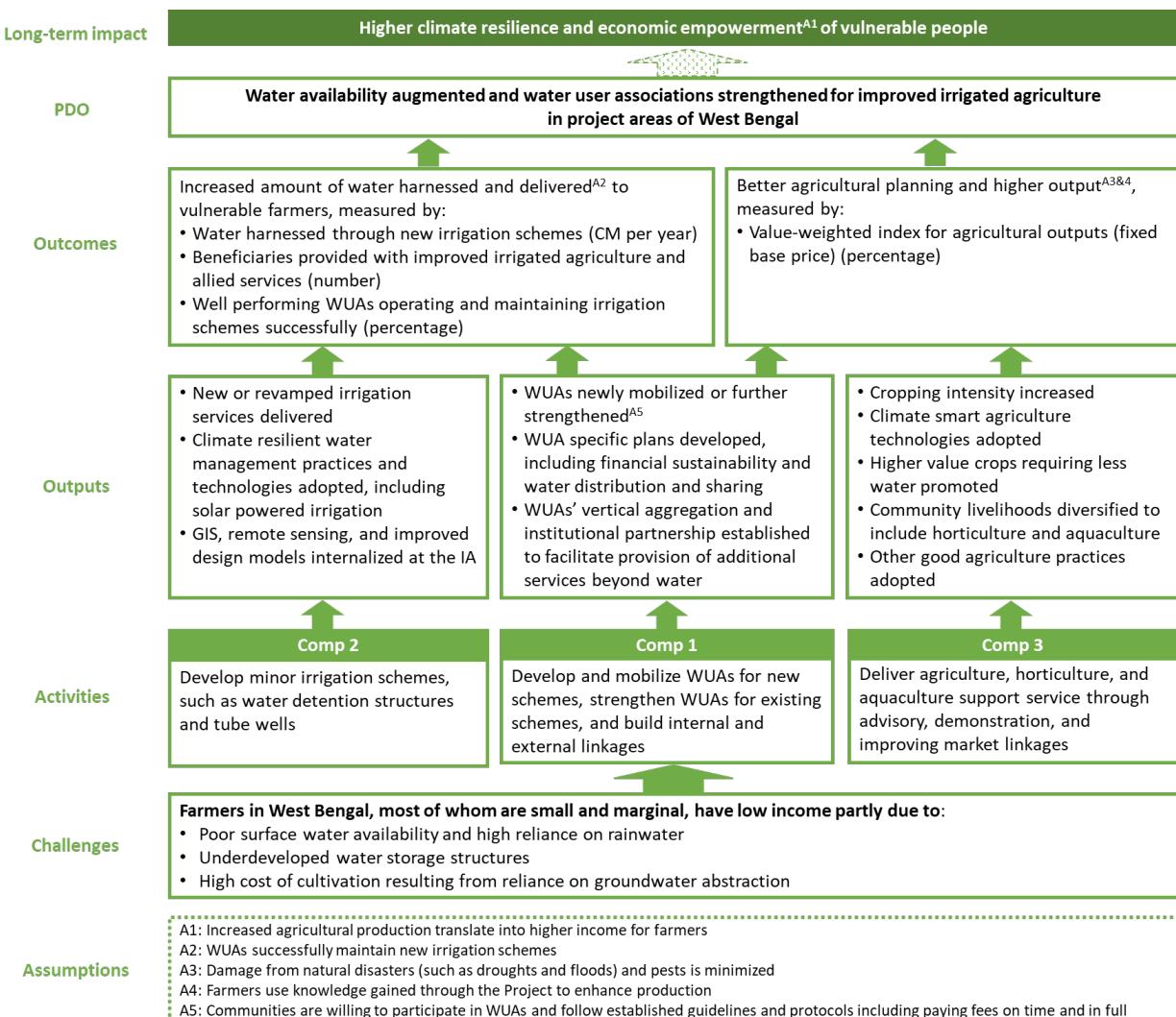
25. **The Project is expected to yield significant and lasting benefits for vulnerable farmers in West Bengal.** It is estimated that about 960,000 people (or 240,000 households) would benefit directly, resulting from new or improved irrigation services that allow intensification of agriculture and from fisheries. Farmer benefits in terms of higher incomes will stem from higher crop yields; more diversified, higher-value crops; improved practices in aquaculture; and better market access and product marketing. Irrigation operation services will be low-cost with the use of solar-based pumping and adoption of water-efficient technologies such as sprinkler and drip irrigation. Nonmonetary benefits include community empowerment through WUAs. Vulnerable farmers—including small and marginal, with many belonging to tribal communities—will be specifically targeted, through project area selection that will account for socioeconomic factors and current farming practices, in particular rainfed farming. Women will be specifically targeted, including through focused training and increased participation in WUA committees and leadership. It is estimated that the Project will reach 2.9 percent of small and marginal farmers and 6.3 percent of tribal farmers in the state. By implementing the Project, the DWRID will gain enhanced capacity to deliver minor irrigation services through collaboration with communities and internalize GIS, remote sensing, and other technological advances.

D. Results Chain

26. **Figure 2 illustrates how project activities will contribute to results and the long-term impact.**



Figure 2. Theory of Change



Note: IA = Implementing agency.

E. Rationale for Bank Involvement

27. Given its global experience in minor irrigation and strong partnership with the GoWB under Phase I, the World Bank is particularly well placed to finance the Project. The World Bank has supported infrastructure investments, policy reforms, and capacity building in farmer-led irrigation around the world.³⁰ It also has ample recent local experience, having supported Phase I. This global and local experience, as well as continued dialogue with the GoWB since the completion of Phase I places the World Bank on a solid footing to support further enhancement of the minor irrigation agenda in the state and strengthen it as a model that can be leveraged by other states and countries.

³⁰ The ones that were particularly relevant and provided insights into designing the Project included GEF Turkey Irrigation Modernization (P167363), the Afghanistan Irrigation Restoration and Development Project (P122235), and the Egypt Farm-level Irrigation Modernization Project (P117745).



F. Lessons Learned and Reflected in the Project Design

28. **The Project draws on lessons from Phase I to enhance its effectiveness.** The main lessons from Phase I that were reflected in designing the Project include the following:

- (a) **Irrigation infrastructure and soft support—such as institutional strengthening and capacity building—should be integrated to ensure sustainability.** This approach is based on the experience that transitioning from rainfed to irrigated farming is a gradual process that requires more than infrastructure. Phase I helped WUAs and the DWRID in several ways. First, it facilitated capacity building for the DWRID and WUAs on planning, O&M, and monitoring of irrigation structures through WUAs and encouraged knowledge exchange. Second, the DWRID was motivated given that its Phase I project team successfully developed tools for online hydrological analyses and subsequently trained a cadre of state engineers on the software. Third, the DWRID worked on institutionalizing systems, processes, tools, and guidelines developed, which included specifications and design parameters for engineering structures, WUA mobilization manuals and training materials, and agricultural extension materials. Published online for public use, these are considered standard operational procedures for WUAs and are being used more broadly in learning activities for WUAs and other stakeholders. This experience provides insights into how further institutional and capacity building activities can be incorporated in a more structured manner into Project design.
- (b) **Use of technology can be a driver for sustainable and effective implementation.** Phase I upgraded outdated planning tools and techniques that were resulting in high failure rates for irrigation schemes that were also susceptible to elite capture and political economy issues. The old tools were replaced with solutions that are evidence-based, more transparent, and more likely to lead to successful outputs. For example, an online hydrological analysis tool helped reduce structural overdesign and associated capital costs; 3-D technology and digital logging ensured sound groundwater development; modern survey tools and Google Earth ensured robust designs of irrigation schemes; and automated monitoring and temporal remote sensing helped assess real-time water availability. The use of solar energy allowed pumping in remote areas with limited access to electricity. Beneficiary and project area selection was done using remote sensing to limit undue political influence.
- (c) **Gender-focused activities result in socioeconomic enhancement of women.** Female participation was mandatory in each WUA under Phase I, and mobilization efforts resulted in 17,099 women joining, accounting for 15 percent of total members. Women were encouraged to hold critical positions within the governance structure of WUAs to ensure their active role in decision-making processes. As a result, about seven percent of the WUA governing body or management committee members were women. Further, Phase I placed emphasis on building niche skill sets for women, resulting in having over 5,000 women involved in remunerative productive activities such as nurseries and hatcheries. The most successful example of this in Phase I is in fisheries, where 25 percent of the 5,500 members were women and incomes increased from INR 35,000 (US\$426) per ha to INR 350,000 (US\$4,257) per ha of water body. Such initiatives have led to enhancing the socioeconomic



status of female workers in agriculture and related activities and transformed them into agripreneurs.

