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Project Information Document (PID)

Appraisal Stage | Date Prepared/Updated: 03-Dec-2023 | Report No: PIDA0106

Public Disclosure Authorized

BASIC INFORMATION

A. Basic Project Data

Project Beneficiary(ies)	Region	Operation ID	Operation Name
India	SOUTH ASIA	P179357	Uttarakhand Climate Responsive Rainfed Farming Project
Financing Instrument	**Estimated Appraisal Date**	**Estimated Approval Date**	**Practice Area (Lead)**
Investment Project Financing (IPF)	24-Nov-2023	20-Feb-2024	Agriculture and Food
Borrower(s)	**Implementing Agency**		
India	Watershed Management Directorate, Government of Uttarakhand		

Proposed Development Objective(s)

Improve production system resilience to make mountain farming emission competitive and profitable in selected micro-watersheds of Uttarakhand

Components

Component A: Developing Resilient and GHG-efficient Production Systems
Component B: Science-based Development of Resilient Springsheds
Component C: Enhancing Income Resilience through Agribusiness and Entrepreneurship
Component D: Project Management, Monitoring & Evaluation, and Learning

PROJECT FINANCING DATA (US$, Millions)

Maximizing Finance for Development

Is this an MFD-Enabling Project (MFD-EP)?	No
Is this project Private Capital Enabling (PCE)?	No

SUMMARY

Total Operation Cost	**140.61**
Total Financing	**140.61**
of which IBRD/IDA	**102.01**

Financing Gap	**0.00**

DETAILS

World Bank Group Financing	
International Bank for Reconstruction and Development (IBRD)	102.01
Non-World Bank Group Financing	
Counterpart Funding	38.60
Borrowing Agency	32.68
Local Beneficiaries	5.92

Environmental And Social Risk Classification

Moderate

Decision

The review did authorize the team to appraise and negotiate

B. Introduction and Context

Country Context

1. **Uttarakhand is a Himalayan state and 92 percent of its territory is hilly and mountainous with rugged topography, prone to climatic and seismic disasters.** Approximately 80 percent of the state's estimated population of 11 million live in hilly areas, creating challenges for access to markets and services. Only nine percent of land is cultivated, with 63 percent under forest cover. Having demonstrated a V-shaped recovery from the COVID-19 pandemic, the Gross State Domestic Product (GSDP) of Uttarakhand in FY22 grew at 6.13 percent (at constant prices). Capital infusion for development backed by generous tax benefits contributed to the GSDP growth[1]. The manufacturing and construction sectors account for 50 percent of the GSDP in the state, owing in part to the emergence of capital-intensive Micro, Small, and Medium Enterprises (MSMEs). With the contribution of the agriculture declining from 11.5 percent in 2011-12 to 8.8 percent of GSDP in 2021-22, Uttarakhand has been undergoing a structural change. However, the percentage of population dependent on the agriculture sector remains high (47.2 percent), and the overall sector growth in the state is positive, thus making it a critical resource to manage risks, support livelihoods and tap growth opportunities.

[1] Uttarakhand Economic Survey 2021-22

Sectoral and Institutional Context

2. **Agriculture in Uttarakhand remains the primary source of livelihoods for nearly half of its population, and much of it is in rainfed hilly areas.** The cultivated land in the state divided between predominantly rainfed hilly areas and the more productive valley plain-land and typically known as irrigated plains. Approximately 80 percent of the farming population is dependent on rainfed hilly areas. The major crops grown are cereals with productivity as low as 1.2 to 1.4 tons/hectare (ha), far below national averages, but with a considerable range of varied cereals such as maize, millets, pulses, horticulture, and integration of livestock, depending on the altitude. On an average, the crop yields in the plains are approximately 50 percent higher than those of the hills, because of limited availability of irrigation water, poor in-situ rainwater conservation, and loss of fertile topsoil. Therefore, while commercially oriented agriculture is practiced in the plains, hill farmers historically have limited marketable surplus. Of the total landholdings, about 89 percent are small and marginal, where achieving scale economies are difficult, with high input costs.

