Public Disclosure Authorized

Project Information Document (PID)

Concept Stage | Date Prepared/Updated: 11-Nov-2022 | Report No: PIDC33993

BASIC INFORMATION

A. Basic Project Data

Country	Project ID	Parent Project ID (if any)	Project Name
Bolivia	P178861		Bolivia Resilient Water Management for Community and Household Irrigation Project (P178861)
Region	**Estimated Appraisal Date**	**Estimated Board Date**	**Practice Area (Lead)**
LATIN AMERICA AND CARIBBEAN	Mar 13, 2023	May 19, 2023	Water
Financing Instrument	**Borrower(s)**	**Implementing Agency**	
Investment Project Financing	Plurinational State of Bolivia	Ministerio de Medio Ambiente y Agua (MMAyA), Viceministerio de Recursos Hidricos y Riego (VRHyR)	

Proposed Development Objective(s)

To improve the availability of water resources and increase access to resilient irrigation in vulnerable rural communities.

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	173.40
Total Financing	173.40
of which IBRD/IDA	150.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	150.00

Non-World Bank Group Financing

Counterpart Funding	23.40

Borrower/Recipient	23.40

Environmental and Social Risk Classification	Concept Review Decision
Substantial	Track II-The review did authorize the preparation to continue

Other Decision (as needed)

B. Introduction and Context

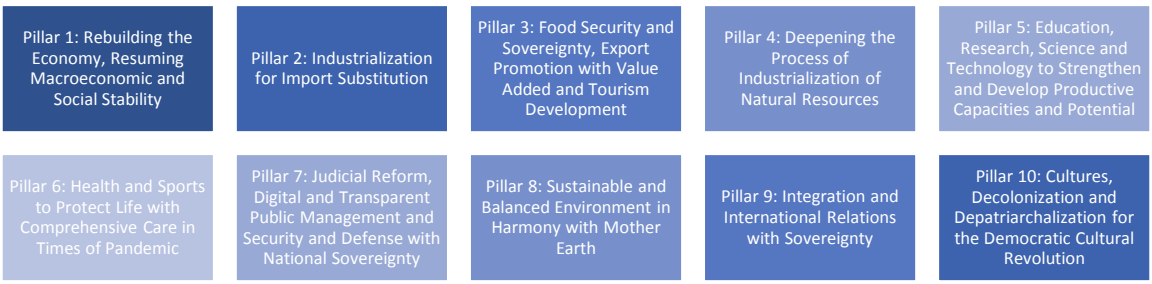
Country Context

1. **Bolivia has made remarkable economic and social progress over the past twenty years.** Between 2006 and 2014, Bolivia's economy, fueled by large public expenditures and high commodity prices, grew at an average of 5.1 percent. Bolivia experienced one of the largest reductions in poverty and inequality in the region. Between 2002 and 2014, the national poverty rate declined from 63 percent to 39 percent, extreme poverty fell from 39 percent to 17 percent, and the Gini coefficient dropped from 0.60 to 0.48. From 2014 to 2018, however, economic growth and poverty reduction slowed considerably due to drops in commodity prices.

2. **The COVID-19 crisis plunged Bolivia into its first recession since 1986.** In 2020, Bolivia's output contracted an estimated 7.8 percent and poverty rates increased. Despite almost-universal emergency transfers provided during the national lockdown, the economic contraction increased poverty from 20 percent in 2019 to 21.6 percent in 2020. By mid-2021, 60 percent of households reported lower incomes than before the pandemic, and 22.7 percent of households reported incidences of being food insecure (five percentage points above pre-pandemic levels). Food insecurity disproportionately affected poor, rural households. Although overall poverty (reported at 20.2 percent in 2021) has decreased since the pandemic-induced peak, certain segments of the population have not recovered.

3. **The National Development Plan of Bolivia (PDES), 2021-25, reflects the Bolivian government's five-year development priorities.** The PDES (framed in the context of Bolivia's ten-year Patriot Agenda 2015–2025) seeks to restore the economy through a Social Community Productive Economic model, which focuses on growth through internal demand facilitated by public investment. The PDES outlines policy objectives and indicators under ten strategic pillars (Figure 1).

