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Report No: PAD2229

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$300 MILLION

TO THE

PROVINCE OF BUENOS AIRES

WITH A GUARANTEE FROM THE ARGENTINE REPUBLIC

FOR A

SALADO INTEGRATED RIVER BASIN MANAGEMENT SUPPORT PROJECT

March 17, 2016

Water Global Practice
Latin America And Caribbean Region

CURRENCY EQUIVALENTS

Exchange Rate Effective Feb 17, 2017

Currency Unit	=	Argentine Peso (ARS)
ARS 15.69	=	USD1
USD 0.064	=	ARS 1

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Jorge Familiar
Country Director:	Jesko S. Hentschel
Senior Global Practice Director:	Guang Zhe Chen
Practice Manager:	Rita E. Cestti
Task Team Leader(s):	Victor Vazquez Alvarez, Maria Catalina Ramirez

ABBREVIATIONS AND ACRONYMS

ADA	Provincial Water Authority *(Agencia del Agua)*
ARS	Argentine Peso
BPBA	Banco de la Provincia de Buenos Aires
CAF	Development Bank of Latin America *(Corporación Andina de Fomento)*
CBA	Cost-Benefit Analysis
CPAI	Provincial Council of Indigenous Affairs
CPS	Country Partnership Strategy
DCyC	The Procurement Department of the Ministry of Infrastructure and Public Services (*Dirección de Compras y Contrataciones)*
DES	Department of Environmental Studies
DL	Disbursement Letter
DPGRE	Provincial Directorate for Risk and Emergency Management *(Dirección Provincial de Gestión de Riesgo y Emergencias)*
DPOH	Provincial Department of Hydraulic Works *(Dirección Provincial de Obra Hidráulica)*
DPOMFB	Provincial Directorate of Multilateral and Bilateral Financing *(Dirección Provincial de Organismos Multilaterales y Bilaterales)*
DSA	Debt Sustainability Analysis
ENSO	El Niño Southern Oscillation
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FM	Financial Management
GAO	General Accounting Office
GDP	Gross Domestic Product
GIS	Geographic Information System
GPP	Gross Provincial Product
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
IBRD	International Bank for Reconstruction and Development
IDB	Inter-American Development Bank
IFI	International Financial Institutions
INA	National Water Institute *(Instituto Nacional del Agua)*
INTA	National Institute of Agricultural Technology *(Instituto Nacional de Tecnología Agropecuaria)*
IRR	Internal Rate of Return
IUFR	Interim Unaudited Financial Reports
IWRM	Integrated Water Resources Management
LIDAR	Light Detection and Ranging
M&E	Monitoring and Evaluation
NGO	Non-Governmental Organization
OM	Project´s Operational Manual
O&M	Operation and Maintenance
OP/BP	Operational Policy/Bank Policy

OPDS	Provincial Agency for Sustainable Development *(Organismo Provincial para el Desarrollo Sostenible)*
PBA	Province of Buenos Aires
PCR	Physical Cultural Resources
PDO	Project Development Objective
PIU	Project Implementing Unit
PMI	Integrated Salado River Basin Management Plan *(Plan de Manejo Integral de la Cuenca del Río Salado)*
PPSD	Project Procurement Strategy for Development
REIA	Regional Environmental Impact Assessment
SMN	National Meteorological Service *(Servicio Meteorológico Nacional)*
SORT	Systematic Operations Risk-Rating Tool
SRB	Salado River Basin
TSA	Treasury Single Account
UCEPO	Project and Works Coordination and Execution Unit *(Unidad de Coordinación y Ejecución de Proyectos de Obra)*
UHI	Undersecretariat of Hydraulic Infrastructure (*Subsecretaría de Infraestructura Hidráulica*)
WB	World Bank
WRM	Water Resources Management

BASIC INFORMATION

Is this a regionally tagged project?	Country(ies)	Lending Instrument
No		Investment Project Financing

[ ] Situations of Urgent Need of Assistance or Capacity Constraints

[ ] Financial Intermediaries

[ ] Series of Projects

Approval Date	Closing Date	Environmental Assessment Category
06-Apr-2017	30-Dec-2022	A - Full Assessment

Bank/IFC Collaboration
No

Proposed Development Objective(s)

To enhance flood protection and strengthen the capacity of the responsible institutions for integrated water resources monitoring and management in the Salado River Basin.

Components

Component Name	Cost (US$, millions)
Integrated Water Resources Management	27.75
River Training Works and Upgrading Associated Infrastructure	337.70
Project Implementation, Supervision and Communication	8.80

Organizations

Borrower : Province of Buenos Aires

Implementing Agency : Ministry of Infrastructure, Province of Buenos Aires

[✓] Counterpart Funding	[✓] IBRD	[ ] IDA Credit [ ] Crisis Response Window [ ] Regional Projects Window	[ ] IDA Grant [ ] Crisis Response Window [ ] Regional Projects Window	[ ] Trust Funds	[ ] Parallel Financing

Total Project Cost:	Total Financing:	Financing Gap:
375.00	375.00	0.00
	Of Which Bank Financing (IBRD/IDA):	
	300.00	

Financing (in US$, millions)

Financing Source	Amount
Borrower	75.00
IBRD-87360	300.00
Total	**375.00**

Expected Disbursements (in US$, millions)

Fiscal Year	2017	2018	2019	2020	2021	2022	2023
Annual	0.00	27.80	47.05	88.98	62.97	50.65	22.55
Cumulative	0.00	27.80	74.85	163.83	226.80	277.45	300.00

INSTITUTIONAL DATA

Practice Area (Lead)

Water

Contributing Practice Areas

Environment & Natural Resources
Social, Urban, Rural and Resilience Global Practice

Gender Tag

Does the project plan to undertake any of the following?

a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF

Yes

b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment

Yes

c. Include Indicators in results framework to monitor outcomes from actions identified in (b)

Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

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

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

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36		✓
Pest Management OP 4.09	✓	
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10	✓	
Involuntary Resettlement OP/BP 4.12		✓
Safety of Dams OP/BP 4.37		✓
Projects on International Waterways OP/BP 7.50	✓	
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

Project Implementation Unit. Section I.A.1 of Schedule 2 to the Loan Agreement. The Borrower, through MoI, shall operate and maintain, at all times during Project implementation, a Project implementation unit ("UCEPO"), with the structure, functions and responsibilities set forth in the Operational Manual.

Collaboration Entities. Section I.A.3 of Schedule 2 to the Loan Agreement. 3. Prior to the carrying out of any given activity under Part 1 of the Project which requires the participation of any Collaboration Entity, the Borrower, through UCEPO, shall enter into an agreement (the Collaboration Agreement) with the corresponding Collaborating Entity, all under terms and conditions acceptable to the Bank, which shall include, inter alia, the responsibilities of the pertinent Collaboration Entity for assisting the Borrower in the implementation of Part 1 of the Project.

Safeguards. Section I.D.1 of Schedule 2 to the Loan Agreement. Without limitation to the provisions of Section 3.01 of this Agreement, the Borrower, shall carry out the Project in accordance with the Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plan (ESMP) and the Indigenous Peoples Planning Framework (IPPF).

Indigenous Peoples Planning Framework (IPPF). Section I.D.2 of Schedule 2 to the Loan Agreement. With respect to the carrying out of any activities under Part 1 of the Project, and when so determined by the Bank as set forth in the IPPF, the Borrower, through MoI, MoE, ADA and DPOH, shall: (a) prior to the carrying out of any said activity, prepare and/or cause to be prepared and furnish to the Bank, an indigenous peoples' plan, acceptable to the Bank (which plan shall be consistent with the pertinent provisions of the IPPF); and (b) thereafter, adopt and implement (and/or cause to be adopted and implemented) said indigenous peoples' plan in accordance with its terms and in a manner acceptable to the Bank.

Technical Assistance. Section I.D.3 of Schedule 2 to the Loan Agreement. The Borrower, through MoI, MoE, ADA and DPOH, shall ensure that the terms of reference for any consultancies related to the technical assistance provided under Part 1 of the Project, shall be acceptable to the Bank following its review thereof and, to that end, such terms of reference shall duly incorporate the requirement of the Bank's Safeguard Policies then in force, as applied to the advice conveyed through such technical assistance.

Voluntary Agreements. Section I.D.4 of Schedule 2 to the Loan Agreement. Without limitation to the provisions of Section I.D.1 above, and for purposes of carrying out the physical works under Part 2 of the Project as determined by the Bank, the Borrower shall, or shall cause the contractor of the works (as the case may be) to, prior to the initiation of any physical works within any given area of the Salado River, enter into an agreement (the Voluntary Agreement) with the relevant landowner of the property adjacent to said area, on terms and conditions acceptable to the Bank, and as detailed in the ESMP.

Resettlement. Section I.D.5 of Schedule 2 to the Loan Agreement. The Borrower shall ensure that any works under Part 2 of the Project do not involve any Resettlement.

Action Plan. Section I.E.1 of Schedule 2 to the Loan Agreement. The Borrower, through MoI (through UCEPO), shall comply with the provisions of the Action Plan, in a manner acceptable to the Bank.

Conditions

Type	Description
Effectiveness	Article V, Section 5.01 of the Loan Agreement. The Additional Condition of Effectiveness consists of the following, namely that the Operational Manual has

	been adopted in a manner acceptable to the Bank.
Type Disbursement	Description Section IV.B.1 of Schedule 2 to the Loan Agreement. Notwithstanding the provisions of Part A of this Section, no withdrawal shall be made for payments made prior to the date of this Agreement, except that withdrawals up to an aggregate amount not to exceed $60,000,000 may be made for payments made prior to this date but on or after March 3, 2017, for Eligible Expenditures (but in no case after more than one year before the date of this Agreement).

PROJECT TEAM

Bank Staff

Name	Role	Specialization	Unit
Victor Vazquez Alvarez	Team Leader(ADM Responsible)		GWA04
Maria Catalina Ramirez	Team Leader		GWA04
Ana Maria Grofsmacht	Procurement Specialist(ADM Responsible)		GGO04
Alejandro Roger Solanot	Financial Management Specialist		GGO22
Christophe Prevost	Team Member		GWA04
Claudia Nin	Team Member		LCC7C
Diana Marcela Rubiano Vargas	Team Member	GPSURR	GSU10
Eleonora Beatriz Camalli	Safeguards Specialist	Social	GSU04
Fabiola Altimari Montiel	Team Member	Lawyer	LEGLE
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Extended Team

Name	Title	Organization	Location
Chris Philip Fischer	Consultant		
David Nathan Sobel	Consultant	World Bank	
Eleonora Camalli	Consultant		
Isabel Filiberto	consultant		
Jeronimo Puertas Agudo	Consultant		

ARGENTINA
SALADO INTEGRATED RIVER BASIN MANAGEMENT SUPPORT PROJECT

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I. STRATEGIC CONTEXT

A. Country Context

1. **After taking office in December 2015, the new Argentine Government moved with speed to implement macroeconomic and structural reforms.** These include inter alia (a) the elimination of export taxes on major crops, beef, and most industrial manufacturing products and the reduction by 5 percent of export taxes on soy; (b) the unification of the exchange rate, effectively ending most foreign exchange restrictions; (c) moving from a system of discretionary- to automatically-provided import licenses in line with World Trade Organization procedures; (d) resolution of the dispute with holdout creditors; and (e) measures to enhance public transparency and accountability. In addition, the National Institute for Statistics launched a new inflation index and improved the overall quality and reliability of statistics. Electricity tariffs and transport fees were increased to improve financial and fiscal, while protecting low-income users with a social tariff. Broader efforts to reduce energy subsidies (which account for a large portion of fiscal deficit) are under way, paired with measures to protect the poor.

2. **Economic activity is estimated to have contracted in 2016, but growth is expected in 2017.** Economic activity is estimated to have contracted by 2.3 percent[1] during 2016, taking a toll on labor markets, where 92,000[2] formal private sector jobs were lost since October 2015 (1.5 percent of total employment). The economic contraction has been decelerating during the second semester of 2016 and economic growth is expected in 2017 (+2.7 percent[1]) on the assumption that the positive impact of recent policy changes kicks in and the global economy recovers. Demand from key trading partners is expected to strengthen. During the last two months of 2016, exports to Brazil and China grew by 30 percent and 18 percent, respectively, compared to the same period in 2015.[3] The median estimate for inflation for 2016 is 40 percent,[4] mostly due to currency depreciation and the reduction of energy and transport subsidies. Inflation has decelerated since August 2016. The central government primary deficit in 2016 was in line with the target established (-4.8 percent). Fiscal consolidation in 2017 will be more gradual than originally planned in part due to increased social spending, including the adjustment of pension transfers, and higher public investment.

3. **Argentina offers many opportunities in a weak global environment, and there is a strong interest from foreign investors and firms**. Going forward, Argentina aims to continue building a growth enabling policy framework to enhance credibility and support broad based growth and quality employment. In particular, the following policies will be important to permanently reduce inflation and put Argentina on a sustainable growth path: (a) increase public spending efficiency as well as its efficacy and reduce the fiscal deficit in line with government targets; (b) continue fostering the credibility of the Central Bank so that monetary policy can further anchor inflation expectations; (c) strengthen competitiveness and productivity through an improved business environment and investments in infrastructure and increasing competition in markets and improving the regulatory framework in sectors; (d) continue strengthening the credibility of official statistics; and (e) continue improving the provision of public goods (including transportation, health, and education) and reducing regional disparities

[1] World Bank 2017. *Global Economic Prospects, Jan 2017 Weak Investment in Uncertain Times*: WB. doi:10.1596/978-1-4648-1016-9.
[2] Source: Ministerio de Trabajo, Empleo y Seguridad Social
[3] Source: National Institute of Statistics and Census of Argentina (INDEC)
[4] Banco Central de la República Argentina. 2016. *Resultados del Relevamiento de Expectativas de Mercado* (REM), December 2016.