3. **Increasing productivity in rainfed hilly areas is challenging and water plays a central and dynamic role**. In the hills, cultivation is characterized by hillside terraces where conventional irrigation practices are not feasible. Annual rainfall is high (1,523 mm) but more than 90 percent is received during the July-September monsoon months, which together with steep slopes, means rapid and large runoff, resulting in soil loss of 40 tons/ha/year. At the same time, there has been an overall reduction in the discharge rate of stream and spring water sources, critical for year-round water supply both for agriculture and the domestic needs of villagers in the state. These stresses compound the constraints to enhancing rainfed agronomic practices and increasing agricultural productivity. Consequently, household incomes are low and there is a trend of out-migration in the last few decades.

4. **The Government of Uttarakhand's (GoUK) support for rainfed agriculture successfully demonstrated restoration of watersheds for improving water flows and increase productivity, but approaches need greater focus**. Implementing watershed treatment to contribute to improving stream flow and spring discharge, more stabilized runoff, and improved irrigation have been well established and demonstrated, including through the World Bank-financed Uttarakhand Decentralized Watershed Development II Project (UDWDP, or *Gramya II* - P131235), which closed successfully in early 2022[2]. Under the project, the state made good progress in implementing watershed rehabilitation improving spring discharge, bringing sizeable new areas under irrigation, with improved cropping intensity and enhanced productivity of selected crops. However, a more focused spring-shed rejuvenation and management, combined with dedicated crop input and advisory for enhanced productivity that also addresses emerging climate vulnerabilities, is yet to be systematically addressed at scale.

5. **Spring-shed management needs to play a key role in rainfed upland agriculture and climate resilience.** Water supply and management play an increasingly critical role with climate change. Historically, in the absence of assured irrigation supply in rainfed areas, comprehensive watershed treatment within a defined hydrological boundary has been the key assurance for moisture retention for rainfed crops, as done under the previous project. However, given the emerging temporal and spatial rainfall variability, watershed management has not been able to ensure full water security through the annual crop cycle. Spring-sheds[3] and the springs they supply to are a critical year-round source of water for agriculture and domestic purposes for many communities in Uttarakhand. For more strategic watershed management, it is imperative to intervene at the spring-shed level to ensure water security in more focused areas of

[2] World Bank. 2022. India - Second Uttarakhand Decentralized Watershed Development Project ICRR (English). Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/099350009162242515/BOSIB135bce8301d24314f5118a7b19c80b910765a

[3] A spring-shed is a set of watersheds and aquifers that integrates into a system that supplies water to a group/group of spring(s)

micro-watersheds. However, there has been a decline in the number of springs flowing through the year[4], with about 10 percent of spring sources having dried up over the last decade. Further, climate change has exacerbated water insecurity through erratic rainfall, drying of springs, reduced discharge, and diminished spring water quality. It is in this regard that spring-shed management, is critical for sustaining irrigation water supplies, also at critical times, for improving food security, and enhancing productivity from arable and non-arable areas.

6. **Challenges to agriculture productivity, and thus profitability persists, compounded by the pressure of climate change, highlighting the need for strong resilience measures in rainfed farming.** To confront climate variable impacts and aligning to Government of India's (GoIs) priorities, the state government plant establish millet as a dominant crop across the state through this project. While the knowledge on climate resilient agriculture is expanding, for the hilly areas of Uttarakhand, like in other mountainous states, there is a pressing need to refine and localize advisories in the very complex topography and the varying microclimates. These need to be also matched with more downscaled agrometeorological information[5], bringing in more precision agriculture, and science on innovations in climate resilient practices, and understanding the effects on Greenhouse Gas (GHG) emissions and reduction. Special attention will be paid to paddy-cultivated areas that emit significant methane emission.