- (d) **Collaboration with academia and the private sector is key to improving farming practices and market links.** Phase I established 15,000 pilot plots covering 5,000 ha to link WUAs with agricultural research organizations and local, national, and global agribusiness companies. These links focused on productivity improvement, efficient water management practices, mechanization, and improved access to new markets. Several firms conducted demonstrations of innovative and exotic seed varieties, and these proved successful. With one firm, floriculture was piloted with success, where Phase I made capital investment in greenhouse, water storage, and drip irrigation system and provided inputs and training, and the firm purchased the produce regularly.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

29. **The DWRID will be responsible for project management and coordination.** Within the DWRID, the existing SPMU and DPMUs created under Phase I will continue to implement the Project. The SPMU will continue to be headed by a Secretary in the GoWB, who will be the Project Director and will report to the SLTSC. The DPMUs, 23 in total, will be led by Executive Engineers of the DWRID, reporting to the District Project Director at the rank of Superintending Engineer of the DWRID. Both the SPMU and DPMUs will be supported by multidisciplinary teams that consist of fiduciary, environmental and social (E&S), M&E, institutional development, agriculture, fisheries, farmer mobilization, GIS, and remote sensing specialists on a contract basis. To provide comprehensive support to beneficiaries, the Project will work with various line departments including those dealing with agriculture, agricultural marketing, food processing industries, horticulture, fisheries, animal husbandry, and panchayat (village council) and rural development. The Project will emphasize training of project staff to build long-term capacity and knowledge in the DWRID through collaboration with research and applied centers.

30. **Strategic support will be provided at the state level through the SLTSC.** Chaired by the Chief Secretary of the GoWB, or a high-ranking government official delegated by the Chief Secretary, the SLTSC will provide overall guidance and policy direction and ensure sound coordination between government entities involved. The SLTSC will meet at least once a year, or more frequently if needed, to take stock of project progress, approve annual work plans and budgets, and make course corrections, as necessary. Its members will include the Engineer in Chief and Ex-Officio Secretary of the DWRID and Secretaries of the Departments of Finance, Agriculture, Food Processing Industries, Horticulture, Fisheries, Agricultural Marketing, and Animal Husbandry.

31. **The DLICs will continue to facilitate and oversee the Project on the ground at district level.** The DLICs, chaired by the District Magistrate, consist of nodal officers of participating line departments in addition to representatives of SOs and WUAs on an invitation basis. They will be responsible for coordination, approval of annual action plans, district-level oversight and progress monitoring, and, as needed, grievance redress and conflict resolution.



B. Results Monitoring and Evaluation Arrangements

32. **M&E will be an integral part of the Project, with overall responsibility by the SPMU.** The SPMU under DWRID will be responsible for managing the web-based M&E platform that was developed under Phase I and will be updated with latest technology to track project progress based on the Results Framework. The platform will support participatory M&E, allowing project stakeholders—such as SPMU and DPMU officials, consultants, SOs, and WUAs—to collect data on project progress, including geospatial data with photographs of outputs and any key features that require regular monitoring. The SPMU will submit quarterly progress reports to the World Bank and relevant line ministries. The contents will include: (a) updated implementation schedules by component; (b) commitment and disbursement by component; (c) the status of indicators against targets; and (d) facts, recommendations, and agreements to be reached on key implementation issues. In addition, the World Bank, the DWRID, and other stakeholders will carry out joint semi-annual progress reviews and a midterm review during the second half of 2025.

C. Sustainability

33. **The Project addresses two main factors that are deemed pivotal for sustainability of its outcomes beyond the project period:**

- (a) **Sustainability of institutions** will be sought through creation of two new cells at the DWRID that will strengthen the DWRID's ability to support WUAs and plan and monitor minor irrigation schemes. The Project will also standardize scheme guidelines and design tools by zones, strengthen the link between minor and major irrigation where possible, and formalize the connection between WUAs and FPOs. These are new institutionalization efforts that will be introduced in Phase II to enhance sustainability. In addition, Phase I institutionalization activities on capacity building will continue.
- (b) **Sustainability of financing** involves securing adequate O&M budget for the infrastructure developed under the Project. O&M financing for Project investments will primarily come from irrigation service fees and other income generation initiatives by WUAs, e.g. annual leases for fisheries. The irrigation fee collection model, based on hourly or volumetric charges, incentivizes more efficient water demand management aimed at reducing water and energy use as well as energy-related emissions. To this end, (i) the SCDMPs will include plans for financial sustainability and (ii) WUAs will be trained on the process for fee determination, collection, and bookkeeping. Financial sustainability of WUAs will be monitored through a WUA rating system that will be used to customize support and provide extra attention to WUAs that are not financially sustainable. Well performing WUAs will motivate others through peer-to-peer learning.



IV. PROJECT APPRAISAL SUMMARY

A. Technical Analysis

34. **The Project will continue to use and update as needed screening and other applications developed during Phase I to prioritize focus areas for Project implementation.** To determine where new WUAs will be set up and new irrigation schemes will be constructed, the application prioritizes areas based on the following criteria:

- (a) **Irrigation need.** The Project will target rainfed areas that are defined as unirrigated areas where only Kharif (monsoon) crops are predominantly grown due to non-availability of water during non-monsoon season. Phase I developed a Google Earth engine application using temporal satellite imageries to track land use on real time basis that will allow selection of Project areas.
- (b) **Watershed and catchment analyses.** Watersheds with low levels of rainwater harvesting will be prioritized. The size and location of potential storage structures for rainwater harvesting will be evaluated based on catchment assessments and flow patterns. For this, GIS tools developed in Phase I will be further improved and will improve ease of access to the field teams through mobile apps or other relevant modes. For small catchments, a high-resolution digital elevation model will be developed.
- (c) **Social targeting.** A composite score that reflects socioeconomic parameters will be calculated for villages in rural West Bengal. Critical parameters include the literacy rate, percentage of working population, and whether it is a tribal area or not. The higher the score, the higher the potential for the village to be chosen for project investments.
- (d) **Logistic accessibility.** To enhance implementation efficiency, areas near Phase I will be prioritized. Proximity between potential scheme areas will be considered as well, so that Project areas are clustered in contiguous villages or in the same watershed, rather than scattered across the state.

35. **Design of minor irrigation schemes will be tailored to the geo-climatological and agro-ecological characteristics and hydrology of the chosen project area.** Phase I classified the state's districts into five zones that feature unique geo-climatologic and agro-ecologic characteristics (map 1). For each zone, typical challenges and relevant options were identified (table 2). The Project will continue to use this zonal model in determining the types of minor irrigation structures to be developed. During this process, watershed-level hydrological assessments will be conducted using the latest technology to assess existing storage capacity and ensure water availability in all proposed water harvesting structures.