4. **Given its geographical characteristics, Argentina is exposed to a variety of natural hazards that adversely impact human wellbeing and economic activity**. The intensity of natural climate variations in many parts of Argentina, with prolonged extreme weather events, has significantly increased during the last decades due to stronger El Niño Southern Oscillation (ENSO) events and climate change.[5] Loss from natural disasters in Argentina is high and relates predominantly to hydrometeorological hazards, which represent 58 percent of total economic losses over the last 50 years.[6] According to *Swiss-Re*, Argentina is among the 10 emerging economies with the highest flood hazard exposure, with potential losses in excess of US$3 billion per year, representing about 0.5 percent of the Gross Domestic Product (GDP).

B. Sectoral and Institutional Context

5. **The Province of Buenos Aires (PBA) accounts for over 30 percent of Argentina's GDP.** For this reason, the PBA is the most important economic region for Argentina, accounting for 40 percent of the national employment and about 38 percent of goods produced in the country and generating more than one third of national export income across diverse sectors.

6. **With an area of approximately 170,000 km^2 spanning over 60 percent of the PBA's total territory, the Salado River Basin (SRB)[7] is of strategic importance to both the PBA and Argentina's economic activity and food security.** This flat, low population density basin houses over 1.4 million inhabitants, 80 percent of which live in urban areas. Land use is characterized by extensive, mostly non-irrigated agriculture and livestock. The highly productive basin generates 25 percent of Argentina's grain and meat production, contributing significantly to national export revenue.

7. **Extreme climate events increasingly threaten economic development in the PBA and the SRB.** In 1980 over 30 percent of the total area of the Province was flooded. Between 1985 and 1987, continuous flood events lasting up to 11 consecutive months in some areas devastated the PBA. Floods throughout the 2000-2011 period resulted in nearly US$4.5 billion in losses and affected 5.5 million people. Disastrous floods have shown worldwide to disproportionately affect vulnerable households with long-term impacts on the poor, particularly on vulnerable groups such as young children and women. During the 2001 event alone, 2.0 million ha were flooded resulting in losses of US$700 million in the agriculture and livestock sectors.[8] In 2015, the highest ever-observed precipitation over the SRB resulted in the flooding of over 800,000 ha and killed 6,000 head of cattle, resulting in upwards of US$652 million in losses. Several droughts, the most significant of which took place in 1999 and 2007, reduced crop yields by up to two-thirds and prompted farmers to scale back planting (area seeded with wheat fell by 20 percent).[5]

8. **The combination of increased average rainfall and changes in land use since the 1980s has resulted in rising groundwater, further increasing the frequency and intensity of floods in the SRB.** Over the last 20 years, the average level of groundwater in the Argentine Pampa has risen by over two meters. This can be attributed to two overriding factors: (i) annual precipitation increased from 750 mm (1920-1985) to 1100 mm (1986-2001)

[5] Capriolo (2012). Extreme Hydrologic Events in North Area of Buenos Aires Province (Argentina)
[6] Swiss-Re (2016). *Staying Afloat: Flood Risk in Argentina.*
[7] SRB, for purposes of the Project, means the portion of the drainage area of the Salado River of approximately 170,000 square kilometers, which is located within the territorial jurisdiction of the Borrower and defined in the Integrated Salado River Basin Management Plan (PMI for its acronym in Spanish - Plan de Manejo Integral de la Cuenca del Río Salado)
[8] Scarpato (2008): La inundación del año 2001 en la Provincia de Buenos Aires, Argentina

in large parts of the upper river basin, and by over 10 percent in the lower Salado[9]; and (ii) during the same timeframe, evapotranspiration decreased substantially due to the conversion of pasture land into intensive agriculture (between 1975 and 2005, the area cultivated with soya increased from 1 to 25 percent).

9. **In response to the higher flood and drought risks, the PBA, with World Bank support,[10] prepared the Integrated Salado River Basin Management Plan (PMI for its acronym in Spanish - *Plan de Manejo Integral de la Cuenca del Río Salado*) in 1999.** The PMI has three main objectives: (i) reduce negative impacts of floods and droughts on the basin's economy and consequently on the provincial and national economy; (ii) improve the economic conditions of the basin through sustainable development, particularly in the agriculture and livestock sectors; and (iii) develop and preserve the environmental value of the basin and, in particular, the wetlands.

10. **Since 2000, when implementation of the PMI began, priority has been given to the implementation of structural measures**. The PMI envisaged river training works along main course of the Salado River, comprised of five sections totaling 506 km, and *Las Horquetas* canal upstream, totaling 254 km. To date, Sections I, II, and III (starting from the river mouth, upstream) have been completed, totaling 477 km and 99.1 million m^3 dredged material. Works along the remaining Sections IV and V, totaling 283 km, remain to be completed to ensure full implementation of the PMI's structural component. The overall effectiveness of the river training works that have been completed to date is clearly evidenced by the fact that the flooding generated by the highest precipitation levels observed in 2015 drained in a record time of six weeks, whereas similar events prior to these interventions produced flooding lasting up to six months.

11. **Despite progress in implementing structural measures called for in the PMI, several challenges remain to be addressed.** Following 15 years of implementation of structural measures, the PBA and users in the basin are aware that river works in the main channel only provide a partial solution to the SRB's problems and that several challenges remain unsolved and some are even intensifying with time:

a. There is still a lack of solid information in terms of both hydrometeorology and the effects of land use on flood generation at the basin level. There are no tools to allow users to take informed decisions and help them increase their resilience to floods and droughts.
b. Limited knowledge exists in terms of the hydraulic behavior of the network of canals beyond the main river channel, also related to the interconnectivity with the system of wetlands and lagoons. Users act and intervene in these canals in an ad hoc, uncoordinated manner, increasing prospects for conflicts.
c. The reduced flood risk resulting from completed river works has given way to longer periods of land productivity. The intensified agriculture and livestock activities, in turn, increase pressure on overall water quality which negatively impacts productive uses of water and environmental quality.
d. The environmental assets of the SRB, including the large number of wetlands, have not been sufficiently studied so there is an absence of environmental policies and measures in place to protect and conserve this increasingly vulnerable area.

12. **The institutions responsible for water resources management (WRM) and implementation of river works have limited capacity to respond to these challenges.** The Provincial Water Authority (ADA for its acronym

[9] Herzer (2013). Flooding in the Pampean Region of Argentina: The Salado Basin in Building Safer Cities: The Future of Disaster Risk
[10] The PMI was developed as part of the World Bank funded Argentina Flood Protection Project (P006052).

in Spanish - *Agencia del Agua*) is the agency responsible for implementing the Provincial Water Law, and the Provincial Department of Hydraulic Works (DPOH for its acronym in Spanish - *Dirección Provincial de Obras Hidráulicas*) has been responsible for implementing the PMI. Both entities present a series of gaps that impede adequate integrated management of water resources in the basin. Water is managed mainly by users in an ad hoc manner. There is no issuance of water use permits and regulations governing the operation of canals and other hydraulic infrastructure are not effective. The Provincial Water Law recognizes payment instruments by users, but these are not being applied, so there is no cost recovery within the water sector and infrastructure works are financed through general budget allocations. ADA has little presence in the territory of the basin and users in turn do not rely on ADA to help mediate problems. In 2002, nine sub-basin committees were established by ADA within the SRB, though at present, they are not operational as they lack participation from key stakeholders including farmer groups, civil society and academia. DPOH still lacks effective tools and instruments to better monitor river works and plan new interventions, particularly throughout the network of tributary canals. Additionally, the Provincial Agency for Sustainable Development (OPDS for its acronym in Spanish - *Organismo Provincial para el Desarrollo Sostenible*) and ADA have responsibility for preserving the province's natural resources, though their capacity in this field is limited.

13. **The PBA envisions continued implementation of the PMI with a strong focus on non-structural activities that are pivotal to address WRM challenges.** Provincial authorities recognize the urgency of strengthening water resources management capacities to complement structural measures in addressing the above-mentioned remaining challenges. The Project will, therefore, support the PBA in building the necessary institutional capacities by financing most of the non-structural measures identified in the PMI, setting the basis for sustainable WRM in the SRB going forward.

C. Higher Level Objectives to which the Project Contributes

14. **Alignment with the World Bank's Country Partnership Strategy (CPS) for Argentina.** The Project is fully aligned with the FY15-18 World Bank Group's CPS for Argentina, discussed by the Executive Director on September 9, 2014 (Report 81361-AR), which supports the World Bank Group's twin goals of eradicating extreme poverty and boosting shared prosperity in a sustainable manner. In particular, the proposed Project is fully aligned with the CPS strategic themes of "*Reducing Environmental Risks and Safeguarding Natural Resources"* by contributing to the CPS Objective 7, "*Reducing exposure to extreme flooding in the Province of Buenos Aires"*. Integrated management of the SRB would further enhance the resilience of the most important economic region of Argentina to the effects of increased climate variability and change. The Project promotes climate change adaptation measures aligned with Argentina's Nationally Determined Contribution to the Paris Agreement of the United Nations Framework Convention on Climate Change (CoP21), with climate change co-benefits for agricultural producers and residents of the basin, due to the type of activities supported.

15. The Project would contribute to the achievement of the United Nations' Sustainable Development Goal 6 *"Ensure availability and sustainable management of water and sanitation for all"* and, in particular, to target 6.5, "*Implement integrated water resources management at all levels"*, and target 6.6, "*Protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes"*. The Project is aligned with the recent 2016 National Water Plan as the key national policy document for the sector. The Plan includes four pillars, one of which, "Adaptation to extreme climate events", relates directly to this Project.

16. In addition, improved flood risk management is expected to increase tax revenues from increased

agricultural productivity and decrease emergency response and reconstruction costs. The fiscal space so created would allow the provincial and national governments to channel additional resources to poor and vulnerable populations (see Annex 5 for details).

II. PROJECT DEVELOPMENT OBJECTIVES (PDO)

A. PDO

17. To enhance flood protection and strengthen the capacity of the responsible institutions[11] for integrated water resources monitoring and management in the Salado River Basin.

B. Project Beneficiaries

18. The Project will benefit the entire population of the Salado River Basin totaling 1.4 million people through improved water resources management. In addition, river works will directly benefit an estimated 75,000 residents of the municipalities along Section IV, Segment 1-B of the Salado River, namely, the departments of San Miguel del Monte, Lobos, and Roque Perez (See Figure 1 in Annex 1).

C. PDO-Level Results Indicators

19. The key PDO level indicators include:

a. Participative River Basin Committees re-established and operational;
b. Hydromet Information System is used for integrated water resource monitoring;
c. Area under enhanced flood protection;
d. People benefiting from reduced flood risk (of which female).

III. PROJECT DESCRIPTION

A. Project Components

20. **The Project will support ADA and DPOH to implement and operationalize structural and non-structural measures envisioned in the PMI.** The Project will finance river training works along 34 km of the middle course of the river and the enhancement of bridges to reduce risks to human life and economic activities. It will also finance non-structural activities aimed to strengthening institutional capacities for improved water resources management, protecting the environment, and supporting the sustainable management of infrastructure investments made under this Project. The Project is structured around three components.

21. **Component 1: Integrated Water Resources Management** *(US$27.75 million, of which US$22.2 million IBRD financing).* This component aims to strengthen institutional capacity for water resources management and environmental and hydrological monitoring at different levels, through the implementation of non-structural measures of the PMI, contributing to a holistic and sustainable management approach. The component includes four subcomponents.

22. *Sub-component 1.1. Water Resources Management Plan for the SRB (US$2.1 million)*. This sub-component seeks to operationalize the PMI through the preparation of a complementary, participatory, updated, short-term WRM Plan. The development of this planning tool will tackle the lack of information in the basin.

[11] The institutions are: (i) the Provincial Water Authority, and (ii) the Provincial Department of Hydraulic Works

23. *Sub-component 1.2. Strengthening Environmental Management in the SRB (US$4.6 million).* This sub-component seeks to strengthen environmental management in the SRB, by supporting the principal provincial authorities[12] with environmental management responsibilities. Activities include water quality control and environmental services for water resources management; and the development of an Environmental and Wetlands Management Plan for the SRB.

24. *Sub-component 1.3. Improving Water Governance (US$12.6 million).* This sub-component seeks to strengthen ADA and river basin committees on one side, and DPOH on the other. Activities aim at building institutions that are capable of providing responses to basin challenges, including a review of cost recovery mechanisms for ADA and corresponding promotion of such mechanisms among users; improving regulations governing river basin committees and drainage associations in order to empower them; and strengthening management and technical capacities of DPOH.

25. *Sub-component 1.4. Hydrometeorological Services and Risk Management (US$8.5 million).* This sub-component aims to generate specific knowledge to understand and manage the risk of floods and droughts. Activities include the development of a hydrometeorological monitoring network for the basin that builds on existing national and regional ones; and the strengthening of institutional capacity to manage it, as well as the development of decision-making tools for risk management, including operational manuals, risk prevention and contingency plans.

26. **Component 2: River Training Works and Upgrading Associated Infrastructure** *(US$337.7 million, of which US$270.16 million IBRD financing).* Following completion of the river training works on the lower Salado River (223 km in Sections I, II and III), and in order to continue to expand the structural measures to reduce the impact of the increased trend in precipitation in the basin, the Province plans to continue implementation of the PMI along the remaining Sections IV and V. This component includes two sub-components.