7. **Addressing gaps in supply chain and inadequate marketing infrastructure for income resilience is critical to sustaining climate-responsive rainfed production systems.** Maximizing the value of rainfed hill agriculture due to its distinct quality and off-season availability is critical to sustain its potential value, and to deliver more sustainable sources of income is also key to resilience. Mountain ecosystems enable the cultivation of crops, including high-value vegetable crops, during the off-season (when plain states are busy producing cereal crops) for most of the country, thereby providing an opportunity for farmers to benefit from relatively higher prices during that season. Commodities from the hills and mountains are also recognized for high quality varieties, and low use of pesticides. The state is close to major urban markets and population centers including the National Capital Region thereby providing a ready market for high value produce. However, the state is unable to realize its potential and incurs substantial post-harvest losses due to inadequate processing facilities, storage infrastructure, and logistical issues in the mountainous terrain. A cluster approach with aggregating products and upgraded processing, marketing has been demonstrated under the Gramya II, but was only supporting a relatively small number of farmers and the enterprise was only just established at the end of the project. Connecting climate-smart precision farming protocol with an effective marketing chain can provide backwards-forward linkages towards a paradigm shift. Agricultural enterprises in the hills will be critical for delivering quality inputs such as seeds. This needs further specialized support for niche markets, geographic indication, targeted markets, and recognizing and branding quality products. There is also currently a lack of entrepreneurship among upland smallholders.

11. **Uttarakhand's vision for agricultural growth is fast evolving with the emerging focus on climate change and scaling up.** GoUK is committed to improving food security, climate resilience and enhancing farmers' income, while aligning with India's Intended Nationally Determined Contributions (INDC[6,7]) and Conference of the Parties (COP26)

[4] Report of the NITI Aayog Working Group on Inventory and Revival of Springs in Himalayas for Water Security, Department of Science & Technology, December 2017 http://dst.gov.in/sites/default/files/NITI-Aayog-report-Springs-29Dec2017-FINAL.pdf

[5] World Bank 2018. Adaptation to El Niño, Climate Variability and Climate Change in Agriculture in Uttarakhand. ASA: Agriculture Adaptation to El Niño and Climate Change (unpublished)

[6] Under the updated INDCs, India is committed to reducing the emissions intensity of its gross domestic products by 45 % from 2005 levels by 2030.

[7] India also commits to strengthening adaptation in its updated NDC through investments in sectors vulnerable to climate change particularly agriculture, water resources, and Himalayan region among others. https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf

commitments towards reducing emissions. The 'Revised Uttarakhand Action Plan on Climate Change'[8] (UAPCC) and the Draft Uttarakhand Agriculture Policy support strongly the rainfed sector's transformation towards improved productivity, climate smart agriculture and diversification, ecosystem resilience and, agribusiness opportunities towards farmers' resilience and profitability. The UAPCC also notes the importance of spring-sheds in water critical resource development.

12. **Uttarakhand holds potential to demonstrate national contribution to global commitments and capitalize its carbon stocks through voluntary carbon markets, as an income enhancing incentive to farmers.** The emergence of voluntary carbon markets in India offers an avenue for incentivizing climate-smart agriculture in the plains and hills, which aligns with the GoUK's aim of reducing GHG emissions through agriculture. A particular area of potential reduction in GHG emissions is reduction in methane from paddy rice, especially in the lowlands forming part of the wider Uttarakhand agriculture landscape.

13. Despite the fluxes of GHGs in farmland ecosystem being a complex process[9], the project is pre-positioned to measure emissions at the farm level to capitalize on the voluntary carbon market as a potential income source for participating farmers, however, subject to unfolding of the regulatory and accountability framework for Certified Emission Reduction (CER) by the government. Given that the project by design will implement climate-smart practices on large land area with selected horticulture and agriculture crops, and with methodology and approach of verification including MRV (Monitoring, Reporting and Verification) in place, the Government of Uttarakhand has encouraged the project to move forward until the Government of India provides clear guidelines on where such CER generated by the project will get counted under its NDC (Nationally Determined Commitment). The volatility in the fast-emerging carbon market holds promise for the project to invest in horticulture crops for generating enhanced CER for the beneficiaries.