Map 1. West Bengal Districts by Zone

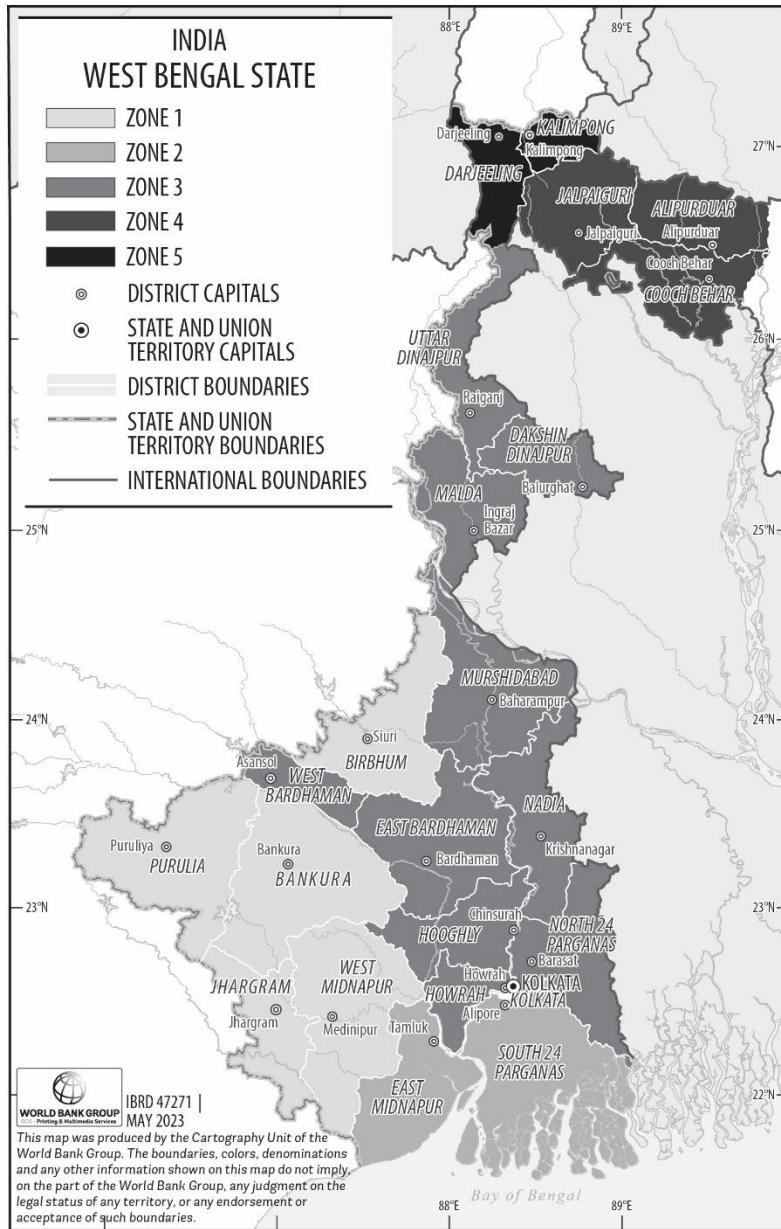


Table 2. Zone Characteristics and Minor Irrigation Interventions

Zone	Hydro-geological and Agro-ecological Features	Critical Challenges	Main Scheme Types
1. Western Model: Red Lateritic Semi-Arid Zone	<ul style="list-style-type: none"> Red lateritic soil Rainfall less than 1,400 mm Temperatures 14.8°C to 37°C Weathered zones and fissures having low yield 	<ul style="list-style-type: none"> Dry/arid with erratic rainfall and extreme temperature Single-cropped rainfed areas Poor market links Technology-deficient area 	Surface water schemes, including <ul style="list-style-type: none"> Series of check dams Small storage structures (water detention structures)



Zone	Hydro-geological and Agro-ecological Features	Critical Challenges	Main Scheme Types
	<ul style="list-style-type: none"> Seasonal rivers 	<ul style="list-style-type: none"> Lands eroded, degraded and poor water retention capacities with low productivity Predominantly tribal belt and people migrate for livelihood 	<ul style="list-style-type: none"> [WDS] and small tanks [happas]) Groundwater schemes (dug well and tube wells) Catchment management Solar pumps
2. Coastal Model: Saline Coastal Zone	<ul style="list-style-type: none"> Saline waterlogged areas Rainfall 1,600 mm to 2,000 mm Temperature 16°C to 35°C Moderately thick confined/unconfined aquifer down to 150 meters having yield of 150 M³ per hour 	<ul style="list-style-type: none"> Rainfed, single-cropped paddy belt Ground water salinity Migration due to extreme environment Tidal inundation Technology deficient 	<ul style="list-style-type: none"> Surface schemes (primarily deepening of coastal canals) Solar pumps
3. The Central Alluvial Model: Vindhyan-Gangetic Alluvial Flood Plain Zone	<ul style="list-style-type: none"> Fertile alluvial soil Rainfall 1,400 mm to 2,000 mm Temperature 15°C to 35.5°C Fairly thick confined/unconfined aquifer down to 150 to 300 meters having high yield up to 150 M³ per hour 	<ul style="list-style-type: none"> Intensive agriculture-led to ground water contamination Low water use efficiency High population density 	Integrated groundwater and storage development <ul style="list-style-type: none"> Tube wells Water management practices including micro irrigation and soil water conservation applications Solar pumps
4. Upper Plateau Model: Terai-Teesta Alluvial Flood Plain Zone	<ul style="list-style-type: none"> Terai soil Rainfall 3,000 mm to 4,000 mm distributed over 6 months Temperature 12.8°C to 32.3°C Confined/unconfined shallow aquifer 300 meters, high yield up to 150 M³ per hour Perennial rivers Incredible water availability 	<ul style="list-style-type: none"> Lesser ground water development against availability Soil inundation during monsoon Urban migration High labour cost Human-elephant conflict 	Integrated groundwater and storage development <ul style="list-style-type: none"> Dug well and tube wells Water Detention Structures Solar pumps
5. Hilly Model: Hilly Zone	<ul style="list-style-type: none"> Brown forest soil Rainfall above 4,000 mm (skewed availability) Temperature 4.8°C to 19.5°C Abundant availability of natural springs Weathered zones and fissures having low yield 	<ul style="list-style-type: none"> Highly water scarce region Inadequate tapping of water resources Single-cropped rain-fed areas Degraded soils Chilling temperature High labour cost 	<ul style="list-style-type: none"> Spring rejuvenation Water storage Landscape management and soil conservation Diversion weirs



Zone	Hydro-geological and Agro-ecological Features	Critical Challenges	Main Scheme Types
		<ul style="list-style-type: none">• High urban migration• Technology deficient• Human-elephant conflict	

36. **As part of M&E, the Project will track the performance of WUAs based on a grading system developed in Phase I.** The grading system aims to evaluate both the governance and service delivery aspects. It consists of (a) 28 indicators that measure the level of scheme performance, financial management, conflict resolution (e.g. water allocation among users), and group activities (e.g. plantation, regular maintenance of schemes, fisheries) among others, and (b) qualitative assessments that are descriptive and, therefore, bring in more rigor to the learning process. Rather than being a mere evaluation tool, the grading results will be used as an institutional development tool to identify both strong WUAs that deserve showcasing and weak WUAs that warrant more support. Grading systems will slightly vary, accounting for different scheme types and the age of WUAs.

B. Economic Analysis

37. **The economic analysis (EA) shows that the Project is economically viable.** Following an approach similar to Phase I, the Project's benefits are assumed to include: (a) increase in yields arising from a shift from rainfed to irrigated agriculture, combined with better agronomic practices adopted by farmers benefiting from agricultural support services under Component C; (b) increase in cropping intensities—from single to double or in some instances to triple cropping—and area expansion through idle land brought into cultivation; (c) increase in output value derived from diversification to higher-value crops, such as vegetables; and (d) additional incomes for farmers and landless households involved in fisheries activities. The analysis assumes irrigation expansion in a command area of approximately 21,000 ha through the development of around 1,100 new minor irrigation scheme clusters. The transformation from rainfed cultivation to irrigated farming takes two to three years. Additional investments in existing WUAs on agricultural support services and strengthening of community-based institutions are expected to yield incremental benefits in the command area of 50,000 ha covered by existing 2,700 scheme clusters. Out of this 50,000 ha, about 11,000 ha is under the schemes that have been completed between 2019 and 2023 and may require support to adopt irrigated agriculture. Finally, 500 ha of irrigation pond water-spread area is expected to be used for fisheries production as well. Based on discussions with the SPMU and DPMUs as well as data collected during field visits, the analysis assumes an average increase in cropping intensities from 89 percent to 120 percent in the newly proposed scheme areas (21,000 ha) and the recently completed schemes from Phase I (11,000 ha) while a 16-percentage point increase in cropping intensities was assumed for other existing schemes (39,000 ha). Further, improvement in yields for paddy by 40–50 percent and diversification toward more profitable and less water-intensive crops such as pulses and vegetables (more than 50 percent of the gross cropped area under these crops compared with 15 percent in the without project scenario) were assumed. The analysis makes conservative assumptions regarding phasing and adoption. For a period of 25 years, and using a discount rate of 10 percent, the economic internal rate of return (EIRR) of the Project ranges from 25 percent to 29 percent for the low and high emission reduction scenarios. The corresponding economic net present values (ENPVs) are US\$145 million and US\$189 million, respectively. The sensitivity analysis confirms the robustness of these results.