Figure 1: Strategic Pillars of Bolivia's Economic and Social Development Plan, 2021–2025



4. **Bolivia is experiencing greater climate variability and more extreme climatic events.** The 2019 Global Climate Risk Index (CRI) ranks Bolivia 10th out of 178 countries in terms of the impacts of climate-related hazards. The most catastrophic disasters, including floods, droughts, and landslides, accounted for US$3.1 billion in damages over a 35-year period (1982–2016)—an average of US$91.1 million per year. Most of these events were influenced by El Niño (the El Niño Southern Oscillation, ENSO), which has been triggering increasingly intense rainfall, landslides, flood, and droughts over the last decade (Cai et al., 2014) due to climate change. In the country's Amazonian lowlands, flooding has become more frequent and its effects increasingly widespread; from 2013 to 2014, floods caused estimated losses of US$450 million and affected 44,000 households in 113 municipalities (World Bank, 2017a). In turn, Bolivia's Altiplano, mid-South Valley and Chaco regions have experienced increasingly intense droughts. In 2016, Bolivia experienced one of its worst droughts, which affected almost half the country's municipalities in seven different departments. Increasing temperatures have also reduced the presence of water-generating mountain glaciers; over the last 50 years, the country has lost approximately half of its surface area of mountain glaciers. Projected increases in temperatures and rainfall during the rainy season will further expose the country to more prolonged dry periods and an increase in the frequency and magnitude of floods, landslides, and other weather-related events (World Bank 2013; WRI 2017).

Sectoral and Institutional Context

5. **In addition to the impact of climatic events, territorial and seasonal disparities have brought water security issues to the forefront.** Water plays a central and cross-cutting role in Bolivia's economic, social and environmental development. Agriculture and hydropower are key to economic development, water supply and sanitation services (WSS) to health and social development and the conservation of ecosystems and forests to environmental development. Although Bolivia has 29,000 m3 of water per inhabitant/year, significantly above the world average of 19,248 m3/inhabitant/year,[1] the temporal and geographic distribution of water resources throughout the country is highly uneven. Most of Bolivia's major urban areas and economic centers are located upstream along the three macro-basins systems of the Del Plata, Amazon, and Altiplano, and face increasing desertification.[2] Water stress is further amplified by the low quality of water due to untreated human, industrial and mining wastewater. In addition, Bolivia faces extensive dry seasons between April and October, during which rainfall represents only about 0 to 15 percent of the annual total. Limited water management capacity has further aggravated water security issues across the country. Evapotranspiration accounts for the primary loss of precipitation inputs, representing approximately 42 percent of losses in the Amazon, up to 75 percent in the Altiplano, and between 47 to 75 percent in the Del Plata river basins. Consequently, annual runoff is estimated to be largest in the Amazon (679 mm), while annual runoff is much less in the Altiplano (70 mm) and variable

[1] FAO. 2016. AQUASTAT Database, Food and Agriculture Organization of the United Nations. Website accessed on: 02/12/2017. Note: Average estimate for Latin America includes all countries except the Caribbean.

[2] Around 77% of the Bolivia's population is living in degraded areas (IPCC, 2018).

in the Del Plata (70–414 mm) basin. For the three macro-basins, seasonal differences in runoff are evident, with more than 60 percent of runoff occurring during the wet season and mostly in the Amazon.

6. **Water availability is directly limiting agriculture, the principal economic activity in rural Bolivia.** Farmers in the highlands and in the Inter-Andean valleys rely on rainfed agriculture and utilize the short rainy season to produce crops, such as potatoes, maize, wheat, oat, beans, peas and onions, primarily for personal use and secondly for local markets. Although irrigation, which allows for a second production cycle during the dry season, is a key method for coping with temporal rainfall variability, only 10 percent of cultivated land in Bolivia is under irrigation.[3] Recognizing the importance of irrigation for agricultural production, the Government of Bolivia (GoB) developed an ambitious plan, "Decade for Irrigation 2015-2025, Towards One Million Hectares Under Irrigation," to promote irrigation. From 2012 to 2017, the GoB invested around US$432 million (with its own funds and support from international partners) in irrigation, expanding coverage by an additional 83,236 hectares (ha.). Most of the investments, however, were targeted at medium-sized traditional irrigation systems. Only 2 percent of investments made in the irrigation sector were directed towards household irrigation systems during this timeframe.