C. Proposed Development Objective(s)

Development Objective(s) (From PAD)

Improve production system resilience to make mountain farming emission competitive and profitable in selected micro-watersheds of Uttarakhand

Key Results

KPI 1: Reduction in GHG emissions from representative cropped land parcels (CRI).
KPI 2: Increase in productivity of selected crops.
KPI 3: Increased water discharge in sample spring-sheds.
KPI 4: Farmers adopting climate smart agriculture technologies and practices promoted by the project (CRI).
KPI 5: Farm Income at HH Level with / without UCRRFP

D. Project Description

[8] TERI. 2022 Revision of State Action Plan on Climate Change for Uttarakhand New Delhi: The Energy and Resources Institute.

15. The project will promote transition to production systems that are climate adaptive, use water, soil and other inputs more efficiently, result in optimum volume and stability in outputs, and are resilient to short and long-term climate variability. With productivity improvement, input-cost reductions, and crop diversification, together with a systematic agribusiness approach to add value to products from the hilly areas, an increase in farmers' incomes and broader household resilience are expected. Specialised climate-smart land and water practices will also aim to reduce GHG emissions per unit of land while enhancing the capacity of terrestrial ecosystems to act as carbon sinks, thereby contributing to climate change mitigation and adaptation. The project will bring in consortia for the co-creation of Climate Smart Agriculture (CSA) knowledge and developing protocols for technologies and localised advisories. An agricultral digital platform will be developed to underpin the science base and delivering of services to farmers.

16. The project will focus on small and marginal farmers, including women farmers, and landless households. The project will be implemented in already selected 58 Micro-Watersheds (MWS) in 993 villages across 8 districts covering a catchment area of 237,634 hectares (ha), which includes arable and non-arable land. All four agro-climatic zones in the state will be covered by the project, an aggregate area of 92,274 ha arable area including fallow and current fallows. Estimated beneficiaries in the project area are 3,70,902[10] households, out of which women are 40 percent. This includes about 70,000 households with land targeted for agricultural assets and services, and further 7,000 landless vulnerable households will get income generating support (some of which may also be agriculture related, depending on needs).

Component A: Developing Resilient and GHG Efficient Production Systems

17. The component provides the foundation for the project to shift cultivation towards optimal input usage pattern, leading to reduced input costs and enhanced average income of farmers[11]. The activities under the component will enhance productivity to an optimal level keeping in mind the soil deficiencies and cost of cultivation. Given that rising weather uncertainty has contributed to large-scale damages to crops, more so under rainfed conditions, the component will move away from highly intensive input usage to low-risk optimal input for sustaining productivity and returns per unit of land while reducing emissions. This component will mobilize farmers' groups to accelerate the adoption of demonstrated technologies as per government norms.

18. **Sub-component A1: Supporting Climate Smart and Diversified Production Protocols:** The project will help localize and test CSA in a participatory manner in representative systems; support farm planning and mobilization of farmers interest groups; and support practices for resilient and GHG efficient farm productivity (especially for flooded rice systems). It will prepare farmers on identifying, accessing, and implementing the most suitable practices for CSA with support of advance weather forecasting in convergence with ongoing government initiatives on weather forecasting.

19. **Subcomponent A2: Building Consortia and Digital Platform for Evidence-based Decision Support:** An evidence-based decision support for CSA will be built on key high-class science partnerships, several of which are possible in the state, but also with national lead science institute. These consortia partnerships will develop knowledge products through a process of co-creation, often with pilot communities, and build a digital data source in the form of advisory and tools, analytics, and data management to support delivery at field, closing the lab to land gap. This will be linked

[10] Based on 2011 Census.
[11] Bedi, J S and G Prabhakar (2023). Weather Uncertainties and the Strategy to Raise Farmers' Income, Economic & Political Weekly, July 15, 2023.

to spatial and farm data systems, a digital platform that will provide analytics relevant for the State. The 'consortia' will engage researchers / scientists from leading institutes[12] to support project implementation and enhance technology diffusion. As the project has multi-faceted aspects, no single institution has the expertise to address the technical requirements to achieve the project aims. The proposed 'consortia' will therefore pool subject-specific expertise with clearly defined outputs, such as to: i) develop resilience protocols to support adoption of improved agriculture production systems; ii) develop precision farming package of practices appropriate for the local rainfed conditions; iii) deploy irrigation methods and irrigation scheduling (volume) to improve agriculture productivity while reducing integrated GHG emissions[13]; iv) develop water use efficiency criteria for crops and cropping patterns for building below ground (soil organic carbon) and above ground biomass (productivity), and v) develop technology for reducing post-harvest loss and create district wise agribusiness growth centers.