38. **The Project's net GHG emissions over its economic lifetime are estimated to be -3,092,881 tCO₂eq, with average net emissions of -123,715 tCO₂eq per year.** Gross emissions are estimated at 6,068,772 tCO₂eq. Net reductions arise from promoting orchards, reducing the annual fallow area by increasing the cropping intensity, and crop diversification away from paddy. While there will be a moderate increase in GHG emissions due to increased use of inputs and increase in area under annual crops, this will be offset through improved management of cropping practices that will help sequester soil organic carbon.

C. Fiduciary

39. **The FM arrangements for the Project are fully reliant on country systems.** Key design features include the use of the GoWB's Integrated Financial Management System (IFMS) and the World Bank's simplified disbursement policies to mainstream the Project's FM arrangement within the state's own FM framework. The FM responsibilities for the Project will be vested with the SPMU. The FM and accountability arrangements are as follows:

- (a) **Planning and budgeting.** The SPMU will prepare a consolidated annual work program (AWP) for the Project based on inputs from the DPMUs. The AWP will be reflected in the annual allocations for the Project under the dedicated component-wise budget heads in the DWRID's annual budget books.
- (b) **Flow of funds.** World Bank funds will be provided to the Government of India (GoI) and made available to the GoWB in accordance with standard arrangements between the GoI and the states. Within the state, funds will be provided to the DWRID for the Project through the GoWB's annual budget. The Project Director will further distribute the allocations to the DPMUs through the state treasury system.
- (c) **Internal control, rules, and regulations.** The internal control framework and administrative procedures applicable to the Project are laid out in the West Bengal Financial Rules, the West Bengal Public Works Department Code, and the Central Public Works Accounts Code.
- (d) **Accounting and financial reporting.** Project accounts will be maintained on cash basis and will be extracted from the state treasury system. Payment for all expenses will be made electronically.
- (e) **External audit.** The CAG will be the external auditor for the Project. The audit report will be submitted by the SPMU to the World Bank within nine months from the close of the fiscal year.

40. **Disbursements by the World Bank will be made based on the interim unaudited financial reports (IUFRs) and the retroactive financing provision.** The SPMU will prepare the IUFRs from the accounting records maintained in the state treasury system for submission to the World Bank within 45 days from the end of each calendar quarter. Eligible Project-related expenditure incurred after July 1, 2022 are eligible for retroactive financing reimbursement, subject to a maximum amount of US\$15 million.

41. **Procurement under the Project will be carried out in accordance with the World Bank Procurement Regulations for Investment Project Financing (IPF) Borrowers (Procurement Regulations)³¹**

³¹ Fourth Edition, November 2020.



and the provisions of the Procurement Plan (PP) approved by the World Bank. The Project will use the Systematic Tracking of Exchanges in Procurement (STEP) to plan, record, and track procurement transactions. The major procurement activities under the Project will be for civil works, solar-based pumping systems, irrigation systems, SOs, expert consultancies, goods, and non-consulting services. Further, where suitable the Project will also introduce community-based procurement with a view to empowering WUAs. Despite the IA's experience in handling procurement under World Bank-financed projects, a number of procurement risks are identified, and a set of mitigation measures will be applied accordingly (annex 1).

D. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	Yes
Projects in Disputed Areas OP 7.60	No

42. **The Project triggers OP 7.50.** The project interventions will be located in the Ganga-Brahmaputra River system, which is considered an international waterway according to the World Bank's Operational Policy regarding Projects on International Waterways. The World Bank sent the notification to the affected riparian countries—Bangladesh, China, Nepal, and Bhutan—on behalf of the GoI in December 2022, and no comments have been received. The Regional Vice President's approval to proceed with finalizing project preparation was received on March 27, 2023.

E. Environmental and Social

43. **With moderate E&S risk, the Project is expected to have high E&S benefits that significantly outweigh the anticipated E&S challenges.**

- (a) **The environmental risk is rated Moderate.** Most activities proposed under the Project, except those under Component B, are likely to be environmentally neutral or may have negligible environmental impacts. The potential risk from the construction of minor irrigation infrastructure would be from noise, dust, wastewater, and waste generated from small-scale construction activities. These can cause some discomfort to local communities but for a short time because none of the construction activities are likely to be close to any settlement and the average construction time is less than six months. Intensification of agriculture is unlikely to lead to adverse impacts such as increased use of chemicals and water and loss of indigenous species and natural habitats. These are unlikely to happen as the Project has strong focus on integrated pest management and integrated nutrient management, promoting water use efficiency and indigenous variety of crops and fishes, and preserving genetic stock of fishes. Impact on biodiversity is not expected given that no interventions are allowed in protected areas, including legally protected areas, important bird areas, Ramsar Sites, congregation sites, wildlife corridors, conservation areas (including those socially protected), and critical habitats. The impacts from support services such as agriculture, horticulture, and fisheries will not be significant because the Project will promote (a) agroclimatic zone-based local species; (b) integrated pest management and integrated nutrient management (and will not procure any chemical pesticide or fertilizer);



- (c) organic farming; and (d) organic feeds in fisheries. The E&S screening is part of the preparation of the SCDMP, so scheme clusters that can have significant impacts on, for example, ecology, biodiversity, cultural resources, involuntary resettlement, and livelihoods will be screened as per the Environmental and Social Management Framework (ESMF). The Project activities have the potential to create impacts on human populations and the environment, but they are not likely to be significant. The potential impacts would be site specific, unlikely to be beyond the actual footprint of the Project, predictable, and temporary or reversible.
- (b) **The social risk is rated Moderate.** This is because the Project does not envisage (a) any private land acquisition and impact on any other assets and livelihood; (b) any major civil works; and (c) any significant labor influx. However, the Project involves voluntary land donation, including in tribal areas. Donations will be by one or few farmers who are part of a WUA for small areas where structures will be constructed (e.g. a water tank or outlet valves). The donor will be incentivized through certain means, including being given the job of pump operator or discount on the water charges for a few years. The IA already has experience in managing the E&S issues. The SPMU includes an Institutional Development Specialist responsible for addressing any social issue, who will be supported by SOs with social mobilizers at district level. However, the risk of exclusion of marginalized community remains to some extent, which will be tracked by the DPMUs. The sexual exploitation and abuse (SEA)/sexual harassment (SH) risk is assessed to be low as per the Civil Works Risk Assessment Tool. The works will be carried out in rural areas, and mostly local laborers will be involved. Still, the Project will identify service providers throughout the state to help carry out community consultations on SEA/SH during the project period to ensure awareness. In addition, the Project will sensitize the IA on SEA/SH issues, prepare a code of conduct to be signed by laborers and other field staff working on the Project, and establish gender-based violence (GBV)/SEA/SH-responsive GRM. The SPMU will regularly monitor GBV/SEA/SH risks, especially on tribes and based on the scope of the proposed construction works during preparation of needed Environmental and Social Framework (ESF) instruments.