7. **Irrigation can play a significant role in improving farmers' livelihoods.** However, the average farm size in the highlands, and inter-Andean regions is less than three hectares (Ha), making traditional irrigation solutions impractical. Land fragmentation is most acute in the highlands, where 60 percent of farms span less than one Ha. Small-scale household irrigation solutions have been successfully implemented in several rural development projects.[4] These solutions capture discharge from small springs or harvest surface runoff and are primarily used for supplementary irrigation of rainfed agriculture. They have allowed rural households to diversify their agricultural production and provide additional water for livestock and human consumption.[5]

Relationship to CPF

8. **The objectives and scope of the proposed Project are in line with Bolivia's forthcoming Country Partnership Framework (CPF) 2023-2026.** The first High Level Outcome (HLO) of the proposed CPF aims to achieve "Increased climate and economic resilience" and seeks to develop institutional and management capacity to handle climate and external shocks. The proposed Project is also aligned with the CPF's third HLO, which aims to attain "Improved access to quality key public services".

9. **The proposed Project is also aligned with the WBG Climate Change Action Plan, 2021-2025.[6]** The Climate Change Action Plan 2021–2025 advocates for a Green, Resilient, and Inclusive Development approach[7] that sustainably eliminates extreme poverty and boosts shared prosperity. This integrated long-term approach seeks to "build back greener" from

[3] According to the latest irrigation inventory (2012), Bolivia has 5,669 irrigation systems, covering approximately 303,192 ha which represents approximately 10 percent of the total cultivated area.
[4] According to the inventory of irrigation systems of 2012, there are 1,618 micro-irrigation systems with less than 10 ha. irrigated, representing 28% of the total irrigation systems supporting livelihoods of 26,159 families (9% of the total families benefitting from irrigation).
[5] Studies to assess the impact of household irrigation were carried out by MMAyA and the German Cooperation Agency (GIZ), which included: *Riego familiar en regiones secas de Bolivia: guía para su implementación (2016); Estudio de efectos diferenciados de los Proyectos Integrales de Cosecha de Agua (PICA) en la familia (2013); Evaluación de atajados en la Macroregión Valles (2012); and "Tres estudios de caso de Manejo Exitoso de Atajados en el Norte de Potosí y Sur de Cochabamba" (2010).*
[6] WBG, Climate Change Action Plan, 2021-2025. Supporting Green, Resilient, and Inclusive Development. The World Bank, 2021.
[7] From COVID-19 Crisis Response to Resilient Recovery. Saving Lives and Livelihoods while Supporting Green, Resilient, and Inclusive Development. WBG Paper, April 9, 2021.

the COVID-19 pandemic, accelerate climate-change mitigation and adaption, and lay the foundation for a strong and durable economic and social recovery. The proposed Project is consistent with the WBG's climate-change commitments, particularly through supporting farmers to increase their adaptive capacity and resilience to the impacts of climate change.

C. Proposed Development Objective(s)

To improve the availability of water resources and increase access to resilient irrigation in vulnerable rural communities.

Key Results (From PCN)

PDO Level Indicators

10. Achievement of the PDO will be measured through the following proposed indicators:

PDO 1: Improved availability of water resources

(a) Number of operational[8] water governance bodies at local level (disaggregating male/ female participation in water government bodies).
(b) Number of basins in water stressed regions with integrated basin management plans adopted and risk management infrastructure in place
(c) Increase (%) in the volume of water available per hectare of cultivated land (m3/Ha)

PDO 2: Increased access to resilient irrigation

(d) Area (ha) in water stressed basins provided with new or improved irrigation systems -core indicator-
(e) Number of farmers with improved irrigation techniques (disaggregating by male/female farmers)

D. Concept Description

11. **The Project will have a strong focus on adaptation strategies for tackling the impacts of climate change on water security as well as developing resilience to climate change exacerbated risks for Bolivia's poorest communities.** The Project will help secure adequate water for irrigation of rain-fed crops, increasing farmers' ability to improve food security and reducing their vulnerability to the increasing, climate change-induced rainfall variability.