Component B. Science-Based Development of Resilient Spring-sheds

20. The objective of the component is to improve spring-shed efficiency by investing in (i) undertaking comprehensive catchment treatment around spring-sheds; (ii) improving quantity and stability of spring flows through drainage management; and (iii) increased volume of water stored for farm use in farm ponds.

21. **Sub-Component B1: Participatory Planning for Spring-shed Development:** This sub-component will (i) strengthen the capacity of watershed committees for enhanced understanding of science-based spring-shed hydrology, and for identifying and developing representative locations for project interventions, especially around critical springs in the area; (ii) invest in drawing and analyzing relevant data layers, including hydrology and climate risks, for delineating spring-sheds and targeting key local land typologies for planning and interventions; and, (iii) engage communities in participatory analysis of trends in water demand and supply, and optimization for farming and livelihoods. The spring-shed plans developed under this component will integrate data from the participatory micro-planning process coordinated by the Village Spring-shed Development Committee through inclusive processes with local stakeholders, and subsequently aggregated at the cluster level to form mini spring-shed plan

22. **Sub-Component B2: Enhancing Springshed Hydrology and Water Storage:** The project will invest in enhancing biotic cover in key stream and spring catchment points for aquifer replenishment. Investment in line treatment and locally relevant solutions including regeneration will be based on options identified from tested good practices and science-based analysis of optimum typology and location. Participatory implementation and monitoring will ensure a strong evidence-based learning for potential scaling-up during the project.

Component C: Enhancing Income Resilience through Agribusiness and Entrepreneurship

23. The objective of the component is to promote investments in agribusiness to increase the stability and diversity and thus resiliency of incomes of rural and agricultural households in the project area (designated micro-watersheds). This will be through value addition of farm-based produce and enterprise development, tapping into the State's rainfed areas' opportunities and relative strengths, also for the most vulnerable households, and tapping the surpluses from productivity gains and agriculture expansion arising resulting from Component A and B.

[12] Suggested institutes, but not limited to are: IIT-Roorkee, National Institute of Hydrology, Institute for Soil and Water Conservation, GB Pant Agriculture University, Indian Institute of Remote Sensing, National Bureau of Soil Survey & Land Use Planning, and ICAR-Vivekananda Paravatiya Krishi Anusandhan Sansthan, GBPHRED, Forest Research Institute / ICFRE Uttarakhand University of Horticulture and Forestry, ATI Nainital.
[13] Integrated GHGs at the farm level refers to combined emissions of CO2, CH4, and NO.

24. **Subcomponent C1: Supporting Agribusiness Promotion Centers:** The competitiveness of smallholder farmers will be promoted by facilitating the establishment of demand-driven value *chains* through a participatory approach. Based on the experience of the emerging growth centers under UDWDP II, the project will help farmers clusters establish Agribusiness Promotion Centers (ABPC), that will enable smallholder farmers to address input supply and post-harvest management issues by ensuring timely availability of seeds and other inputs, aggregating produce, performing primary (sorting, grading, and packaging) and secondary processing activities (oil milling, spice powders, etc.), and developing market linkages. The products developed by the ABPC could be marketed locally or under the aegis of the existing '*Gramyashree*' brand. The ABPCs will be professionally managed but owned by the smallholder farmers or collectives, such as cooperatives or Farmer Producer Companies (FPCs) from the project area. The project, where needed, will support the development of farmer collectives. Further, the subcomponent will also support the project in conducting value chain studies for identifying market gaps and will invest in capacity building of relevant stakeholders (farmers, project staff, etc.) through trainings, workshops, exposure visits, and other activities on agribusiness.