27. *Sub-component 2.1. River Training Works (US$290.7 million).* This subcomponent will finance training works on Section IV-1-B of 34 km. The river cross-section is being augmented to hold a flood event of a return period of approximately 10 years,[13] which, in this section of the river, corresponds to about 450m^3/s. The works will provide incremental flood protection for higher return period flood events, meaning that these events would have a lesser geographic extent and temporal impacts after the works are completed. These works are also important to enable sequential interventions upstream in tributary areas of the basin that cover an additional area of 43,000 km^2 that could then drain to the hydraulically enhanced Salado River.

28. River works will imply the movement of approximately 25 million m^3 of sediments and soil. The Project will continue to support the cost-effective and environmentally friendly approach in which sediments are being handled. Dredged material will be placed in discontinuous parcels, or *recintos*, in adjacent farmlands along the river course, which would be slightly elevated and have higher productivity due to the nutrient rich sediment. The Project will document experience with the *recinto* approach to systematically assess benefits and share lessons learned in the future.

29. *Sub-component 2.2. Upgrading Associated Infrastructure (US$47.0 million)*. It will finance the adaptation

[12] ADA; DPOH; OPDS and the Ministry of Agribusiness.
[13] The design return period was selected in the PMI after considering different recurrences and completed an economic analysis for each of them. The alternative chosen produces the greatest cost benefit ratio within affordable costs.

of seven existing bridges to the new river cross-section enhancing their hydraulic capacity and increasing their resilience to extreme floods. Also, as a result of the consultation process of the Project, the subcomponent will finance works of two recreational beach areas (*balnearios)* requested by citizens in the Municipalities of Roque Perez and Villanueva.

30. **Component 3: Project Implementation, Supervision and Communication** *(US$8.8 million, of which US$6.89 million IBRD financing).* This Component seeks to support the Project Works Coordination and Execution Unit (UCEPO for its acronym in Spanish) in project management, including the carrying out of the Project audits, and DPOH in the supervision of the river works. It will finance communication activities, a technical assistance to support a Users' Oversight Committee. It will also support the development of a Grievance Redress Mechanism (GRM).

B. Project Cost and Financing

Table 2: Project Financing (in million US$)

Project Components	Project cost	IBRD or IDA Financing	Counterpart Funding
Component 1: Integrated Water Resources Management	27.75	22.20	5.55
Component 2: River Training Works and Upgrading Associated Infrastructure	337.70	270.16	67.54
Component 3: Project Implementation, Supervision and Communication	8.80	6.89	1.91
Total Costs	374.25	299.25	75.00
Front End Fees	0.75	0.75	0.00
Total Financing Required	375.00	300.00	75.00

C. Lessons Learned and Reflected in the Project Design

31. Project design has incorporated lessons learned during the implementation of the PMI, previous flood risk management projects in Argentina, as well as best practices from around the world. Main lessons learned include: (i) avoid focusing solely on structural measures anchored on political priorities, bringing an external partner with knowledge on best practices and convening power to help implement non-structural measures; (ii) involve a third party monitoring for the river works, to guarantee transparency, public participation and local ownership; (iii) put in place a robust GRM to manage Project related information requests, complaints and grievances; (iv) prioritize the construction of enhanced bridges, so the river training works will not be interrupted when the excavation reaches the bridge; (v) strengthen water governance at the basin scale following a strong participatory approach, seeking to boost the active role of users (basin committees) and strengthening the institutions in charge of water resources management in a gradual manner through project activities; and (vi) put special attention in certain procurement processes (hydromet system), with extra support by specialized technical experts and oversight from the Bank, factoring in capacity building tasks in the terms of reference of the selected firm to install the equipment to ensure sustainability.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

32. The Borrower will be the PBA. The implementing Agency will be the Borrower's Ministry of Infrastructure and Public Services through UCEPO. The Borrower has previous experience with Bank-financed infrastructure projects. UCEPO will be in charge of securing and coordinating safeguards implementation, monitoring and evaluation (M&E), and coordination with the World Bank. The Borrower's Ministry of Economy is responsible for financial management arrangements. The Procurement Department of the Ministry of Infrastructure and Public Services (DCYC for its acronym in Spanish - *Dirección de Compras y Contrataciones*) will be responsible for all procurement under the Project.

33. The UCEPO will manage the contracts with consultancies and construction companies; order payments of eligible expenditures; and coordinate with other entities at the provincial and national levels, including ADA and DPOH. ADA and DPOH will be in charge of the design and technical supervision of the Project activities under Component 1. DPOH will be also responsible for the execution of the works under Component 2. Implementation of Component 1 will benefit from collaboration agreements with participating entities and institutions[14] for activities such as data sharing, and facilitation of participatory processes. A model collaboration agreement is included in the Project's Operations Manual (OM).

34. For the river works and construction of bridges, DPOH supported by a consulting firm will supervise the works. A Users' Oversight Committee[15] will be set up to act as a third party monitoring entity representing the main beneficiaries of the river works. The Department of Environmental Studies of the DPOH has adequate capacity for environmental supervision, although additional personnel will be contracted to further strengthen it.

35. The PBA has committed to ensure parallel implementation of structural and non-structural components of the Project. To avoid the risk of delays of key activities under Component 1, an Action Plan with specific milestones for key consultancies on hydrologic planning, institutional strengthening and establishment of the hydromet system, has been agreed upon with the Ministry of Infrastructure. The Action Plan will be included in the OM and covenanted in the Loan Agreement. These milestones are set up aiming at having these activities under implementation within the first year after the loan becomes effective.

B. Results Monitoring and Evaluation

36. The UCEPO will have overall responsibility for M&E, and will monitor and evaluate progress under the Project based on the results framework presented in Section VII. The UCEPO will prepare semi-annual progress reports during Project implementation in a manner and format acceptable to the Bank. These reports will describe the overall progress made and status of all components and activities and specifically, progress towards achievement of the PDO. The UCEPO will include an M&E and planning staff that will report directly to the Project coordinator.

[14] Including the National Meteorological Service (SMN for its acronym in Spanish - *Servicio Meteorológico Nacional*), the National Institute of Agricultural Technology (INTA for its acronym in Spanish - *Instituto Nacional de Tecnología Agropecuaria*), the National Water Institute (INA for its acronym in Spanish - *Instituto Nacional del Agua*), OPDS and the Ministry of Agroindustry, among others.
[15] The Committee will be established according to the Decree 148, 2003. PBA's earlier experience with said types of committee has been positive. The Committee can present to the Ministry of Infrastructure, reports, observations and/or suggestions to be considered for the works. The Borrower is strongly committed to establish the committee before the river works start.

C. Sustainability

37. The public good nature of flood mitigation infrastructure services, coupled with the large capital outlays required for their construction, justifies public financing of these investments. Nevertheless, the impact of these investments to the government budget could be mitigated by progressively increasing cost recovery within the water sector. This Project will contribute to this aim by assessing and promoting the application of payment instruments already recognized by the Provincial Water Law but not yet applied, setting the stage for the most direct beneficiaries of infrastructure investments to start paying for flood protection and risk mitigation services.

38. The Project will help ADA, DPOH and users to assimilate new knowledge to understand the complex hydrodynamics of the SRB factoring in a series of key drivers of change such as land use and climate variability and change. Key stakeholders will better understand how the river behaves as it adapts with time to its new profile facilitating adaptive management by both provincial institutions and users, increasing resilience in the basin and enabling adequate environmental management of wetlands.

39. Technical designs selected for main investments minimize the need for O&M. So far, there is no evidence from the previously completed works that significant expenditures are needed to maintain the hydraulic capacity of the river once dredged/excavated. The river characteristics (very low slopes, low velocities, and soil profile) and the fact that there is no navigation in the river make the probability for additional dredging very low. The PBA will develop a sediment transport model under Component 1 to aide planning and basin management, providing evidence to support the financial outlays required for maintenance.

40. The technical specifications and terms of reference for the hydromet system contract are being informed by World Bank experience in Sri Lanka and assessed by high-level experts from the Water Expert Team, to ensure they are tailored to the existing needs and include appropriate capacity building mechanisms to local staff to ensure sustainability. The contractor will gradually transfer O&M responsibilities to technical staff from government agencies who will also be trained in these tasks. The O&M needs of these investments in the medium- and long-term will be incorporated in the Ministry's annual budget[16].

D. Role of Partners

41. The PBA has engaged with several multilaterals and donors to make important investments in Integrated Water Resources Management (IWRM) throughout its territory. The Inter-American Development Bank (IDB) is currently financing the Reconquista River Sanitation (3256/OC-AR) that is the follow-up project of the Reconquista River Project (797/OC-AR). The Development Bank of Latin America (CAF) recently approved a US$100 million loan to reduce the impacts of flooding in the Lujan Basin. Additionally, the Province has received the support of the Dutch Government through expert visits, resulting in recommended actions to implement in the SRB. Finally, the PBA is currently in discussions with the Chinese construction sector to finance about US$1 billion in river works planned in the PMI, to continue with the river works on the sections in the upper SRB. The Dutch support has been closely coordinated with the World Bank to maximize synergies.

[16] These represent about the same amount of estimated increase in tax revenue due to the reduced impact of floods in the direct area of influence of the river works financed under the Project.

V. KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

42. The overall Project risk is considered Substantial. The key risks and associated risk management measures include:

a. **Technical design.** This substantial risk relates mainly to the design of Component 1, due to its complexity involving numerous institutional strengthening activities and improving coordination among agencies and among users. In order to facilitate its implementation, activities are being grouped and included in the same contracts, minimizing the number of procurement processes for this component. The World Bank team is also providing additional technical support through a group of high-level experts in water resources management.

b. **Institutional capacity for implementation and sustainability**. This is rated substantial because of a risk of continued focus on structural measures while neglecting critical non-structural measures and key institutional reforms. The Provincial Government has shown strong commitment to implement Component 1, and to make sure implementation proceeds as planned. Parallel implementation of Components 1 and 2 is specified in the OM by prioritizing key procurement milestones of the three largest packages of Component 1 during first year of implementation. The Action Plan to ensure parallel implementation will be covenanted in the Legal Agreement (See Annex 2).

c. **Environmental and social.** The environmental risk is rated substantial due to the type and scope of the river training works and potential cumulative and induced impacts. To improve availability of basin-level environmental information, strengthen related knowledge and decision making, Component 1 will finance essential non-structural measures of the PMI, including environmental monitoring and analysis with a focus on wetlands. The social risk is estimated to be moderate, given that the level of acceptance and farmers' demand for the drainage works is high; the works are implemented based on voluntary agreements with affected landowners; the landowners are not a vulnerable population from a socio-economic point of view; and the record of complaints to date is low. However, it is to be noted that the environmental and social impacts observed to date along the 223 km of the works executed on the main course of the Salado River provide reassurance that these risks can be adequately managed.

d. **Climate and disaster risks.** This risk is rated substantial. A Climate and Disaster Risk Screening has been completed for the proposed Project. The screening identified droughts and extreme precipitation and floods as the main natural hazards in the Project area. There is a relatively substantial probability that a flood event will occur during the implementation of the works. To mitigate this risk, contingency funds are part of Component 2, and the preparation of a risk management plan is an obligation of the contractor.

VI. APPRAISAL SUMMARY

A. Economic and Financial (if applicable) Analysis

43. The economic viability of the Project was determined using a cost-benefit analysis (CBA) for the river training works and other flood protection measures envisioned under the comprehensive PMI and an innovative benchmarking approach for the hydrometeorological system.

44. The CBA of all the structural flood protection measures envisioned under the PMI in the entire basin was based on the average annual damage averted in the future resulting from the reduction in the area that will be inundated and the duration of the flood event for return periods ranging from 2 years to 100 years. The analysis included monetary benefits associated with: (i) reduction of damage in agricultural production; (ii) reduction of private property and rural infrastructure damage; and (iii) increase in production resulting from changes in land use patterns.[17] Using updated baseline data from 2007, the CBA showed aggregate positive results with an internal rate of return (IRR) of 11.7 percent. A CBA has been also conducted for the Section IV-1-B of the river to be targeted by the Project following a similar methodology to monetize benefits. The estimate IRR for the structural measures of the Project is estimated at 6.8 percent.

45. A thorough analysis of design alternatives as part of the PMI led to the selection of the alternative to extensive interventions in the river and network of canals, showing increasing returns to scale as works progress upstream in the basin (e.g., expanding from the main river channel to tributaries and primary canals and from primary to secondary canals, provides increasingly cost effective flood protection).

46. The reduction in losses from flood events could decrease emergency response and reconstruction costs, and increase tax revenues. The increase in annual tax revenue due to the works in Section IV-1-B and those future ones enabled by this Project in 43,000 km^2 upstream, is estimated at US$75.0 million once the works in that area are completed. This extra fiscal space resulting from reducing the amount of funds allocated for emergency response and additional tax revenues could be redirected to social investments.

47. The Project will yield additional indirect benefits not fully captured by the CBA through: (i) institutional strengthening of ADA, DPOH and River Basin Committees that will indirectly empower the 1.4 million inhabitants of the basin with enhanced tools and resources for water management; (ii) increasing land values resulting from the reduced flood risk, and corresponding additional property tax revenues that could be allocated for social investments; (iii) development of conditions for private sector development beyond agriculture, particularly in the tourism sector; and (iv) improved access to public services and income generating activities for urban residents left isolated by floods.[18] A debt sustainability analysis of the PBA has been conducted by the World Bank, and the results show that public debt is sustainable in the medium- to long-term (see Annex 4 for details).