44. **The Project has prepared an ESMF that provides guidance on preparation of specific investments.** It lays out processes to screen, identify, assess, mitigate, and minimize any risk, such as exclusion of marginalized communities and adverse impact on the community and environment for 'yet to be identified' irrigation and other developments. The ESMF includes template Environmental and Social Management Plans (ESMPs), which would be updated with specific ESMPs as part of the assessment carried out during the preparation of investments. Further, the ESMF addresses occupational and community health safety and implementation arrangements for managing E&S issues and the GRM. To address the requirements of Environmental and Social Standards 2 (Labor and Working Conditions), a Labor Management Procedure has been prepared. Owing to Phase I, the institutional arrangements for E&S management measures are already in place, although district-level environment professionals need to be onboarded. An Environment and Social Commitment Plan (ESCP) and a Stakeholder Engagement Plan (SEP) have been prepared. The ESCP records the requirements for preparing instruments for



investments that may be needed as per the ESF. The ESMF, SEP, Labor Management Procedures, and ESCP were finalized and disclosed.³²

45. Eligibility for retroactive financing will be determined based on an E&S audit. The E&S audit will prepare a corrective action plan, if any, which will be applied to eligible contracts. The recommendations laid out in the corrective action plan will have to be implemented on eligible contracts prior to submission of retroactive claims for disbursements. These processes are laid out in the ESMF and the commitment regarding the E&S audit and implementation of audit recommendation is reflected in the ESCP.

46. Citizen engagement is strengthened through various project interventions. During project preparation, communities in over 100 potential irrigation scheme locations have been engaged to identify issues related to community participation and location of proposed infrastructure. During implementation, the Project will (a) further engage with the beneficiaries through community consultations and focus group discussions to finalize the scheme cluster sites, identify land and land donors (if required), and devise commensurate response and support measures, including for disadvantaged and vulnerable people; (b) set up an accessible multi-tiered GRM with the participation of local self-government; (c) train WUAs members, at least one-third of whom would be women, on managing the infrastructure and the ESMP and sensitize them to GBV measures and support; (d) evaluate the implementation of the ESMF periodically; and (e) conduct beneficiary satisfaction surveys. The Project will include an indicator on the survey results.

47. A summary of climate adaptation and mitigation activities embedded in project design is provided in the Climate Change Technical Note. Climate change considerations have been mainstreamed in the Project and will directly contribute to improving access to irrigation, enhancing management of water resources, and augmenting production of agricultural commodities in the project areas. The Project will help West Bengal to attain its 2030 vision of becoming a carbon-neutral state and enable the GoWB to better adapt to the impacts of climate change by building the knowledge base and decision-support systems for climate-resilient planning and investment. Investments included under the Project will also directly strengthen institutional and infrastructure capacity to mitigate climate change impacts through improved water security and enhanced agricultural productivity.

V. GRIEVANCE REDRESS SERVICES

48. Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the World Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the World Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of World Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any time after concerns have been brought directly to the attention of World Bank Management and after Management has been given an opportunity to

³² In country on the DWRID's website on February 20, 2023 and March 7, 2023; and on the World Bank's external website (<https://documents.worldbank.org/en/publication/documents-reports/documentlist?qterm=p177876>) on February 28, 2023 and April 6, 2023.



respond. For information on how to submit complaints to the World Bank's GRS, please visit <http://www.worldbank.org/GRS>. For information on how to submit complaints to the World Bank's AM, please visit <https://accountability.worldbank.org>.

VI. KEY RISKS

49. **The overall risk rating for the Project is Moderate.** Overall risks are limited due to strong ownership by the GoWB, existing project implementation structures at the state and district levels, and a successful planning and implementation model for interventions that was validated in Phase I. Risks that are considered moderate and manageable include DWRID's unfamiliarity with the ESF, which requires capacity building; elite capture and entrenched interest groups at the local level, which will be managed through WUA awareness campaigns and participatory M&E; selection and supervision of schemes based on watershed-based planning principles, which will be achieved through clustering and capacity building; and low fiduciary capacity of WUAs, to which project funds will not be directly provided.

50. **There is Substantial residual risk related to institutional capacity for implementation and sustainability, especially at the local, or WUA, level.** Newly established WUAs may struggle to adopt, implement, and maintain modern agricultural techniques and infrastructure. Further, service fee collection may not be sufficient to sustain project interventions. To mitigate this risk, the Project will assist WUAs through SOs and provide technical assistance that will allow their members to meaningfully participate in scheme planning and implementation. Technologies will be chosen based on farmers' needs, their skills level, and local market opportunities. The Project will leverage the experience of successful WUAs in the state for peer-to-peer learning through demonstrations and site visits. Emphasis will be placed on raising awareness on the importance of paying service fees to sustain the infrastructure. The WUA cell is expected to formalize the necessary support to WUAs.

**VII. RESULTS FRAMEWORK AND MONITORING****Results Framework**

COUNTRY: India

West Bengal Accelerated Development of Minor Irrigation Project - Phase II

Project Development Objectives(s)

The PDO is to augment water availability and strengthen water user associations for improved irrigated agriculture in Project Areas of West Bengal.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
Augment water availability and strengthen water user associations for improved irrigated agriculture								
Water harnessed through new irrigation schemes (Cubic meters/year)		0.00	20,000,000.00	50,000,000.00	70,000,000.00	80,000,000.00	110,000,000.00	120,000,000.00
Well performing WUAs operating and maintaining irrigation schemes successfully (Percentage)		0.00	30.00	40.00	40.00	50.00	60.00	60.00
Value-weighted index for agricultural outputs (fixed base price) (Percentage)		90.00	100.00	100.00	110.00	120.00	140.00	150.00
Production of oilseed (Metric tons/year)		1,500.00	5,000.00	10,000.00	12,000.00	13,000.00	15,000.00	17,000.00
Production of pulses (Metric tons/year)		250.00	500.00	1,000.00	2,000.00	3,500.00	4,500.00	5,600.00



Indicator Name	PBC	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
Production of fish (Metric tons/year)	500.00	1,000.00	2,000.00	4,000.00	6,000.00	8,000.00	10,000.00	
Beneficiaries provided with improved irrigated agriculture and allied services (Number)	0.00	20,000.00	60,000.00	100,000.00	150,000.00	200,000.00	240,000.00	
of whom are small and marginal farmers (Percentage)	0.00	10.00	30.00	50.00	60.00	75.00	85.00	
of whom are farmers belonging to tribal communities (Percentage)	0.00	1.00	3.00	5.00	6.00	9.00	11.00	
of whom are female farmers (Percentage)	0.00	4.00	7.00	11.00	15.00	18.00	20.00	

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	Intermediate Targets					End Target
			1	2	3	4	5	
Component A: Strengthening community-based institutions								
Water user associations created/strengthened (Number)	0.00	500.00	1,200.00	1,800.00	2,400.00	3,100.00	3,800.00	
Beneficiaries satisfied with the services (Percentage)	0.00	10.00	15.00	20.00	30.00	40.00	50.00	
Water user association with women in leadership role	0.00	5.00	5.00	7.00	10.00	12.00	15.00	



Indicator Name	PBC	Baseline (Percentage)	Intermediate Targets					End Target
			1	2	3	4	5	
Component B: Minor irrigation services								
Area improved with new/improved irrigation services (Hectare(Ha))	0.00	2,000.00	5,000.00	10,000.00	20,000.00	27,000.00	30,000.00	
Farm lands improved with water management practices (Hectare(Ha))	0.00	1,000.00	2,000.00	4,000.00	5,000.00	8,000.00	10,000.00	
Area irrigated with green energy (Hectare(Ha))	0.00	1,000.00	2,000.00	4,000.00	6,000.00	8,000.00	10,000.00	
Component C: Agricultural support services								
Area diversified to high value crops (Hectare(Ha))	0.00	500.00	1,000.00	2,000.00	3,000.00	5,000.00	6,000.00	
Area under plantation (Hectare(Ha))	0.00	500.00	1,000.00	1,500.00	2,000.00	2,200.00	2,500.00	

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Water harnessed through new irrigation schemes	This indicator relates to improved irrigation services newly established in Phase II and accounts for both rainfall runoff water harvesting and groundwater pumping from wells. This	Annual	MIS	For surface water schemes, both in situ data collection for water storage capacity and remote sensing will be used. For groundwater pumping,	DPMU and SPMU engineering team. SO and WUAs