25. **Subcomponent C2: Micro- Enterprise Development:** Value addition of farm produce will be facilitated further through micro-enterprises in the project areas. The subcomponent will enable individuals and collectives to develop new or expand existing micro-enterprises with the aim of maximizing returns for farmers supported under the project. The project will facilitate identification and training of entrepreneurs and will provide both technical advisory and financial support for these enterprises. Priority will be given to green enterprises and enterprises supporting higher value realization for organic produce.

26. **Subcomponent C3: Income Generation Support for Vulnerable Groups:** The project will support the inclusion of marginalized (including women headed) and landless households. The project will finance small-scale income generating activities for such groups against basic business proposals developed with the assistance of field level staff or locally recruited consultants. The grant would be awarded by the district offices directly to the accounts of the beneficiaries in vulnerable households after appraisal by the state office. The project will also provide skill and business management training to the beneficiaries.

Component D: Project Management, Monitoring & Evaluation, and Learning

27. The objective of this component is to (i) strengthen the institutions associated with the project; (ii) deliver effectively and efficiently project outputs in a timely and accountable manner with adaptive learning, and (iii) generate and disseminate cutting-edge knowledge on a range of issues related to climate-resilient agriculture.

28. ***Project monitoring and evaluation and learning:*** The project will be supported throughout and on all levels by a robust project Monitoring and Evaluation and Learning system (M&E/L) to track project progress and outcomes (where necessary by project specific surveys and studies), which will maximize analyses made by partnerships, and data collection and access from and to the digital platform. Project specific tracking inputs, outputs, and results from project specifically baseline, mid-line and end-line surveys, and specific thematic studies, to ensure the successful implementation and achievements will be coordinated under this component.

Component E: Contingent Emergency Response Component (CERC)

29. The project will include CERC with a zero allocation at project approval. This arrangement shall permit a rapid project restructuring should a disaster strike and allows the Bank to support recovery efforts quickly, if required.

Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Area OP 7.60	No

Summary of Screening of Environmental and Social Risks and Impacts

30. The possible adverse social risks are primarily related to (i) potential adverse impacts/exclusion on Transhumant populations (Bhotiya/ Anwal/ Van Gujjars/ Nomadic groups); (ii) risk of exclusion of tribal communities, landless and women farmers; and other vulnerable groups from project benefits; (iii) weak grievance redressal mechanisms at the village level; (iv) potential health and safety risks to communities during proposed earthworks; and (v) SEA/SH related risks. The identified social risks and impacts are anticipated to be temporary, site specific and largely reversible and can be managed through appropriate risk management mechanisms. The adverse environmental risks and impacts related to minor earth and civil works for spring-shed treatment and infrastructure to support post harvest processing. These adverse effects are mostly related to disturbance to soil, soil and water pollution, occupational and health risks, and collection, generation of wastes. The productivity enhancement related activities may also trigger excess use of water, agro chemicals, use of hybrid crop varieties etc. leading to soil, water and food contamination, occupational health risks, loss of traditional varieties etc. Most of these environmental risks and impacts are however temporary, site specific and largely reversible in nature and can be managed and mitigated through appropriate mitigation measures.

E. Implementation

Institutional and Implementation Arrangements

31. The project would be implemented by the Watershed Management Directorate (WMD), under the Watershed Department, which is the special purpose vehicle of the GoUK. At the state level, a PMU has been established under the leadership of the Chief Project Director and the Project Director whose positions have already been filled. The PMU would be responsible for the overall project management, financial management, including budgeting and disbursements, monitoring results, procurement, and ESF. At the regional level, the WMD has two Project Directors in Garhwal and Kumaon who would assist the Project Director in project implementation. Further, at the district level, a DPMU, has been established at each district. Each DPMU is headed by a Deputy Project Director who is responsible for project planning, implementation, and monitoring. The state and district offices would have officers on deputation from all the line departments (including Forest, Agriculture, Horticulture, Animal Husbandry, and Rural Development), both at the state and district level, allowing for convergence with other programs and interdisciplinary competencies for project management.

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APPROVAL

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