B. Technical

48. All Project activities fall within the scope of the PMI, developed in 1999 and updated in 2007 with regard to the economic and environmental evaluation. The design of the enhanced cross-sections of the river follows a similar design as originally proposed, and its functionality has been proven on the 226 km of river already executed. A key element that has changed from the original design in the PMI is the introduction of the discontinued *recintos* as an innovative way to deposit dredged material, instead of following a traditional approach of building dikes along the river course. The location of these deposition areas follows clear technical, social and environmental criteria, and requires having a mutual agreement with the landowners. The technical criteria exclude deposits in wetlands and in areas closer than 200 m from the river. This design also enables a better connectivity of the network of canals in the basin while providing “room for the river.” The technical

[17] The hypothesis is that advanced agricultural technologies will be adopted increasing yields as a result of the reduction in flood risk.
[18] Losses per day of work due to floods were estimated at US$275,000 in the direct area of influence of the Project works.

appraisal reviewed the specifications of river works and bridges to be upgraded with the Project. The hydraulic impacts of all these works, including tributary canals, have been thoroughly modelled.

49. Non-structural measures included in Component 1 are being implemented for the first time in the context of the SRB. A thorough assessment of the existing institutional capacities was carried out to ensure that Project activities are designed appropriately, incorporating institutional strengthening elements in key strategic areas, such as use of hydrological models, management and operation of the hydromet network, and use of associated analytical tools. Consultancy firms in charge of implementing these activities will be training staff from ADA and DPOH in such areas to ensure adequate capacity is in place to implement the actions included in the WRM and Environmental Plans. The Project design also recommends an optimal sequence to be followed for the implementation of activities to ensure that the most basic needs are covered first, including those related to Subcomponent 1.2 on institutional strengthening.

50. On the basis of information available at appraisal, the climate change co-benefits of the Project it is estimated to be 98.8 percent of the total Project cost, determined by the costs of Sub-components 1.1, 1.3 and 1.4, and Component 2. Such activities in Component 1 will generate hydrological knowledge incorporating climate variability and change in the models used, and build capacity to use such tools for decision-making in a context of increasing hydrometeorological risk. The cost of Component 2 is fully factored in this percentage, as the river works are designed to reduce the impact of the increasing trend in precipitation observed in the last decades in the basin.

C. Financial Management

51. Financial Management (FM) arrangements in place at the PBA were recently assessed in FY17 as part of the preparation of another Bank-financed operation[19] and were found acceptable to the Bank. Project specific FM arrangements will be supplemented by PBA government-wide financial management arrangements, which provide a sound control framework, although with some overlapping functions. Moreover, the proposed Project will follow the same FM arrangements of previous World Bank-financed operations implemented by the PBA, including the role played by the Ministry of Infrastructure and Public Services being responsible for making payments of the Project's eligible expenditures through the PBA's Treasury Single Account (TSA). FM performance of Previous World Bank operations with PBA have been consistently assessed as satisfactory and the World Bank has received acceptable audits on time. The disbursement arrangements include retroactive financing, since procurement processes for work contracts under Component 1 are expected to start shortly after Project approval.

D. Procurement

52. Procurement will be conducted according to the World Bank's "Procurement Regulations for IPF Borrowers", issued in July 2016, for the supply of goods, works, non-consulting and consulting services under the Project. A procurement capacity assessment of the DCyC was carried out by the World Bank, and reviewed mainly the organizational structure for implementing the Project, the interaction with UCEPO and the technical entities, such as: ADA and DPOH, staffing and procurement systems that are in place, in order to determine the risk and mitigation measures. The assessment concluded that DCyC has adequate procurement capacity to implement the Project, in terms of staffing and knowledge, with specific experience in using Multilateral Development Bank's

[19] (P159843) AR AMBA Urban Transformation Project. Board Date: February 27, 2017.

procurement procedures, in particular for works and goods. However, some weaknesses in the selection of consulting services were identified. Based on all the aforementioned assessment and the fact that the expected activities are not complex in terms of procurement, and do not imply major risks, the procurement risk is rated as Moderate.

53. The Borrower has developed a full Project Procurement Strategy for Development (PPSD) under the close support of the World Bank (a summary of the findings of the PPSD is included in Annex 2). The Procurement Plan for the first 18 months of implementation was defined based on the results of the PPSD. In addition to the prior review supervision to be carried out from Bank country offices, the capacity assessment of the implementing agencies has recommended annual supervision mission to carry out post-review of procurement actions.

E. Social (including Safeguards)

54. The social impacts identified by the Environmental and Social Impact Assessment (ESIA)[20], are predominantly positive, e.g. generation of employment, generation of induced economic activities, improvements on roads and related infrastructure with the consequent improvement in productivity and regional economy. Negative social impacts, such as modifications on communication pathways, are limited to the construction phase and temporary, and can be avoided, minimized or mitigated by using the measures in the Environmental and Social Management Plan (ESMP).

55. During the development of the PMI and during previous works on the Salado River, there have been different participation instances that allowed the inclusion of community concerns to the overall project. In the PMI, the results of the interaction with the academic sector and nongovernmental organizations (NGO) informed the formulation of the river training works. A public hearing on the works in Section IV-1-B, was carried out on September 27, 2016 in Roque Perez. It allowed for an enriched Project design, including works in two *balnearios*; public beach areas in Roque Perez and Villanueva. The advanced draft of the ESIA report was disclosed in-country and on the World Bank external website on December 7, 2016. The final ESIA report was consulted on line from December 15, 2016, to January 12, 2017, including offering opportunity for face-to-face discussion at the office of the Department of Environmental Studies (DES) of DPOH between January 10 to 12, 2017. This consultation did not yield any questions or considerations. The final ESIA report was disclosed in-country on February 15, 2017 and on the World Bank website on February 21, 2017. In order to allow continued community participation during the different Project stages, the ESMP includes a Communication Program and a GRM. The Water Resources Management Plan and the Environmental and Wetlands Management Plan for the basin will be also developed through a participative process.

56. There will be no involuntary taking of land that result in relocation or loss of shelter, loss of assets or access to assets, or loss of income sources or means of livelihood, and therefore OP 4.12 on Involuntary Resettlement will not be triggered. The dredged material extracted from the riverbed is of rich quality and demanded by many farmers. Its final disposal relies on properly documented voluntary agreements with the implied landowners. Agreements ensure that there is power of choice and informed consent. The potential dredging impacts to crops on some small strips of land that some farmers may periodically use, even though they know the land is public and subject to frequent floods, will also be avoided. In cases where a farmer was using the public domain land adjacent to his/her property to plant crops, the DPOH will announce the works in a timely

[20] Prepared by DPOH and approved by the Bank. See Annex 6 for a summary

manner and provide written notice so that the farmer has the necessary time to harvest crops prior to impact. Summing up: voluntary agreements will be reached with all farmers who own property adjacent to the area to be dredged; said agreements will include an agreement for the government to enter the relevant farmer's property to access the dredging area, an agreement to dispose the dredged soil (if applicable), and an agreement on the date that dredging will commence (so crops, if any, can be harvested before the dredging date). Therefore, no physical works are carried out without the consensus of the landowner. The procedure and details on these agreements are explained in the Voluntary Agreements Protocol, disclosed as part of the ESIA. It has been confirmed that additional works under Component 2 (the seven bridges and the two public beach areas) will not require land acquisition.

57. The OP 4.10 on Indigenous Peoples is triggered, as there are indigenous peoples present in the SRB, as documented in the National Registry of Indigenous Communities. Indigenous peoples are not located in the area directly impacted by river works under Component 2. There are activities under Component 1 that will carry out tasks with, or directed to different stakeholders with a key role in water management or affected by water related issues in the basin. Such stakeholders will first need to be identified by studies characterizing the basin, and only when these studies are completed it will be possible to know whether IPs are among such stakeholders. If as a consequence of those studies, IPs are identified as stakeholders with a key role in water management or affected by water related issues in the basin, site specific IPPs will be prepared accordingly. Therefore, an indigenous Peoples Planning Framework (IPPF) has been prepared by DPOH and approved by the WB. It was consulted from February 3 to 13, 2017, with the National Institute for Indigenous Affairs (INAI) and the Provincial Council of Indigenous Affairs (CPAI). Both INAI and CPAI agreed with the proposed strategy and emphasized the importance of prior consultation. The final IPPF was disclosed in-country on February 15, 2017, and on the World Bank external website on February 21, 2017. Broad community support for specific activities would then be obtained during implementation for the preparation of site specific IPPs, if required.

58. The labor force that will work on Section IV-1-B is not expected to exceed 100 workers, including local workers. Considering that the current population in the area of works is about 71,000, the potential impact of that influx is relatively low. No vulnerable groups have been identified that could be particularly impacted by the labor influx. The fact that the workers will be housed in camps and will receive mandatory training on health and safety issues (including on the prevention of communicable diseases) will contribute to reducing the potential impact on the host community.

59. All participatory processes in the Project will incorporate a gender approach. These process include: the preparation of the Water Resources Management Plan and the Environmental and Wetlands Management Plan for the SRB, and the Improvement of regulations and participation of water basin committees, among others.

F. Environment (including Safeguards)

60. The Project aims at net positive environmental impacts through the implementation of the ESMP for the river training works under Component 2; and through a basin-level Environmental and Wetlands Management Plan to strengthen environmental management related to water quality and flows under Subcomponent 1.2. The Project triggers OP 4.01 on Environmental Assessment and has been categorized as Category A due to (i) the 34 km of river training works to widen and deepen the riverbed and the disposal of dredged material in *recintos*; and (ii) the sensitivity of the SRB due to the presence of wetlands and riparian buffers with environmental value particularly for avifauna. The track record of the environmental and social management of the 223 km of the

works to date has not presented significant negative impacts.

61. The development of the PMI included preparation of a strategic Regional EIA (REIA) with a basin-wide scope in 1999, and its review and update of the same in 2007. The REIA was financed by the World Bank and followed the applicable safeguards policies. The sections of the river already dredged followed environmental management guidelines, including an Environmental Management Manual for Hydraulic Works in the SRB prepared in 2007. The ESIA and related ESMP prepared for the Project following World Bank requirements for a Category A project are based on the REIA and an EIA that the DPOH had undertaken and consulted publicly at feasibility stage. The OPDS is reviewing the EIA to provide a Declaration of Environmental Aptitude (*Aptitud Ambiental*), required for the Project works by the provincial legislation.[21]

62. According to the ESIA, the key potential negative environmental impacts during construction relate to alterations in the pattern of water flow as a result of the excavation in the riverbed and surrounding areas. This will generate disturbances and losses of habitat in the river and its margins and affect soils of the flood plain, producing a reduction of edaphic quality of the riparian zone and the associated benthonic micro-fauna. These impacts can be avoided, minimized or mitigated by the ESMP as they are considered localized, temporary and reversible once the works are completed, due to the environmental considerations of its design and the overall capacity of the biological/fluvial corridor to restore similar conditions. The specific induced and cumulative environmental impacts potentially caused by the global river training works relate to: (i) water quality (sedimentation and turbidity during construction and potential increase of nutrients and fertilizers due to increased drainage from agricultural areas during operation); and (ii) fish populations and recreational fishing activity. The Project's contribution to these potential impacts is not considered significant due to the limited size of the works. Subcomponent 1.2 aims to strengthen informed decision-making related to environmental management at the basin level with a particular focus on water quality and wetlands management.

63. The Project triggers OP 4.04 on Natural Habitats as the entire course of the Salado River is considered an Important Bird Area despite the overall heavy impact of anthropogenic activities across the basin. However, the Project works' direct impact area does not include any type of natural habitats as defined by OP 4.04. A qualified assessment of populations of significant bird species will take place before construction works start, and the environmental selection criteria set for the *recintos* requires an environmental analysis of each potential parcel. Further, the implementation of the SRB Environmental and Wetlands Management Plan is expected to strengthen management of the Samborombón Bay Ramsar site and other existing, currently scarcely managed protected areas.

64. The Project triggers OP 4.09 on Pest Management since the reduced flooding and execution of the *recintos* are expected to increase agricultural production and potentially the use of agrochemicals. The Project will not imply direct increases in the use of pesticides or herbicides, nor does it require a stand-alone Integrated Pest Management Plan. As described in the ESIA/ESMP, the Project will promote sustainable agricultural practices under Subcomponent 1.2 to minimize chemical and nutrient flow into the river. The Project triggers OP 4.11 on Physical Cultural Resources for precautionary purposes since there are no known physical cultural resources within the Project works' direct impact area. However, the SRB is known for paleontological findings of animal fossils and the river training works might result in chance finds. The ESMP includes specific requirements and guidance to address them.

[21] This review is expected to be completed during the first quarter of 2017

G. Other Safeguard Policies (if applicable)

65. The Project triggers OP/BP 7.50 on Projects on International Waterways as (i) it is located in the SRB that is a tributary of the Rio de la Plata, a water course shared with Uruguay and subject to the Rio de la Plata Treaty and its Common Maritime Front, approved by Law 20645; and (ii) the Project involves infrastructure works to improve the drainage of the river basin. However, the Project was granted an exception[22] from the obligation to notify Uruguay, because Argentina is the lowest downstream riparian of the Salado River, the river runs entirely within the country, and there is no concern that the Project could cause appreciable harm to other states.

H. World Bank Grievance Redress

66. Communities and individuals who believe that they are adversely affected by a World Bank supported project may submit complaints to existing project-level grievance redress mechanisms or the World Bank's 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 WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit *http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service*. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

[22] Memo approved by the Regional Vice President for Latin America and the Caribbean on Dec 12, 2016.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY : Argentina

Salado Integrated River Basin Management Support Project

Project Development Objectives

To enhance flood protection and strengthen the capacity of the responsible institutions for integrated water resources monitoring and management in the Salado River Basin.