	<p>will represent improved water availability for both irrigation and fish and, hence, improved irrigation service delivery. The water storage capacity will be determined with respect to the total number of fillings of surface storage during a crop year. The groundwater harnessed will be estimated with respect to the amount of water pumped during a crop year.</p>			<p>the yield and pumping hours will be measured in sample tube wells. Additionally, solar systems will be equipped with a real-time monitoring system for power usage that will provide an indirect estimate of water use.</p>	
Well performing WUAs operating and maintaining irrigation schemes successfully	<p>This indicator measures the institutional strengthening and empowerment of WUAs. A well-performing WUA is one that provides improved irrigation service delivery for Rabi crops and fisheries. Using the WUA grading methodology, the WUAs with A and/or B will be considered as well performing. The WUAs from Phase I (2700) and Phase II (1100), totaling 3800 WUAs, will be targeted.</p>	Annual	MIS	<p>The Project will continue using a grading system from Phase I. Currently, the grading methodology comprises (i) 28 indicators comprehensively covering governance, roles, functioning, and performance results of WUAs capturing all-round performance areas; and (ii) qualitative indicators bringing in more rigor to the learning. It uses two separate grading for different</p>	SPMU



				types of schemes – surface water and groundwater. WUAs acquiring an ‘A+’ grade are considered as ‘matured’, ‘A’ as performing, ‘B’ as fledging, ‘C’ needing attention, and ‘D’ needing immediate attention.	
Value-weighted index for agricultural outputs (fixed base price)	This indicator measures the effectiveness of the agriculture service delivery and is a composite indicator accounting for crop intensification, diversification to high-value crops, and productivity. The unit price of each commodity will be fixed at the base price so price inflation will not impact this indicator. This will be estimated as the ratio of composite value at baseline and post-implementation.	Annual	MIS and WUAs or Fisheries group	It will be assessed using both field and remote sensing data, the cropping pattern, cropped areas, and respective crop yields. The schemes will be assessed in detail, and the methodology will be scaled up. The data collection for fisheries output will be from data maintained by WUAs.	Support organizations and DPMUs would collect the data while SPMU will compile in MIS.
Production of oilseed	This indicator measures the effectiveness of the agricultural services through crop diversification, soil	Annual	MIS and WUAs	A combination of approaches will be used including farmer interviews, crop	WUA and support organizations would update through DPMUs; and SPMUs will



	health through crop rotation, and water saving for irrigation. Both changes in the yield of oilseed and the increase in the area of oilseed crops both during Kharif and Rabi will be accounted for. This indicator would apply to the new irrigated area of 21,000 ha of Phase II and 11,000 ha of Phase I.			-cutting experiments, and remote sensing-based assessments to determine the cropped areas and their respective yield.	verify at the central level.
Production of pulses	This indicator measures crop diversification, soil health through crop rotation, improvements in nutritional status, and water saving by including all kinds of pulses in the Kharif and Rabi seasons. This indicator accounts for improvements in the increase in both yield and area as a result of water availability from newly irrigated areas of schemes (21,000 ha of Phase II and 11,000 ha of Phase I).	Seasonal	MIS		DPMU and SPMUs
Production of fish	This indicator measures the diversification of primary livelihood activities from improved water availability. The indicator will include the production of fisheries,	Monthly	MIS	WUAs through fisheries group/s, which will be trained to keep account of production as they tend to use it for home consumption. SOs and	Support organization, DPMUs and SPMUs



	as well as the production of fingerlings on a monthly basis. This would apply to WDS of around 500 ha developed during Phase II and new WDS developed during the last two years where communities are yet to be trained.			DPMUs will also continue to monitor selected schemes.	
Beneficiaries provided with improved irrigated agriculture and allied services	This indicator measures direct beneficiaries of irrigation and agricultural services provided by the Project. The indicator accounts for 80,000 farm households benefiting from the new irrigation schemes and additional 150,000 households benefiting from agriculture, horticulture, and fisheries livelihood support activities.	Annual	MIS	Farm households are members of WUAs, which have sub groups of fisheries groups and higher-level institutions of producer groups.	SPMU
of whom are small and marginal farmers					
of whom are farmers belonging to tribal communities					
of whom are female farmers					



Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Water user associations created/strengthened	The water user associations are the immediate outcome of strengthening community-based institutions of farmers which include support to existing as well as new WUAs. This indicator will account for all WUAs including existing ones from Phase I (2,700), and newly created ones under Phase II (1,100).	annual	MIS	All WUAs registered and in operation will be accounted for in this indicator.	SPMU
Beneficiaries satisfied with the services	Measures accountability and governance of WUAs and project management support. This is measured through the satisfaction levels of beneficiary farmers, particularly with the new irrigation services.	Biannual	Survey and M&E	The users will be provided to give feedback through various modes including mobile and focused surveys of beneficiaries.	DPMU
Water user association with women in leadership role	Measures the inclusion and equity aspects of WUAs strengthening in Phase II WUAs. The indicator measures women members occupying leadership positions within the executive committee of WUA. During Phase I, 7	Annual	MIS	Each WUA will maintain an updated MIS of its executive committee members.	DPMU and SOs: Social unit



	percent of WUA leadership positions were held by women. The indicator will aim to improve this during Phase II in new WUAs (1,100 numbers).				
Area improved with new/improved irrigation services	The indicator measures the impact of the Project in transforming rain-fed areas cultivated during a single crop season to irrigated cultivation with potentially multiple crop seasons. The indicator includes command areas of the new irrigation services established (19,000 ha) and an additional area of 11,000 ha developed during the last batches of schemes from Phase I. The transformation to irrigated cultivation happens not only through assured irrigation but also through the adoption of water management practices, utilization of assured solar pumping, support with production technologies, and marketing-related services. Farmers in drought-prone areas need time to convince themselves	Seasonally	MIS	<p>The Project would use field and remote sensing-based assessment. Selected schemes will be assessed in detail throughout the project cycle.</p>	DPMUs and SPMU



	in taking the risk of additional crops, and this normally takes initially 2-3 years of continued work with farmers. Although the Project is aiming to establish new irrigation services for around 26,000 ha, this indicator would account for the areas showing impact during the Project period only.				
Farm lands improved with water management practices	This indicator measures the convergence of agriculture support services within the command areas of schemes commissioned. The indicator will account for command areas served with improved water management practices including sprinklers, drip irrigation systems, vermicompost, irrigation scheduling supported by soil moisture measurement, or other agri-advisory support services.	Annual	MIS	MIS will maintain the areas that benefitted from various interventions for each scheme. WUAs, SO, and the agricultural team will contribute to this assessment.	DPMUs
Area irrigated with green energy	This indicator measures the effectiveness of using green/renewable (predominantly solar)	Annual	MIS	Project progress reports	DPMU engineers unit



	energy for powering the irrigation schemes and serving the command area. This will be provided to both phase I and II schemes.				
Area diversified to high value crops	This indicator measures the effectiveness of agriculture support services. The indicator will account for command areas cultivating newer crops than the traditional ones, including high-value crops like vegetables, flowers, fruits, and other horticulture crops. The command area that benefitted from phase I and II schemes will be considered.	Annual	MIS	WUAs will be trained to map cropping patterns. SO and DPMU staff shall update the cropping pattern in various schemes. Based on their ground-truthing, remote sensing-based assessment will be improved to identify various crops.	DPMUs, SOs and SPMUs
Area under plantation	This indicator measures resilience efforts for catchment management and shifting from risky seasonal crops to tree and plantation crops as mitigation against climate uncertainties. The indicator will account for command areas brought under cultivation of mixed fruit plantation and other tree	Annual	MIS	The field team shall update in MIS/GIS system including their survival status.	DPMUs/WUAs



	crops, especially on the fringes of WDS and other water harvesting structures and catchment areas.				
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**ANNEX 1: Implementation Arrangements and Support Plan****COUNTRY: India****West Bengal Accelerated Development of Minor Irrigation Project Phase II****Implementing Agency**