12. **The Project design will consider some basic principles, *inter alia*:**
    - **A comprehensive analysis of needs at the basin level.** Activities, or subprojects, related to the availability and sustainable use of water resources for target areas will be identified through a comprehensive analysis of the basin's needs. For activities under the VRHR's responsibilities and that are eligible for Project funding, pre-feasibility studies (Technical Report on Preconditions or IT) and detailed technical designs (Pre-investment Technical Design Studies or EDTPs) will be prepared. In the case of activities that are not under the VRHR's

[8] An operational water governance body defined as a management unit that is organized and is actively performing its duties according to the guidelines and procedures established by the VRHR.

responsibilities or are not eligible for financing under the Project, subproject summaries will be prepared to help stakeholders look for other funding sources.

- **Basins as the basic geographic unit.** The Project will target basins of less than around 250 km^2 (operational hydrographic units), whose management unit is the Basin Management Organization (OGC).[9] These basins will be grouped, reaching sizes of up to 20,000 km^2, and managed by a Basin Management Unit (UGC)[10].
- **A bottom-up approach.** The activities or subprojects will be identified and prioritized by the communities with the active participation of the municipal governments and the OGCs. A bottom-up approach will also be used for data collection in the field to build ownership and ensure that the communities are aware of the results of the work.

13. **The Project will focus on reaching Bolivia's most vulnerable population.** The Project's target will be basins located in the departments of Oruro, La Paz, Cochabamba, Potosí, Chuquisaca, and Tarija, which are mostly in the highlands and inter-Andean valleys. The geographic area comprises 201 municipal governments. Eligibility criteria for the selection of these basins included: (i) high aridity index, (ii) high levels of poverty, (iii) high population density, and (iv) potential areas of intervention under sub-components (2.1), (2.2) and (2.3). The Project will sequence the activities to focus initially on basins that present high levels of need and high levels of readiness for implementation, tackling 'low-hanging fruit' quickly to demonstrate early successes in the first phase of the Bolivia Climate Smart and Resilient Program and inform the design of the following phases.

14. **A background study on irrigation services, including a baseline study for a sample of households and communities targeted under the Project, will be carried out to understand how water infrastructure is implemented and managed.** The aim will be to inform the design of the Project implementation strategy and set a baseline to monitor results.[11]

15. **Project Components.** The Project will comprise the following four components.

16. **Component 1. Water resources planning and pre-investment studies (US$10.3 million).** This component will fund studies with two objectives: (i) development of water management plans at the basin level that follow both IWRM and integrated basin management (MIC by its acronym in Spanish) approaches. This task will involve the

[9] Basin Management Organizations (OGC) (*Organismos de Gestión de Cuenca*). The OGCs are local, community bodies that identify and monitor the development of initiatives and local investments which are implemented within a basin water management plan. The OGCs are also active in following up the implementation of these initiatives as a means to developing management capacities at local level.

[10] Basin Management Unit (UGC) (*Unidad Gestora de Cuenca*). This is a technical body responsible to facilitate, articulate and technically coordinate the organizational units of the Basin Interinstitutional Platforms. These platforms bring together public, private and civil society stakeholders, to facilitate a participatory decision-making in the formulation, implementation, monitoring and evaluation of activities agreed within a basin water management plan. The UGCs are also expected to provide technical advice to the stakeholders.

[11] The background paper will gather information on demographics, gender and generational issues, socio-economic characteristics of the target population (including the educational level of family members, productive activities, and access to markets, and estimated income level), and the challenges posed by rural migration. It will also assess the communities' current sources of water for human consumption and productive activities and access to and the quality of basic infrastructure services, such as electricity, roads, and WSS. It will gather information about the institutions and social organizations working in the target municipalities, and the roles these organizations play in the implementation of agriculture projects. The study will obtain information on how the communities and households organize themselves to administer, operate and maintain their irrigation services, how much they pay or how they contribute to irrigation costs, and how decisions are made at the household and community levels to implement agriculture projects.

identification and analysis of the main challenges basins face from a territorial and sectoral perspective, and the development of a strategic vision based on the sustainable use of water resources; and (ii) development of pre-investment studies and detailed engineering designs for the subprojects, related to water conservation, irrigation, and risk management infrastructure, identified in each basin water management plan.