Project Development Objective Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Participative River Basin Committees re-established and operational		Number	0.00	9.00	Annual	Project Reports Basin Committees reports / legal foundation documents	ADA

Description: River Basin Committees are re-established through the issuance of a new regulation (and corresponding decrees) by ADA, formally set up and supported to ensure they are operational and complying with their functions, including meeting regularly with effective participation of relevant stakeholders (i.e. economic actors, affected parties, institutions, or NGOs) to provide ADA with inputs to be formally considered in decision making processes related to the implementation and monitoring of the Water Resources Management Plan for the Salado River Basin.

In 2001, ADA approved a regulation to define the River Basin Committees functions and established 9 of them through the corresponding decrees. Yet, in practice, these committees do not function because of lack of adequate representation of key stakeholders, lack of clear functions, no real link with ADA and thus no power to influence

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
water management decisions. Therefore the baseline is 0.							
Name: Hydromet Information System is used for integrated water resource monitoring		Yes/No	N	Y	Annual	UHI Reports	UHI
Description: The Hydromet Information System will facilitate the collection, quality control, analysis and exchange of hydromet information, ensuring provision of data to the main institutions in charge of Integrated Water Resource Monitoring in the River Basin. The system will also facilitate the development of hydrological products							
Name: Area under enhanced flood protection		Square kilometer(km2)	0.00	435.00	Annual	DPOH Reports	DPOH
Description: Area in which a significant reduction of the flooding time occurs compared with the existing flooding time calculated for each respective return period. Unless a flood event occurs during the lifetime of the project and after the works have been completed, in which is possible to measure the area affected and reduction of flood duration in such area, the proxy metric to verify this indicator is the full implementation of the river works as per the existing design. Partial completion of the works will imply the need to determine the corresponding partial protected area.							
Name: People benefiting from reduced flood risk.		Number	0.00	75000.00	Annual	Project Reports	UCEPO DPOH
Female beneficiaries		Percentage	50.00	50.00			
Description: Number of people benefiting from reduced flood risk due to the river works in the Sector IV-1-B. The target of 75,000 beneficiaries corresponds to the							

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
residents of the municipalities along the referred sector of the Salado River, San Miguel, Lobos and Roque Perez. These people will be considered “beneficiaries” once the works have been completed. Partial completion of the works will imply a re-assessment of the corresponding partial target.							

Intermediate Results Indicators

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Name: Water Resources Management Plan for the Salado River Basin developed and under implementation, including an Environmental and Wetlands Management Plan.		Yes/No	N	Y	Annual	Project Reports	UHI
Description: The Water Resources Management Plan will be developed based on the results of the studies and analysis detailed in Component 1 and will include the effective participation of an inter-institutional and multi stakeholder task force. This Plan will also include the preparation, approval and initial implementation of an Environment and Wetlands Management Plan. “Under implementation” means that at least all key actions / measures included in the Plan that are part of the Project, are being implemented. These include the hydrological balance used as a decision support tool, permits for water uses and discharges being issued, regulations for operations of canals prepared, and future works in network of canals being designed.							
Name: ADA’s decentralized offices fully functioning		Number	0.00	2.00	Annual	ADA Reports Project Reports	ADA

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
Description: Offices equipped with the necessary personnel, infrastructure, equipment and technical tools and effectively performing the functions defined in the new organic structure of ADA.							
Name: Flood and Drought risk maps, analysis of land use change impacts, and operational manuals for Drought and Flood Emergency Management completed		Yes/No	N	Y		UHI Reports	UHI
Description: Flood and drought risk maps developed using historic satellite and hydro climatological data and taking into account land use change in the last decades, with collaboration of INTA, universities and other institutions. Analysis of the impact of land use change over the hydrology of the river basin completed. The operational manuals will be developed in coordination with ADA and DPGRE, with the involvement of all related institutions and stakeholders.							
Name: Number of hydromet stations installed and operational		Number	77.00	217.00	Annual	UHI	UHI
Description: Number of hydrometric stations (including the measurement of phreatic, water quality, sediments and ground water parameters) installed by the project in the Salado River Basin providing data to the Hydromet Information System in real time. The baseline refers to 77 existing meteorological stations in operation in the river basin, managed by national institutions (Servicio Meteorológico Nacional, SMN, and Instituto Nacional de Tecnología Agropecuaria, INTA).							
Name: Wetlands identified in the river basin and objectives and measures for protection defined and agreed by DPOH, ADA and		Yes/No	N	Y	Annual	UHI Reports	UHI

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
OPDS.							
Description: As part of the Environmental and Wetlands Management Plan, wetlands in the river basin will be identified and assessed with the aim of establishing the ecological value and threats to each wetland. Following the results of this assessment, a set of objectives for protection will be defined and a set of priority protection measures proposed and consented with the responsible institutions (DPOH, ADA and OPDS).							
Name: Km of river hydraulically enhanced		Kilometers	223.00	257.00	Annual	DPOH Reports Contractor Reports	DPOH
Description: The works for the hydraulic enhancement will include the adaptation, widening and deepening of the river cross section along the 34 km of the second leg of Section IV (IV-1-B). This indicator is directly linked with PDO indicators 3 and 4. The baseline of 223 km corresponds to the length of river hydraulically enhanced in sections I, II and III downstream							
Name: Percentage of volume of river sediments/soil safely disposed in recintos		Percentage	0.00	100.00	Annual	DPOH Reports Contractor Reports	DPOH
Description: Refers to the sediment and soil removed from the riverbed through the river training works. According to pre-design stage, this corresponds to approximately 25 million m3. This number may change at detailed design stage.							
Name: Number of bridges with increased resilience to		Number	0.00	7.00	Annual	Project Reports	DPOH

Indicator Name	Core	Unit of Measure	Baseline	End Target	Frequency	Data Source/Methodology	Responsibility for Data Collection
flood events.							
Description: The following bridges will be upgraded by the project: (1) Puente ferroviario FFCC Roque Pérez – Salvador María; (2) Caminero Roque Pérez – Salvador María; (3) Puente Ruta Nacional N° 205; (4) Puente Carretero Ernestina - Elvira; (5) Puente FFCC Ernestina – Elvira; (6) Puente Ruta Nacional N° 3; (7) Puente FFCC Videla Dorna - Gorchs. Upgraded means that new bridges will be constructed with enhanced hydrological conditions.							
Name: Project-related grievances registered and addressed under the Project Grievance Redress Mechanism.		Percentage	0.00	100.00	Annual	Project progress report DPOH Reports	DPOH
Description: This indicator measures the number of addressed grievances over the number of registered grievances (in percentage).							

Target Values

Project Development Objective Indicators

Indicator Name	Baseline	End Target
Participative River Basin Committees re-established and operational	0.00	9.00
Hydromet Information System is used for integrated water resource monitoring	N	Y
Area under enhanced flood protection	0.00	435.00
People benefiting from reduced flood risk.	0.00	75000.00
Female beneficiaries	50.00	50.00

Intermediate Results Indicators

Indicator Name	Baseline	End Target
Water Resources Management Plan for the Salado River Basin developed and under implementation, including an Environmental and Wetlands Management Plan.	N	Y
ADA's decentralized offices fully functioning	0.00	2.00
Flood and Drought risk maps, analysis of land use change impacts, and operational manuals for Drought and Flood Emergency Management completed	N	Y
Number of hydromet stations installed and operational	77.00	217.00

Indicator Name	Baseline	End Target
Wetlands identified in the river basin and objectives and measures for protection defined and agreed by DPOH, ADA and OPDS.	N	Y
Km of river hydraulically enhanced	223.00	257.00
Percentage of volume of river sediments/soil safely disposed in recintos	0.00	100.00
Number of bridges with increased resilience to flood events.	0.00	7.00
Project-related grievances registered and addressed under the Project Grievance Redress Mechanism.	0.00	100.00

ANNEX 1: DETAILED PROJECT DESCRIPTION

COUNTRY : Argentina
Salado Integrated River Basin Management Support Project

Project components

1. The integrated basin management approach for the Salado River was proposed in the Salado River Basin Management Plan (*Plan Maestro Integral de la Cuenca del Río Salado*, PMI). The PMI is a strategic plan presenting long-term challenges and solutions. It includes structural and non-structural measures designed to reduce the impact of recurrent floods and droughts in the context of an environmentally sound economic development. Since the approval of the PMI, there has been good progress in the implementation of the structural measures, but the pace for executing non-structural measures has been much slower. This Project seeks to restore the balance between both types of interventions, and provide the responsible agencies with tools needed to address the existing water resources management challenges in the basin.

2. The proposed Project has three components. Component 1 includes non-structural measures for integrated water resources management in the Salado River Basin, focusing on strengthening the capacities of the agencies responsible for water resources management: the Buenos Aires Provincial Water Authority (*Autoridad del Agua de la Provincia de Buenos Aires*, ADA) and the Provincial Department of Hydraulic Works (*Dirección Provincial de Obras Hidráulicas*, DPOH). The second component will finance river training works to enhance the hydraulic capacity of the Salado River, through enlarging its cross-section, as specified in the PMI. These works began in 2000 at the mouth of the river (Section I) and continued upstream (see Table A1-1). The section proposed for financing is Section IV-1-B of 34 km in the middle course. The third component includes support to provincial entities for management of the project, and for the active involvement of direct project beneficiaries.

Component 1: Integrated Water Resources Management *(Cost: US$27.75 million, of which US$22.2 million IBRD financing).*

3. Implemented by ADA and DPOH, this component will promote the integrated water resources management (IWRM) of the Salado River Basin, and the institutional strengthening of these two agencies as a necessary prior step. The proposed activities are based on an analysis of the needs for strengthening technical, administrative, and legal aspects of both institutions. This component establishes targets for short-term action derived from the PMI's strategic guidelines.

4. The low percentage of registered users impedes having a cadaster of users receiving and demanding services, with the consequent lost opportunity for financing the provision of water management services. The basin is subject to multi-year floods and droughts that affect vast areas (tens of thousands of km^2), with negative effects over the urban population and agricultural and livestock production. At present, these events are not being sufficiently monitored and analyzed. The components of water risk and resource management are interconnected, because the excesses or deficits of water have to be managed in accordance with the needs for production, and with the help of medium-term forecasts and projections that are currently not available.

5. There is also a problem of water quality in the basin, with multiple impacts on the hydrological

environment (i.e., industrial and urban discharges, potential pollution due to phytosanitary products, suspended solids and risk of salinization aggravated in the long term by the rise in the average sea level). These threats could, in some cases, harm natural areas of special interest. There is a lack of efficient coordination in the operation of the network of canals that users try to compensate by building ad hoc temporary works with no overall planning. The situation is expected to worsen in the future, because the basin is being subjected to major threats due to the pressure on the resources from a more intensified agriculture, promoted by favorable international market conditions, and the effects of climate change.

6. The objective of moving toward integrated management of the basin can be achieved through four main lines of action: 1. Water Resources Management Plan for the SRB, to identify the short- and medium-term management needs, and actions to address them in different fronts; 2. Strengthening Environmental Management, to develop the knowledge and tools to better consider environmental factors systematically in decision making processes; 3. Improving Water Governance, in order to develop the institutional capacity for implementing the measures identified in the planning process; 4. Hydrometeorological Services and Risk Management, to improve the capacities and regulations for evaluating and managing hydrometeorological risks.

7. The transfer of technology and knowledge to ADA and DPOH will be a horizontal process in all the activities financed by the project under Component 1, and will be explicitly stated in all terms of references of the corresponding consultancies proposed.

Sub-component 1.1. Water Resources Management Plan for the Salado River Basin *(Cost: US$2.1 million)*

8. Some of the most important limitations for Integrated Water Resource Management are the insufficient coordination amongst stakeholders and the lack of knowledge of the basin. Water related activities in the basin are self-managed by users in an uncoordinated manner. Current knowledge of the water cycle components and water demands is fragmented and ADA lacks data for decision-making. These challenges underscore the need for a planning tool to articulate water resources management, using a multisector, participatory approach. This tool will incorporate forecasts and projections to better understand the effects that land use, the different operation forms of the systems of canals, the ENSO cycles, climate variability and climate change, would have over the basin's water resources.

9. The PMI established strategic objectives whereas the planning instrument proposed under this subcomponent is more operational. It is oriented to create management capacity in the short term, without compromising the long-term objectives of the PMI. The plan will have a time horizon of eight years with a mid-term evaluation after four years. The activities included in it (structural and non-structural) will be planned for short and medium time horizons of 4+4 years with the understanding that significant results should be observed after the first four-year period. The plan will be approved through a resolution by Undersecretariat of Hydraulic Infrastructure (*Subsecretaría de Infraestructura Hidráulica,* UHI) and will be developed through the following three set of activities:

10. *Activity 1.1.1.- Basin Characterization and Water Balance,* including the following tasks:

(a) Based on available data (including satellite information), available water resources in the subsoil and the riverbeds will be studied to establish a water balance model for the basin that will be further improved as new datasets become operational. This activity will involve obtaining basic data, developing also a hydro-

geological characterization of the basin. ADA and DPOH will use the first operational version of this water balance model, maintain it, and improve it as part of their responsibilities.