1. **The DWRID will have the main responsibility for the implementation of the Project.** The department has 350 professional staff, with a mixture of civil, mechanical, electrical, and agricultural engineers. The staff are located at the center in Kolkata and decentralized over eight circles, which have a total of 50 divisions across 23 districts. The DWRID's main responsibility during the last 40 years has been the development of minor irrigation schemes that currently cover about 1.7 million ha. It has been the policy of the DWRID to hand over completed schemes, and so far about 68,400 minor schemes have been handed over to WUAs for O&M while 7,800 schemes are maintained by the DWRID. The DWRID's annual budget is INR 1,000 crore per year, of which INR 200 crore has been spent in continuing Phase I activities after its closure, supporting about 400 schemes. The Project (Phase II) is targeting to disburse around INR 250 crore per year supporting about 200 schemes, which is well within the range of the available capacity. To provide adequate technical support, the Project will finance additional 450 contractual staff, including multi-disciplinary team of specialists along with engineers and surveyors.
2. **The DWRID has set up a SPMU and 23 DPMUs to implement the Project.** The SPMU is located in Kolkata and the DPMUs in district centers. The units are staffed with a combination of department staff and consultants. In some areas, Phase I introduced camps during the peak phase of implementation headed by Assistant Engineers and other team. The same may continue in Phase II.
3. **Committees at the state and district levels will review and guide project implementation.**

- (a) **SLTSC.** At the state level, the SLTSC will annually periodically review the progress of the Project and provide strategic directions, guidance on policy matters, and conflict resolution, if any. The Project Director (SPMU) will be the convener of the SLTSC, and its members will include Engineer in Chief and Ex-Officio Secretary of the DWRID and Secretaries of the Departments of Finance, Agriculture, Food Processing Industries, Horticulture, Fisheries, Agricultural Marketing, and Animal Husbandries.
- (b) **DLIC.** At the district level, the Project will be regularly (on average every three months) reviewed by a DLIC, chaired by the District Magistrate. The DLIC will include the District Project Director (technical), Agriculture Activity Manager of the District Board (elected member), senior district-level representatives from the Departments of Agriculture, Food Processing Industries and Horticulture, and Fisheries, concerned Executive Engineers, staff of the Electricity Distribution Company, and SO and WUA representatives, as required. The DLIC will be the main forum for district-level coordination of project activities with other ongoing government programs, approval of annual action plans, monitoring of project progress, and grievance redressal and resolution of conflicts, if any, among the implementing partners.
- (c) **Convergence with line departments.** The Project will continue to coordinate with line departments, including agriculture, fisheries and horticulture, to align agricultural support



services and provide value addition to other state-run schemes. At the state level, the nodal officers will be assigned by line departments to enable the opportunities for convergence with the Project. At the district level, while the DPMUs' multidisciplinary teams execute the Project, expert support of line departments will continue to be sought.

Financial Management

4. **FM assessment.** An assessment of the FM arrangements has been undertaken in accordance with the Bank Policy and the Bank Directive 2021 and the Financial Management Manual for World Bank Financed Investment Operations 2017. Given the successful implementation of Phase I, the SPMU has the requisite capacity for implementing the Project, and the FM arrangements for the project are fully integrated with the GoWB's public financial management systems. The overall FM risk is accordingly assessed as Moderate.

5. **AWP and budgeting.** The DPMUs will be required to submit costed estimates of the activities they plan to undertake in the ensuing fiscal year. The SPMU will review the annual work plans of DPMUs and prepare a consolidated AWP for the Project at the time of finalization of the DWRID's aggregate budget, that is, before the start of the new fiscal year. The consolidated AWP-cum-budget will be submitted by the SPMU to the DWRID for its approval before onward submission to the State Finance Department. The State Finance Department has made a budget provision of INR 2,050 million (US\$25 million) for the fiscal year 2023–24 for DWRID to meet the project-related expenditures. The Executive Engineers in the DPMUs, as the drawing and disbursing officers of the DWRID, will be responsible for verifying and approving expenditure in the districts through the state treasury system.

6. **Internal control.** The DWRID follows the financial rules and procedures laid down in the State Financial Rules and the Central Public Works Accounts Code for accounting and reporting procedures. All financial controls applicable to routine GoWB expenditures will apply to the expenditures made from the Project.

7. **WUAs.** While no project funds will flow directly to WUAs, they are expected to be (a) contracted by the Project for implementation of different minor works, and (b) assume responsibilities for O&M of the completed schemes. All WUAs covered under the Project are registered under the West Bengal Societies Registration Act, 1961 and are hence (i) required to maintain the prescribed set of accounts, and (ii) subject to annual external audits. The Project will strengthen the capacity of the WUAs to comply with the statutory framework of accounting, internal controls, financial reporting, and auditing, as laid down in the Act.

8. **Accounting and reporting.** Accounting will be reported on the State's online IFMS. Based on the reports of compiled expenditures against the budget lines from the IFMS, supplemented by copies of the manual monthly financial reports submitted by the DPMU, the DWRID will prepare quarterly IUFRs reflecting activity-wise project expenditures. The World Bank will reimburse expenditures reported in these IUFRs and transfer funds to GoWB following the standard Centre-State mechanism of Additional Central Assistance on a back-to-back basis. For retroactive financing, the SPMU will submit a separate stand-alone IUFR certifying the actual expenditure incurred.

9. **External audit.** The CAG, through the offices of the Auditor General in West Bengal, will be the external auditor for the Project. The scope of audit will be as per the terms of reference agreed with the



office of the CAG. The audit report for the Project will be submitted by the SPMU to the IBRD within nine months from the close of the fiscal year. The audit report for the expenditures incurred under the retroactive financing provision will be combined with the first-year audit report.

10. **Disbursement schedule.** Loan funds will be disbursed under the following categories subject to the allocated amount and the disbursement percentage as indicated in table 1.1.

Table 1.1. Disbursement Schedule

Category	Amount of the Loan Allocated (Expressed in US\$)	Percentage of Expenditures to be Financed (Inclusive of Taxes)
1. Goods, works, non-consulting services, consulting services, incremental operating costs, and training	147,630,000	70%
2. Front-end fee	370,000	Amount payable pursuant to Section 2.03 of this Agreement in accordance with Section 2.07 (b) of the General Conditions
3. Interest rate cap or interest rate collar premium	0	Amount due pursuant to Section 4.05 (c) of the General Conditions
TOTAL AMOUNT	148,000,000	

Procurement

11. **Procurement regulations.** Procurement for the Project will be carried out in accordance with the World Bank's Procurement Regulations for IPF Borrowers dated July 2016, and revised in August 2018 and November 2020, and the provisions stipulated in the Loan Agreement. Further, the Project would be subject to the World Bank's Anti-Corruption Guidelines, dated October 15, 2006, and revised in January 2011 and July 2016. Unless otherwise agreed with the World Bank, the World Bank's standard procurement documents will be used.

12. **Implementation arrangements for procurement.** The DWRID of the GoWB is the main IA, which is supported by the existing SPMU and DPMUs created under Phase I in procurement function for the program. The procurement will be undertaken under the Project through a National Informatics Centre-based e-Procurement portal, which has been already used by the IA in Phase I, and the same system has been cleared by the World Bank for use in this Project. To empower the WUAs, the Project will use community procurement to execute simple and small civil works, such as digging the ditches and plantation activities, based on nomination by concerned WUAs.

13. **Project procurement strategy.** Major items to be procured under this Project are small civil works of minor irrigation schemes such as check dams, WDS, and solar-based pumping system and tube wells. A few consultancy assignments are also envisaged. A Project Procurement Strategy for Development (PPSD) (under preparation) has been developed for the Project based on detailed requirements, capacity assessment, and market analysis. Based on the findings, decisions on packages and lots are being finalized to ensure adequate participation of bidders, which will form part of the PP. The PP shall be augmented and modified based on changing requirements during project implementation.