17. **Component 2. Climate resilient infrastructure investments (US$112.1 million).** This component will fund works and the supervision of investments related to water conservation, soil and land management, irrigation, and risk management to adapt to the impacts of and to build resilience against climate change exacerbated floods and droughts. The component will be divided into three sub-components:

- Subcomponent 2.1. Investments in MIC. Investments will include activities to protect water sources, water planting and harvesting, soil improvement, protection of water recharge areas and recovery of forest areas. These investments aim to reduce the vulnerability of watersheds facing degradation and desertification, and to increase water availability and local storage capacity. The investments will also enhance soil and crop carbon stock.
- Subcomponent 2.2: Community and household irrigation systems. The investments in household and community irrigation systems will include infrastructure for water capture (harvesting of surface runoff, groundwater extraction and other alternative water sources), the installation of water storage solutions, the conveyance of water to the field, and the equipment necessary for water distribution on the plots.
- Subcomponent 2.3: Risk management infrastructure. The subcomponent will support infrastructure to protect land and communities against extreme hydrological events, including flooding, and conserve, restore and manage soils degraded by erosion.

The typology of infrastructure to be implemented in each Subcomponent is presented in **Annex 3**.

18. While works implemented under Component 2 should ideally be generated from subprojects developed in Component 1, the VRHR already has a portfolio of pre-investment studies and detailed technical designs that reflect the social demands of communities or municipalities located in the Project's target areas. After an assessment of the eligibility of these subprojects, no-regret activities would be funded by the Project. In general, irrigation investments will be accompanied by MIC investments to secure the water balance.

19. **Component 3: Capacity building for water governance and enhanced productivity (US$14.1 million).** This component will fund technical assistance (TA) and capacity building activities to enhance water governance at the national, macro, regional and basins level. The component will include the following activities, *inter alia:* (i) the development of the School of Water Culture for Life; (ii) TA and training for Basin Management Units (UGC), Basin Management Organizations (OGC), municipal governments, and farmers; and (iii) support for the future development of a national information system on water resources.

20. **School of Water Culture for Life.** The Project will finance the design of the School, including a course management platform and the structure of the curricula for the different target audiences. A diagnostic of capacities and identification of synergies with other institutions, including on-going programs developed under the leadership of the Ministry of Education and national universities, will be undertaken.

21. **The component will finance TA and training to UGCs, OGCs, municipal staff and farmers for strengthening local capacity on planning, implementation, and operation and maintenance (O&M) of the Project's infrastructure investments and for improving and diversifying irrigated agricultural production.** TA and training will be provided

through consulting services. The VRHR has developed three TA and training programs which will be implemented along the subprojects' implementation cycle, namely:

- Organizational Strengthening and Support at the Basin Level (*Fortalecimiento Organizacional y Acompaniamiento en Cuenca*, FORAC). To be implemented in the pre-investment phase.
- Organizational Strengthening and Technical Assistance at Basin Level (*Fortalecimiento Organizacional y Asistencia Técnica en Cuenca*, FORATC). To be carried out during the construction and operational phases of the infrastructure.
- Organizational Strengthening and Productive Technical Assistance (*Fortalecimiento Organizacional y Asistencia Técnica Productiva*, FORATP). This is a TA and training program on household and community irrigation systems and includes training on agricultural production. It will be provided to farmers for two years, covering at least two complete production cycles, and support farmers during the construction and operation of the irrigation infrastructure. The TA and training will include advice on agricultural production, efficient use of water, implementation of irrigation management plans, and a business plan for production, marketing and strengthening of producer associations.

22. **Information and knowledge on climate, water resources and hydrological risks is limited and one of the main deficiencies for effective water resources management and pro-active risk management in Bolivia.**[12] [13] In parallel to the proposed Project, the Bank will provide TA through a recently approved ASA,[14] funded mainly by the Global Water Security and Sanitation Partnership (GWSP), to support the development of tools to improve hydrometeorological monitoring and the development of an improved system for seasonal forecasting.