(b) Based on remote detection with field verification, there will be an inventory of the basin's water infrastructure, including historical or non-registered canals, including control elements. This inventory will also incorporate groundwater abstraction wells used for economic activities and any other relevant infrastructure for tapping surface or ground water. In the case of hydraulic structures, there will be an evaluation of their condition and an estimate of operation and maintenance costs or repairs in cases where the structures are considered useful for the system. There will be an analysis of the hydraulic connectivity of the canal systems and the elements that would be needed to ensure a consistent and rational network. This basin characterization will also factor in the characteristics and elements of existing agreements on water transfer with the provinces of Santa Fe, Pampa and Córdoba.

(c) An inventory of actual water uses (not only registered ones) will be developed using appropriate technology available, for instance, to detect irrigated parcels visible in satellite images. Current and future demands will be estimated based on observed trends or reasonable scenarios. Other potential demands in addition to farming and traditional industry will be examined, including those related to tourism, aquaculture, and other of economic interest. Special attention will be paid to water demands for maintaining of ecosystems, such as environmental flows and volumes. Following indications of the PMI, the analysis of water uses will also develop specific studies on tourism potential in the basin and on the methods and feasibility of complementary irrigation.

(d) Development of different supply and demand scenarios using a hydrological model, introducing variations in the water balance: Projections will include the effect of natural climate variability, climate change and the ENSO cycles, but also different development trends in the basin affecting land use, or water volumes demanded. All the information generated will be included in ADA and DPOH's Geographic Information System (GIS).

11. Activity 1.1.2. - Identification and assessment of problems. Using the results of the basin characterization, this activity will develop a diagnostics of the current situation considering imbalance in the execution of the structural and non-structural components of the PMI. This diagnostic will use the water management tools developed in the previous activity, and will be prepared in a participatory manner, incorporating the views of the basin´s key stakeholders. The assessment of problems will address issues related to governance, management and allocation of the resource, management of hydrological risks (see subcomponent 1.4) and environmental and social protection (subcomponent 1.2).

12. *Activity 1.1.3. - Identification of specific interventions and measures, assessment of costs and financing, and implementation chronogram:* based on the previous analysis, the lines of action will be determined, which may include structural or non-structural measures, validating those included in the plan and developing more specific actions at the operational level. A participatory, consensus-based methodology will be designed to establish a continuous mechanism of peer review the implementation of the plan among relevant stakeholders. This activity will also prepare a roadmap of actions in the plan, prioritizing them in order of urgency and importance in a time frame of 4+4 years, and considering a mid-term review evaluation process, specific budget, and proposals for financing. Last, a monitoring and evaluation program for the entire component 1 of the Project will be defined as one of the first tasks of this activity.

Sub-component 1.2. Strengthening Environmental Management in the Salado River Basin *(Cost: US$4.6 million)*

13. This subcomponent seeks to strengthen environmental management in the Salado River Basin, both in terms of how urban, industrial and agricultural activities impact the quality and flow of water, and in terms of how water resource management activities affect other aspects of the environment. Water quality is affected by both point and diffuse sources of pollution from human activities. The flow of water in the basin is related not only to rainfall, but also to land use changes, in particular by the transition from pasture to intensive agriculture, which, in the basin, has decreased rates of evapotranspiration significantly, causing a rise in groundwater levels. In addition to more frequent and prolonged flooding, this can cause soil salinization, reducing its productivity. Land use decisions also affect the sediment load in drainage channels with implications in their hydraulic capacity and maintenance costs; influencing the overall flood risk and water availability during dry periods.

14. At the same time, the management of water resources needs to take into consideration a variety of potential impacts on the environment, including the positive effect of periodic flooding for the fertility of fields, the need to maintain flows for river connectivity, and the impacts on the functioning of ecosystems, most importantly wetlands. Not only do wetlands perform a number of valuable hydrological functions, improving water quality, trapping sediment, and buffering variations in flow, but they are also important natural habitats, of particular significance for bird and fish populations. Most notably, at the mouth of the Salado River, Samborombón Bay is a Ramsar site, a wetland of international importance. National concern for the protection of wetlands was highlighted most recently by the Senate's approval in November, 2016, of a draft law on Minimum Budgets for the Environmental Protection of Wetlands. This draft Law has the objective to identify, conserve, protect, and promote ecological restoration, and sustainable use of wetlands, to preserve the ecosystem services that these provide.

15. The PMI intended to develop and preserve the environmental value of the basin, especially the wetlands. The PMI included a Regional EIA, with a basin-wide scope, which was updated in 2007 in its economic and evironmental aspects, as part of the overall PMI review. The specific ESIA prepared for this Project includes not only an Environmental and Social Management Plan (ESMP) addressing the direct impacts of the structural measures to be financed, but also a broader set of activities to be undertaken for the development of an Environmental and Wetlands Management Plan for the Salado River Basin. Based on this analysis and associated recommendations, Subcomponent 1.2 seeks to strengthen the capacity for management of the interaction between water resources and other aspects of the environment of the principal provincial authorities with responsibilities in this regard: ADA, DPOH, the Provincial Agency for Sustainable Development (*Organismo Provincial para el Desarrollo Sostenible* – OPDS) and the Ministry of Agribusiness. Subcomponent 1.2 includes the following activities:

1.2.1 Water Quality Control and Environmental Services for Water Resource Management

16. To reinforce ADA in fulfilling its mandate to control water quality, support will be provided to:

(a) Develop an inventory of point source discharges in industrial and urban areas, including its incorporation into a GIS database;
(b) Establish criteria to monitor and evaluate diffuse pollution from the agricultural sector, in collaboration with the National Institute of Agricultural Technology (INTA);
(c) Analyze the effect of discharges on natural environments, including investments to upgrade existing

laboratories, training to staff and equipment, in particular to support the use of pollutant dispersion calculation models;

(d) Propose discharge and water quality regulations, and strengthen the structure and capacity of ADA to ensure their implementation and intervene in the event of non-compliance;

(e) Install an environmental control network and the development of GIS-based products for real-time control, through links between the new Hydrological Service (see Subcomponent 1.4) and ADA´s department in charge of the discharge control;

(f) Drawing on international experience, together with the Provincial Ministry of Agroindustry, evaluate the potential of regulatory and market-based instruments, including systems of payments for environmental services, to affect land-use decisions to improve water resource management, including through the management of sediment loads, water-table levels, rates of evapotranspiration, salinization, and water retention for flood and drought management.

1.2.2 Environmental and Wetlands Management Plan

17. The Environment Department of DPOH has capacity and mandate for managing the impact of water infrastructure on the environment, while the OPDS has mandate for promoting sustainable development of natural resources in the province, including protected areas. ADA has also mandate for the environmental management of the basin. A working group, consisting of these three agencies, with the collaboration of the Provincial Ministry of Agroindustry, will be established to oversee the preparation and initial implementation of an Environmental and Wetlands Management Plan for the SRB.

18. This plan will support an integrated approach to natural resource management, including management of the cumulative environmental impacts of the PMI, through the following categories of activities:

(a) Preparation of an environmental and social diagnostic at the basin level, focused on an inventory and classification of wetlands and the identification of key indicators to monitor (i) terrestrial ecosystems (e.g. soil, groundwater level and vegetation); (ii) lentic and lotic aquatic ecosystems on the ground; and (iii) underground aquatic ecosystems.

(b) Based on the results of the diagnostic, implementation of a program of environmental monitoring and analysis in the most important areas identified in the SRB (including in the Samborombón Bay Ramsar Site and other wetlands), focusing on the analysis of relationships between water resource management activities, surface and ground water quality and flows, flora and fauna, and the conservation of natural ecosystem services;

(c) Definition of a procedure for categorizing wetlands reflecting their environmental significance and potential use, application of this procedure to the most important wetlands identified through the program of environmental monitoring and analysis, and the development of conservation measures for these wetlands based on their categorization;

(d) Public communication programs, stakeholder consultations, environmental education, training of technicians, and provision of information on the activities of ADA, DPOH and OPDS, and the dissemination of data and analytical findings on the web.

19. The phasing of these activities will start with the update of the baseline environmental characterization of the basin and definition of the key indicators to be used in subsequent monitoring. The analysis of the ecosystem impacts will follow, concluding with the development and implementation of a continuous program

of environmental monitoring. Related training and acquisition of the necessary equipment will be programmed to efficiently enable and support these three phases.

20. Following the results of the identification and assessment of wetlands, a set of objectives for protection will be defined and a set of priority protection measures will be proposed and agreed by the responsible institutions (DPOH, ADA and OPDS).

Sub-component 1.3. Improving Water Governance *(Cost: US$12.6 million)*

21. According to the Water Law of the Province of Buenos Aires, ADA has full competencies to evaluate, allocate, protect, and develop the province's water resources. This includes tasks such as regularization and registration of current uses to help understand better current and future demand and planning of resource allocation based on water availability. Current procedures for tracking use, permits for drainage and protection works, and for granting permits in general, are slow and inefficient, not publicized and lack mechanisms for participation. This means that permits are granted for only a small fraction of the actual uses, and revenue coming from fees and tariffs paid by users is very low.

22. DPOH is the body of the Ministry of Infrastructure responsible for planning and executing the hydraulic, environmental sanitation and flood control works in the PBA, coordinating with competent bodies involved in emergencies and implementing mitigation measures. In practice, DPOH also participates in IWRM activities such as hydro-meteorological monitoring and research, authorization of hydraulic works to users, facilitate land use planning and environmental management related to works. However, DPOH faces a number of constraints, such as the lack of human, technical and technological resources that prevent DPOH from effectively executing all its competencies.

23. Works executed by DPOH in the public domain zones might increase the value of arable land. Although the works in the riverbed are in the public domain, the line demarcating the hydraulic public domain is not mapped, which could bring difficulties to identify ownership and user rights for the land. The lack of public works taxes is a lost opportunity for obtaining renewable investment funds. Similarly, there is minimal participation of, and interaction with, the key stakeholders sectors affected by changes in water supply.

24. ADA follows an obsolete organization chart and a management structure concentrated in the city of La Plata. This means that actions requiring field work (of a technical or social nature) are difficult to execute or are simply not carried out. For the same reasons, ADA's relations with various community stakeholders are limited or nonexistent, and users do not trust ADA to solve their problems. As a result, users utilize available resources (drainage canals or ground water, for example) as they see fit, without coordination or control, with the consequent risk of conflicts.

25. There are basin committees in each of the basin's nine sectors but they present important challenges that impede the fulfillment of their objectives. In practice, they are entities for coordination with local governments composed exclusively by mayors of the municipalities without direct participation of users or civil society. In each committee there is a technical consultative body with no authority for real execution. These bodies meet infrequently or do not meet, do not systematically reflect social demands, and have not developed the capacity for designing a medium and long-term vision to guide their work. The nine geographical sectors are too large to deal with day-to-day management problems. There is an unknown number of canal users'

associations that use ad hoc criteria to manage small or medium-sized areas. These areas include a network of drainage canals built by local residents, and only a few of them are recognized by ADA. The only administrative function executed by ADA with respect to unregistered canals has been a punitive one, although the institution recognizes the potential value of these works. Proposed actions to improve governance and public participation are as follows:

26. *Activity 1.3.1. Strengthening management and administrative capacities of ADA.* This activity includes the following sub-activities:

(a) Support for the redesign of ADA´s organizational structure: In coordination with the current efforts of ADA on the subject, ADA's current organization chart will be assessed with a view of creating a structure that will allow full compliance with the institution's objectives. This analysis will incorporate the programming and control functions, in order to have oversight of the programs and define and monitor indicators of accomplishment of the goals set by the Executive Board. This initiative will include training of the necessary staff for effective implementation of these new functions.
(b) Creation of a unit capable of developing and monitoring hydrological products for water resources management, using information collected by other institutions, as well as the hydro-geological and hydrometeorological data provided by the network to be installed under this Project.
(c) Support for the redesign of internal processes, procedures and regulations for granting permits and registration of surface and groundwater uses, discharges, and water infrastructures. An analysis will be carried out to cover administrative procedures, information flows, and decision making processes. Regulatory improvements will be recommended for more efficient management. All geographical data will be reflected in the institution's GIS platform. "Paperless" management will be encouraged.
(d) Implementation of a program for the regularization of water users and water infrastructure, including a campaign to increase registration of users and permits for drawing water and developing infrastructure, so the rights of third parties and environmental demands can be respected. The campaign to register users is intended to increase financing for ADA through customer bills. This initiative includes training activities of ADA's staff with showcases of similar institutions that have successful experiences.
(e) Identification and development of financial instruments: Articles 2, 45, and 112 of Law 12.257 make a provision for payments for ADA's functions of issuing, permits, fees for works and services, and fees for improvements. The Project will propose guidelines for calculating these payments, and for increasing the revenue base in terms of number of beneficiaries and payment categories.
(f) Continuous support to ADA to engage in efforts to modernize management and to assimilate the results of the activities above. This support will be provided with consultants who will be working at ADA's offices with decreasing involvement over the course of the project, as capacities are transferred to ADA´s staff. There will also be upgrading of some of ADA's work spaces.

27. *Activity 1.3.2. Strengthening of DPOH.* This activity will support DPOH's key responsibilities including, inter alia, planning and programing large hydraulic infrastructure; the design, supervision and maintenance of water works; or the authorization of works by third parties. In some cases, these activities call for technical capacity that DPOH currently lacks. Specifically, the Project will provide support through individual consultants, that eventually will be absorbed by DPOH's staff to the functions of:

(a) maintenance, operation, regulation and supervision of hydraulic works, both in the main river channel and in the network of canals;
(b) environmental monitoring and management activities linked to river works (including monitoring of

biodiversity and wetland management) to support the preparation of activities under sub-component 1.2;
(c) management of geographical information systems (GIS);
(d) flood risk monitoring and management, to strengthen the capacity to respond to emergencies.
(e) Development of manuals for the design of new works in rural basins

In addition specific technical products will be developed, including:

(f) The development and corresponding training in operational hydrological products, including a sediment transport model to help in the planning and basin management, providing evidence to support the financial outlays required for the infrastructure maintenance.
(g) Development of hydraulic models for the design of interventions on rivers and canals, and for management and operation of hydraulic structures. These modeling tools will factor in climate change scenarios.
(h) Systematic evaluation of the benefits of the *recinto* approach for public dissemination.