14. **Procurement risk assessment.** The risk ratings have been decided based on both the probability of occurrence of various events and their likely impact. Assessment parameters, include, among others, procurement capacity and experience of the IA, complex nature of the procuring items, and possibilities of fraud and corruption/transparency-related risks. Also, this is a procurement-intensive project and many small-value procurements are envisaged. Based on the assessment, the overall procurement risk rating for the Project is determined as 'Moderate'. The residual rating on procurement will be reviewed and updated periodically by the World Bank. Table 1.2 describes major procurement-related risks and the mitigation plan with responsibility matrix/timeline.

Table 1.2. Key Procurement-Related Risks and Mitigation Plan

Risks Identified	Mitigation Measures Proposed	Responsibility
Despite experience in World Bank procurement in Phase I, institutional capacity on procurement needs strengthening.	<ul style="list-style-type: none"> Organizing regular training programs on procurement to enhance capacity Project Operation Manual (which will include a chapter on procurement) 	IA/World Bank
Typical procurement such as solar pumps and their maintenance	<ul style="list-style-type: none"> Use of appropriate market approach based on recommendations of the PPSD Monitoring through the PP and quarterly reports 	IA/World Bank
Risk of inadequate budget or delay in budget from the Government	<ul style="list-style-type: none"> Budget planning would be kept streamlined with advance provisions. 	IA
External interference in the procurement process, transparency, and fraud and corruption issues	<ul style="list-style-type: none"> Use of e-Procurement Fair complaint handling mechanism Disclosure of procurement-related information External/internal procurement audits 	IA

15. **Procurement readiness.** The Project already has the SPMU and DPMUs in place. The Project is ready with bid documents for floating tenders in short notice.

16. Based on the preliminary assessment, most of the procurement will follow the national market using Request for Bids (RFB). There is no proposal to use the international approach or best and final offer or negotiations. The procurement category and method of the selection process is given in table 1.3.

Table 1.3. Procurement Category and Method of Selection Process

Category	Description	Selection Method
Works	Including supply-cum-installation works	RFB - National; RFQ - National/international
Goods/non-consultancy services	GIS, IT systems, computers and accessories, software and related items, and so on	RFB - International/National, RFQ - National including GeM; a few may be DS
Consultancy	External audit, internal audit, M&E and so on, research activities, and capacity-building activities	QCBS, LCS, FBS, QBS, CQS, a few may be DS

Note: CQS = Selection based on Consultant's Qualifications; DS = Direct Selection; FBS = Selection under a Fixed Budget; GeM = Government e Marketplace; LCS = Least-Cost Selection; QCBS = Quality- and Cost-Based Selection; QBS = Quality-Based Selection; RFQ = Request for Quotations.



17. Arrangements under National Competitive Procurement. National competition for the procurement of goods, works, and non-consulting services according to the established thresholds will be conducted in accordance with paragraphs 5.3–5.6 of Section V of the Regulations and the following provisions:

- (a) Only the model bidding documents for National Competitive Procurement agreed with the GoI task force (and as amended from time to time) shall be used for bidding.
- (b) Invitations to bid shall be advertised on a widely used website or electronic portal with free open access at least 30 days before the deadline for the submission of bids unless otherwise agreed in the approved PP.
- (c) No special preference will be accorded to any bidder either for price or for other terms and conditions when competing with foreign bidders, state-owned enterprises, small-scale enterprises, or enterprises from any given state.
- (d) Except with the prior concurrence of the World Bank, there shall be no negotiation of price with the bidders, even with the lowest evaluated bidder.
- (e) GeM set up by the Ministry of Commerce, GoI, will be acceptable for procurement under the RFQ method.
- (f) At the borrower's request, the World Bank may agree to the borrower's use, in whole or in part, of its electronic procurement system, provided that the World Bank is satisfied with the adequacy of such system.
- (g) Procurement will be open to eligible firms from any country. This eligibility of firms shall be as defined under Section III of the Procurement Regulations. Accordingly, no bidder or potential bidder shall be declared ineligible for contracts financed by the World Bank for reasons other than those provided in Section III of the Procurement Regulations.
- (h) The RFB/Request for Proposals document shall require that bidders/proposers submitting bids/proposals include a signed acceptance in the bid, to be incorporated in any resulting contracts, confirming application of, and compliance with, the World Bank's Anti-Corruption Guidelines, including without limitation the World Bank's right to sanction and the World Bank's inspection and audit rights.
- (i) The borrower shall use an effective complaint redressal mechanism for handling procurement-related complaints on time.
- (j) Procurement documents will include provisions, as agreed with the World Bank, intended to adequately mitigate against environmental, social (including SEA and GBV), and health and safety risks and impacts.

18. Use of GeM will be allowed instead of RFQ/shopping for all activities with estimated value less than US\$100,000.

19. STEP. The Project will implement STEP, a planning and tracking tool, for procurement-related communications with the World Bank. Details of the procurement activities that have been prepared, including the PP, will be entered in STEP. A few staff from the IA have already been trained by the World Bank to use STEP, and others will be trained as and when required.



20. **Procurement review thresholds.** Table 1.4 lists the procurement thresholds for the various procurement methods.

Table 1.4. Procurement Thresholds for the Various Procurement Methods

Procurement Type	Market Approach Method Threshold (US\$, millions)	World Bank's Prior Review Threshold (US\$, millions)
Works	Open International: More than 40 Open National: Up to 40 National RFQ: Up to 0.1	All contracts > 15
Goods, IT, and non-consulting services	Open International: More than 10 Open National: Up to 10 National RFQ: Up to 0.1	Goods and IT: All contracts > 4 Non-consulting services: All contracts > 4
Consulting firms	Open International: More than 2 National market approach < 2 CQS < 0.3 LCS, FBS - in justified cases QCBS, QBS - in all other packages	All contracts > 2
Individual consultants	No thresholds	All contracts > 0.4
DS	No thresholds	With prior agreement based on justification <ul style="list-style-type: none">• For goods/works/non-consulting services: According to paragraphs 6.8–6.10 of the Procurement Regulations• For consultants: According to paragraphs 7.13–7.15 of the Procurement Regulations

21. **Advance contracting with retroactive financing.** For effective project implementation and start-up, the Project has initiated advance contracting, which is likely to include, but may not be limited to, critical consultancies envisaged under the Project.

22. **Post review.** All contracts not subject to prior review by the World Bank will be subject to post review. Post review of the sampled procurements would be carried out during the Project's implementation support missions and/or special post review missions. The World Bank may conduct, at any time, independent procurement reviews of all the contracts financed under the loan.

23. **Complaint handling mechanism.** To address procurement complaints received by the Project, a link disclosing details about the specific procurement complaint handling mechanism for this Project will be given on the IA's website. The mechanism would include a brief on whom to complain to, how it will be resolved, and what will be the estimated timeline. The IA is also required to ensure recording of procurement-related complaints in the STEP tool. Both the World Bank and the borrower will use STEP to track complaints. The borrower will be responsible for performing the following actions in STEP: (a) promptly record all complaints relating to procurement process in IPF operations; (b) for procurement process complaints received on contracts subject to the World Bank's prior review, submit the borrower's proposed response to each complaint before issuing it to the complainant(s); (c) record the borrower's response to the procurement process complaints upon issuance to the complainant(s); and (d) promptly register requests for debriefings and update STEP with the record of the debriefings to interested parties.



24. **Record keeping.** All records pertaining to award of contracts—including bid notifications; bidding documents; bid opening minutes; bid evaluation reports; signed contracts; and all correspondence pertaining to bid evaluation, communication exchanged with the World Bank and the bidders/consultants in the process, bid securities, and approval of invitation/evaluation of bids—must be retained by the SPMU and DPMUs. These will also be uploaded in STEP.

25. **Disclosure.** The minimum documents that will be disclosed on the IA's website include (a) RFB/Request for Expressions of Interest and (b) details of contract awards. The following details are published on the United Nations Development Business website through STEP: (a) an invitation for bids for procurement of goods and works using open international procedures and (b) contract award details of all procurement of goods and works using open international procedures.