23. **Component 4. Project management (US$13.5 million).** This component will fund activities to support Project administration and management, including procurement, financial, environmental, social, technical management, and monitoring and evaluation.

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

Summary of Screening of Environmental and Social Risks and Impacts

The Environmental and Social Risk is considered substantial. Environmental risks and impacts could result, such as: i) Impacts on natural habitats due to inadequate water management planning, ii) Impacts on biodiversity due to inadequate resource management planning in the basin, iii) Impacts on agrobiodiversity due to the introduction of foreign species to production systems as a result of the introduction of irrigation systems that enable year round higher-value crop production, iv) Risk of contamination of water and soil due to inappropriate use of agrochemicals that may be intensified

[12] The World Bank's analysis of the 2016 drought in Bolivia identified the lack of information on drought risks and a missing drought monitor and early warning systems as main reasons for the country's high drought vulnerability (World Bank, 2019).
[13] The MMAyA with SENAMHI, implemented several projects to strengthen the country's capacity in hydrological monitoring, including the development of a National Climate and Water Information System (*SNICA* for its acronyms in Spanish) which was supported by the World Bank within its Pilot Project on Climate Resilience (P129640).
[14] Mainstreaming climate resilience and promoting sustainable management of water resources and services in Bolivia, P179020

as a result of the introduction of irrigation systems, v) Risks related of consumption and management of water in construction, vi) Risk of inadequate management of waste and hazardous wastes (fuel oil) during construction, vii) Risks of pollution, air emissions and noise during construction, viii) Risk of damage to archaeological remains due to excavations; ix) Occupational health and safety risks, and x) Risks related to the construction of reservoirs (currently expected to be small), which may include changes to surface hydrology, dam safety considerations, minor flow reductions in rivers and streams to divert water to reservoirs (with potential for downstream effects on other water users), potential disruptions to fish and other aquatic biodiversity if water intake structures block river flows, etc. Due to the small to medium scale and location of the civil works anticipated for each subproject, most risks and impacts are expected to be predictable, temporary, reversible, low in magnitude, site-specific, and with low probability of major adverse effects to human health or the environment. Nonetheless, this will be further analyzed during project preparation, in order to propose appropriate measures to avoid, reduce and mitigate potential environmental risks and impacts in a manner consistent with the ESF, including the cumulative impacts in the basins.

Based on the limited information currently available, potential social risks of the project preliminarily identified include: (i) risk of elite capture and potential exclusion of vulnerable populations and groups whose interests could be under-represented from project benefits, such as indigenous women, elders, youth, persons with disabilities, and sexual and gender minorities, if targeted strategies to ensure their engagement are not incorporated in the preparation and implementation of the Project, particularly in an institutional context with limited level of coordination between the multiple entities expected to be involved, including the implementing agency MMAyA/VRHyR through UCEP-Mi Riego (Components 2 and 4) and UCP-PPCR (Components 1, 3 and 4), and the decentralized offices of both entities, the different levels of water users organizations, subnational governments, and local intersectoral agencies; (ii) potential loss of the indigenous agricultural knowledge of the Quechua and Aymara population in the project area, as well as their knowledge of biodiversity management, mainly as a result of agricultural technical assistance and increased involvement in the market economy, if cultural pertinence measures were not properly taken into account; (iii) minor labor influx risks associated with the civil works, especially if codes of conduct are not followed, even though project efforts will focus on promoting local hiring of community workers; (iv) potential increase or intensification of underlying local tensions and even of conflicts if stakeholder engagement processes are not properly carried out in rural agricultural areas with water scarcity; and (iv) use of areas with potential economic or social alternative uses, particularly agriculture, to build the community irrigation infrastructure works, creating an opportunity cost for the local population. The social risk rating will be revisited prior to Appraisal to determine if it needs to be modified, based on the results of analytical work to be carried as part of the preparation of the Project's E&S risk management instruments, and the feedback received in the consultations with project stakeholders, which are expected to provide further clarity on the likelihood and severity of the potentially adverse social impacts and risks.

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