DOPH's field offices will be also upgraded to reinforce the institution's capacity to respond to users' demands in terms of coordinating and facilitating interventions in the system of secondary and tertiary canals.

28. *Activity 1.3.3. Support for the de-concentration of ADA's functions.* The activity will include the analysis and definition of regions for de-concentration, including functions, roles, and sizing (geographical basis, functions to be de-concentrated, required staffing, financial resources, assessment of the enforcement capabilities).
This sub component will implement two field offices, including necessary equipment to become operational.

29. *Activity 1.3.4. Improvement of regulations and participation of water basin committees and drainage organizations*. The goal of this activity is to support the establishment and functioning of participatory organizations and strengthen their links with ADA and DPOH. These needs exist at various levels: from the basin level as a whole, to the level of the tertiary and quaternary drainage networks. This activity will analyze and review the adequacy of the current configuration and distribution of basin committees, the relationship between them, the applicable regulations, and promote their effective functioning so that when the project activities are completed a key number of basin committees are operational using revised regulations. At the level of the smaller drainage organizations, this activity will facilitate their regularization. To this end, it is proposed to carry out a pilot activity in a selected area that will develop the organizational structure, from the drainage associations at the local level to the basin committees, generating lessons learned from good practices with respect to the implementation of regulations, with demonstrable effect in the corresponding sub-basin or catchment area. In accordance with the above, the following sub-activities are planned:

(a) A joint analysis of the current situation with the existing committees and other relevant partners in the basin (assessing integration and membership, public support and follow-up, financing, organization, legal powers, functions and performance).
(b) Analysis and proposal for subdivision of the Salado River Basin corresponding to adequate jurisdictions of basin committees, promotion of the establishment of the committees including a stakeholder analysis to determine which groups should be represented and under which mechanisms and proposing upgraded regulations and statutes for their operation.
(c) Design of measures to incentivize the recording, declaration and legalization of customary drainage practices.
(d) Design of regulations for the management, financing, operation, organization, and control of drainage

systems (drainage management consortia).

(e) Execution of a pilot management project. The new regulations and measures will be carried out in a selected area where the project will support a river basin committee and the regularization, establishment, and functioning of the corresponding drainage associations. This pilot initiative will be carried out in close coordination with the activities for upgrading the practices for soil management and management of drainage systems presented in Sub-component 1.4. The following tasks are planned:
   i. Selection of the pilot area in the Salado River Basin, and design of a general governance structure for WRM.
   ii. Support the regularization and establishment of canal drainage associations, including support for their organization, training, initiation of activities, and their coordination with the respective basin committee.
   iii. Follow-up, analysis, and dissemination of progress.

30. *Activity 1.3.5. Support to inter-institutional coordination and communications, awareness and transparency.* The activity includes:

(a) Support for preparation and implementation of coordination programs. ADA will coordinate the signing of coordination agreements and protocols with DPOH (drainage and works); the agricultural sector (development of the tertiary drainage network and promotion for the regularization of water associations); meteorological services and other information providers such as SMN, INTA, INA, or the Hydrology of Plains Institute and the Provincial Directorate of Risk Management (DPGRE). The agreements will explicitly mention activities in which there is concurrent jurisdiction, and mechanisms for collaboration, which will also be reflected in the project's Operational Manual. They will also mention the regulations (such as those for flood management, for example) that require joint action by several of these institutions.

(b) Design and implementation of an awareness and capacity building program for better water and soil management: promoting programs among users where the consequences of land use on water resources are well understood with the aim to gain resilience during wet and dry climatic cycles and through the realization that sustainable land use requires a series of efforts in terms of resources and best practices.

31. *Activity 1.3.6. Light Detection and Ranging (LIDAR)* applied to the main course of the river and an associated area along it, to help delineate the Hydraulic Public Domain. This activity will also provide valuable information for basin characterization in activity 1.1.1 and preparation of flood maps 1.4.2

Subcomponent 1.4. Hydrometeorological Services and Risk Management *(Cost: US$8.5 million)*

32. One of the most noteworthy aspects of the Salado River Basin is its exposure to hydrological risks, which includes both the risk of flooding and the risk of droughts. ENSO oscillations and sharp climatic variations, among other factors, have led to a series of wet years in which the soil is saturated from heavy flooding and rainfall, and a series of dry years in which water is very scarce, with the consequent effects on farming systems and wetland ecosystems.

33. Although there are agencies, such as INA, INTA, or SMN, that provide weather data and make short- and medium-term projections and forecasts, the PBA does not have a proper hydrometeorological service capable of managing this information. Furthermore, the basin's hydrometeorological network is deficient and must be strengthened with stations that enable the PBA to estimate ground water levels and streamflow as a basis for developing an early warning system. It is important to understand that although the effect of flooding lasts for

months in some cases, because of the poor drainage of the basin, flood can occur within several hours or a few days. Warnings for the towns and producers (especially in the livestock areas) are therefore essential. To do this, it is necessary to include the participation of the Provincial Directorate for Risk and Emergency Management (*Dirección Provincial de Gestión de Riesgo y Emergencias*, DPGRE) of the Province of Buenos Aires, which is the agency responsible for the disaster risk management in the province. Since all the elements of the risk management chain are far from being operational, one project activity will be the preparation of flood and drought contingency management plans, which will require the coordination of ADA and DPOH with DPGRE and the cooperation of other agencies, such as SMN and INTA.

34. The objective of this subcomponent is the development of technical and institutional capacities to improve the management of flood and drought risks in the Salado River Basin. The subcomponent includes the following activities:

35. *Activity 1.4.1. Creation of a hydrological service.* This activity includes the following sub activities:

(a) Design and implementation of the organizational structure of the hydrometeorological service, including a core group of professionals with functions and activities to develop capacity for hydrometeorological and hydro-geological observation and analysis.
(b) Design and establishment of hydrometric, meteorological, phreatic/ground water, water quality, and sediment dynamics monitoring networks in the Salado River Basin, to respond to the information needs. For this purpose, all current infrastructure established by other institutions, such as INTA, SMN, DPOH, and Institute for Planes Hydrology (*Instituto de Hidrología de Llanuras*, IHLLA) will be considered. As part of this task, a network of 140 hydrometeorological automatic stations will be installed in the basin.
(c) Design and establishment of a hydro-environmental information system (Hydro-environmental Monitoring and Control Center). This system will facilitate the collection, quality control, analysis and exchange of data, and the development of hydrological products and their distribution. The system will also be an essential tool both for decision-making processes, particularly in the context of risk management, and in the operation of hydraulic infrastructure and in monitoring water works during project implementation. The system will provide data and information for the public domain, benefiting the general public. The products with a geographical component will be managed by the existing GIS system, information from which will also be made available in the public domain.
(d) Update and re-calibrate the analysis developed under sub-activity 1.1 on the impacts of climate variability and climate change on the hydrology of the river basin, with the new data available from the hydromet system, to better understand the ENSO phenomenon for improving water resources management and flood and drought risk management in the basin.

36. *Activity 1.4.2. Flood Risk Monitoring and Analysis.* This activity includes the following sub-activities:

(a) Development of flood risk maps in the Salado River basin using historic satellite and hydro-climatological data, taking into account the land use change occurred in the last two decades, with the collaboration of INTA, universities, and other institutions.
(b) Development and calibration of hydraulic models with a risk management approach (that eventually could be linked to an early warning system), considering the particular soil and land use conditions of the Salado River Basin. ADA/DPOH will provide the output and interpretation (ie. alert thresholds) of the hydrological models to DPGRE, who, in turn, will use this information in its flood risk management activities (risk prevention, reduction or emergency preparation and response), including any future local or regional early warning systems implemented in the basin.

37. *Activity 1.4.3.- Drought Risk Monitoring and Analysis.* This activity includes the following sub-activities:

(a) Design and implementation of a drought monitoring and decision making system and implementation of mechanisms of coordination with all relevant institutions and sectors involved.
(b) Development of improved seasonal climate forecasts, focused on water resource management, with the support of SMN, INTA, and other institutions.

38. *Activity 1.4.4. Development of operational manuals and identification of good practices for drought and flood risk management*. In order to advance in the Drought and Flood Risk Management, a group of activities are proposed, categorized into two groups:

1. Risk prevention:

(a) Development of land use management plans and regulations to reduce floods and droughts risks and to control groundwater level (ex. restoring economically and environmentally sustainable crop rotation plans to maintain moisture and soil fertility);
(b) Development of land use guidelines oriented to minimize flood and drought damages;
(c) Development of regulations concerning the use of river beds that have been dried up, desiccated, and abandoned as a result of water works financed by government;
(d) Development of local guidelines for disaster risk management, including the phases of identification, reduction, response and financial protection.

2. Emergency / Disaster Management:

(e) Preparation of a Provincial Contingency Plan (including the elaboration of operational manuals and regulations) for flood and drought emergency management, jointly between ADA/DPOH and the DPGRE, and with the participation of other provincial offices according to their functions;
(f) Study of new approaches on the use of gates in all tertiary channels, as an option for flood and drought risk management and development of a strategy for managing hydraulic structures (gates) in the main channels in order to mitigate the effect of droughts and floods.

Component 2: River Training Works and Upgrading Associated Infrastructure *(US$337.7 million, of which US$270.16 million IBRD financing)*.

39. This Component will finance the hydraulic enhancement of 34 km of the Salado River, as well as the upgrading of seven bridges that cross the river and other complementary works. These works are designed to help reduce the impacts from the recurrent flood events due to increased trends in precipitation observed in the basin in recent decades.

40. *Sub-component 2.1. River Training Works (US$290.7 million).* Since 2000, the Province of Buenos Aires has been implementing structural measures of the PMI, in particular the river training works along the lower Salado River (223 km in Sections I, II and III, starting from the river mouth) and Las Horquetas Canal (251 km) in the west of the basin, to increase drainage capacity. With this purpose, the works augment the river cross-sections by deepening and widening the riverbed, and create also adjacent berms. Dredged sediments are used to elevate farmlands along the river course and improve soil productivity. These works enable the DPOH to

construct secondary canals and give farmers the chance to better drain their fields through tertiary canals. For the full implementation of the structural PMI components, the Province aims to work on the remaining Sections IV and V. Section IV has been divided into four legs. The first half of leg 1 (IV-1-A) of 26km will be financed by the National Government.

Table A1-1. River training works of the Salado River. Progress made until June 2016

Section	Length	Volume dredged	Progress (percentage)	Year completed	Investment (US$)*
I	48 km	19,210,615 m^3	100	2004	44,664,255
II	57 km	22,441,268 m^3	100	2006	68,004,079
III	118 km	44,000,000 m^3	91	2010	392,984,733
IV	199 km	100,000,000 m^3	0	Not started	792,000,000
V	84 km	20,000,000 m^3	0	Not started	198,000,000
Canal Las Horquetas	254 km	13,500,000 m^3	100	2001/2002	133,333,333

Source: DPOH
*Exchange Rate ARS-US$ from years of construction/current exchange rate.

41. The river training works to be financed under Component 2 include widening and deepening of the riverbed of the second leg of Section IV (IV-1-B). This section is approximately 34 km long, from Beguerie-Lobos Bridge to the Bridge of National Route No 205, close to the city of Roque Perez (Figure 1). The Salado River along section IV-1-B has a defined but narrow channel and low depth, which leads to overflow during heavy rains.

42. The works in Section IV-1-B have been designed following the guidelines and technical criteria of the Engineering Designs for Works of the Integral Master Plan (PMI) and will connect Section IV-1-B with the downstream sections that have already been executed, preparing the conditions for the continuation of the river training works upstream. The works aim to: (i) conform the sections of the river to give a suitable drainage capacity for a flood corresponding to approximately a 10 year recurrence period; and (ii) deposit the resulting nutrient-rich sediment in discontinuous parcels on agricultural farmland called *recintos*, elevating the land approximately 0.4 meters and improving the soil profile and consequently the productive capacity of the soil.

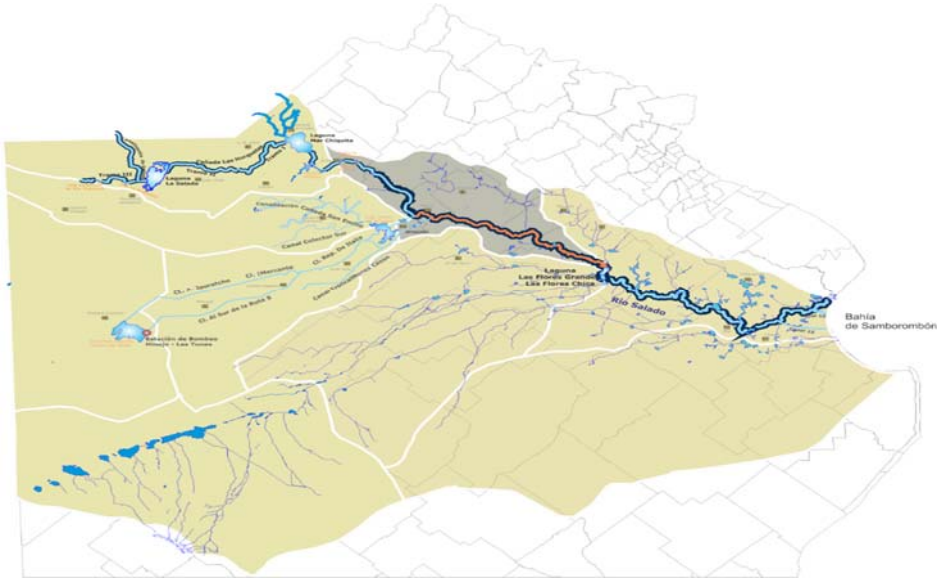


Figure 1: Salado Basin with the river training works on the main stream. Section IV is marked in orange. Source: DPOH

43. The river works will implement an innovative composite cross-section, formed by a smaller interior section that will conduct the average and the low flows, complemented by a larger exterior section, formed by two lateral berms, designed to conduct the maximum flow (Figure 2). The interior section, trapezoidal, will have 40 meters of width of depth, depth of 1,20 and 1:3 lateral slopes. The larger section extends on side banks 60 m on both sides of the lower channel. The external slopes of excavation will have an inclination of 1V: 4H. This design ensures the channeling of the low flow and the contention of the designed floods in the larger section. The cross-sectional design foresees an operation with low maintenance and prevents meander formation.

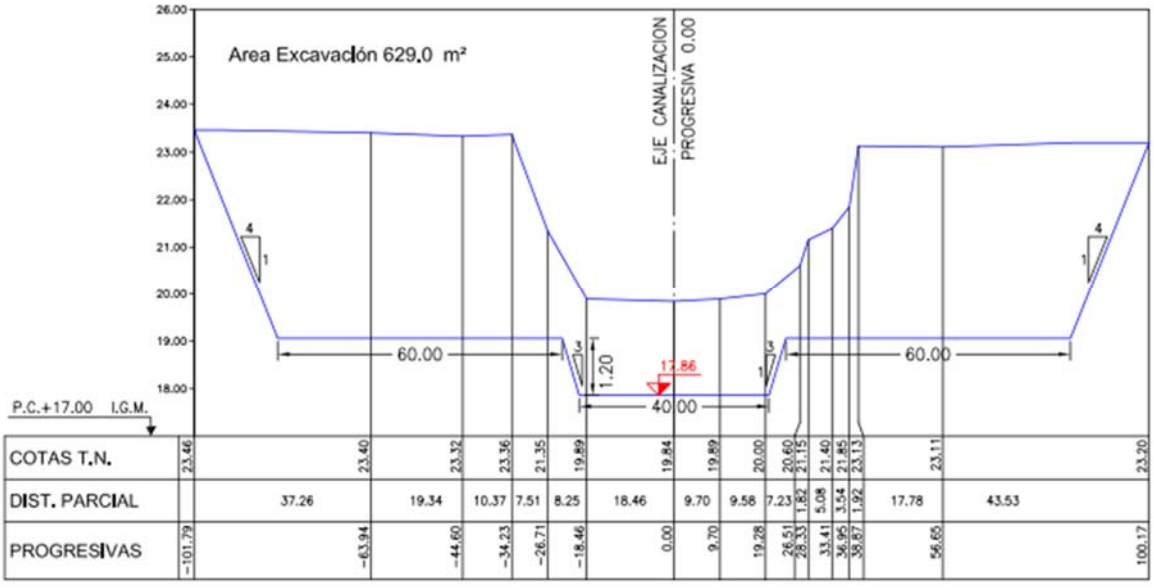


Figure 2. Proposed river cross composite section

44. The impacts of all river training works, including the tributary canals, have been thoroughly modeled.[23] Effects of the already implemented river training works on flood duration have been significant, even though the river training works of the upper Salado and the construction of secondary and tertiary canals still remain to be completed. The activities include also complementary works such as the replacement of existing fences and the removal of embankments and lateral soil deposits.

45. The dredged material is nutrient-rich and will be distributed in discontinuous parcels called *recintos* on agricultural farmland along the banks of the river. For that purpose, suitable areas located at a minimum distance of 200 m from the river be have been preselected, according to the morphology of the land and to environmental conditions (Figure 3).

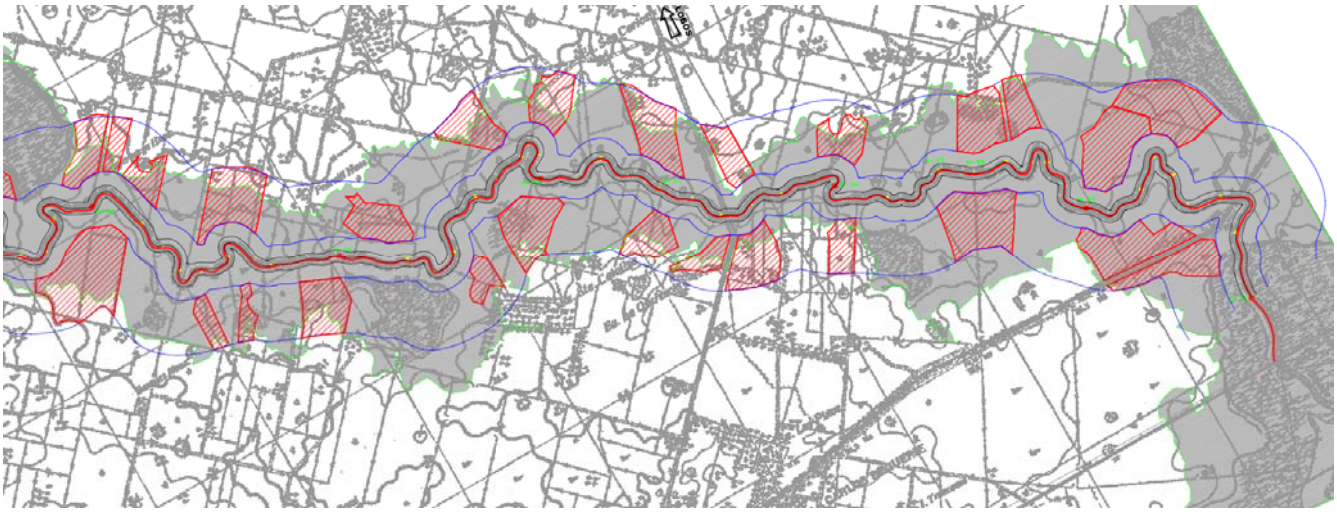


Figure 3: Location of the potential discontinuous parcels, or *recintos* in which soil and dredged material would be deposited (striped polygons). Source: DPOH

46. The proposed environmentally friendly approach for the creation of *recintos* to deposit dredged material allows the river to overflow in low, non-productive areas and wetlands during relatively low return period events. It should be noted that the potential *recinto* sites, identified in the engineering designs, do not include areas with any natural habitat as defined by the WB OP 4.04. During the final design of these parcels, environmental criteria will be used such as: i) exclusion of any interference with the natural surface runoff of wetland areas and permanent lagoons; ii) exclusion of any plots of natural pasture of the Pampas ecoregion; iii) establishment of a biological corridor, free of enclosures, of 200 m of distance to the edge of the river.

47. The proposed deposition of dredged sediments has potential positive impacts such as the elevation of adjacent farmlands and the improvement of soil productivity. The process entails removal of the topsoil layer, deposition of the dredged material, and re-deposition of the original soil on top. Thus far, experience with the deposition of sediments on adjacent farmland has been positive, yet no systematic evaluation of the approach has been conducted. Nonetheless, interviewed farmers that have benefited from the interventions are satisfied.

[23] Menéndez (2012): Evaluación de las Inundaciones y las Obras de Drenaje en la Cuenca del Salado (Prov. Buenos Aires) mediante Modelación Numérica.

48. *Sub-component 2.1. Upgrading Associated Infrastructure (US$47.0 million)*. This subcomponent includes works to enhance the following three road bridges, one footbridge, and three railroad bridges: (1) Puente ferroviario FFCC Roque Pérez – Salvador María; (2) Caminero Roque Pérez – Salvador María; (3) Puente Ruta Nacional N° 205; (4) Puente Carretero Ernestina - Elvira; (5) Puente FFCC Ernestina – Elvira; (6) Puente Ruta Nacional N° 3; (7) Puente FFCC Videla Dorna - Gorchs. The bridges will be re-built just beside the existing ones, with longer spans, higher elevation and deeper foundations to adapt to the enhanced river cross-section and allow for larger flows, thus increasing their resilience to extreme events. Based on experience from previous sections downstream, the enhancement of the bridges will be conducted prior to the execution of the river training works to allow space for machinery during the works, either on the channel or on the banks. The projected bridges take into account the design flow of the canal and take into account high return period floods.

49. The component also includes the execution of complementary works in *balnearios*, or public beach areas, in the city of Roque Pérez (*Partido* Roque Pérez) and Villanueva (*Partido* General Paz). These minor works include the construction of access, lighting, sanitation and equipment of existing facilities in these recreational areas to support and strengthen the tourism sector, as recommended by the PMI and requested by residents from these municipalities.

50. So far, there is no evidence from the previously completed sections that significant investments are need to maintain the hydraulic capacity of the river once training works have been undertaken. The river characteristics (very low slopes, low velocities, soil profile), and the fact that there is no navigation, make the needs for maintenance dredging very low. A sediment transport model (to be financed under Component 1) will provide further data to support the financial outlays required for maintenance. As a result, activities under Component 1 will identify specific maintenance measures needed, not only for the main river but also (and mainly) for the network of canals in the basin.

Component 3: Project Implementation, Supervision and Communication *(US$8.8 million, of which US$6.89 million IBRD financing).*

51. This component seeks to support the Province in efficient project management. The main activities to be implemented through this component are: 3.1 An independent external audit, to evaluate financial statements and the performance of financial management related to the Project; 3.2 Strengthening of the procurement, technical, environmental and social functions of the UCEPO to ensure sufficient and qualified human resources to meet the project preparation and supervision needs; 3.3 Technical Assistance to DPOH for the works supervision through a specialized firm; 3.4 Technical assistance to the users' oversight committee for monitoring of river training works, to support them in the task of monitoring the river works and the development of a grievance redress mechanism for the Project; and 3.5 Communication campaigns and other operational expenses.

ANNEX 2: IMPLEMENTATION ARRANGEMENTS

COUNTRY : Argentina
Salado Integrated River Basin Management Support Project

Project Institutional and Implementation Arrangements

1. The Borrower will be the Province of Buenos Aires through its Ministry of Economy. The implementing Agency will be the Ministry of Infrastructure and Public Services through its UCEPO. The Borrower has previous experience with Bank-financed infrastructure projects. UCEPO will thus be the actual Implementing Agency, in charge of procurement, safeguard monitoring, project M&E, and interaction with the World Bank. The Ministry of Economy is responsible for financial management arrangements.

2. During project implementation, UCEPO will manage the contracts with consultants and construction companies and order payments to contractors. UCEPO will coordinate with other entities at the provincial and national levels (if necessary), including ADA, DPOH and OPDS. ADA will be in charge of the design and technical supervision of most of the project activities in Component 1, with DPOH being responsible for the implementation of certain activities of Sub-component 1.2. DPOH will be responsible for the execution of the works under Component 2.

3. UCEPO will manage a large volume of projects (including other projects financed by other multilateral institutions). To date, the unit is preparing seven projects namely: Integrated basin management of Lujan River Basin, Colorado River Aqueduct phase 1 and 2, Buenos Aires Province Infrastructure rehabilitation, and water treatment plant construction for La Plata, Berisso and Ensenada, to be financed by CAF, Urban transformation project and this one with the World Bank. In addition, the unit is managing three ongoing projects: Reconquista Basin Project and Agricultural service projects (IDB) and Fluvial ports competitiveness (FONPLATA), and there are other four projects awaiting funding from multilaterals.

4. In order to ensure sufficient capacity, a multidisciplinary group of professionals will be appointed (key personnel has been selected with enough Bank experience) to manage this new operation.

5. The main responsibilities of the UCEPO will be to:
   (a) Coordinate with institutions involved in the project making sure technical inputs are received on time, and that all necessary implementation arrangements are in place to avoid delays;
   (b) Undertake procurement functions of the project, including keeping files and records;
   (c) Oversee compliance with Bank safeguard policies, including monitoring of social and environmental issues;
   (d) Make official requests for no-objections to the Bank and liaise with the Borrower on official requests for changes to the Project scope or terms; and
   (e) Submit semi-annual progress reports detailing progress in achieving Project objectives. The format and content of these progress reports will be approved by the Bank.

6. UCEPO has presented a structure with two divisions, one in charge of formulation and management of projects and other in charge of planning, evaluation, and procurement. The Unit has presented the CV's of key personal of both units, who are well experienced in Bank operations, as well as large infrastructure projects.

7. **Technical, environmental and social supervision**: Large or complex works require particular attention. Using a similar approach as implemented in the past, works financed by the Bank will be supervised by a users' oversight committee, acting as a third party monitoring group with participation of local relevant stakeholders (land owners, agrarian associations, NGOs). This group will receive technical assistance from a specialized independent consulting firm. A specialized firm will support DPOH for the supervision of works. DPOH has been carrying out the inspection of works since the beginning of the implementation of the PMI so it counts with the experienced and skilled professionals. The Department of Environmental Studies of the DPOH has the necessary capacity for the environmental supervision, and additional personnel will be contracted to further strengthen it.

Financial Management

8. **Financial management assessment conclusion.** Financial Management (FM) arrangements in place at the Province of Buenos Aires (PBA) were assessed recently in FY17 as part of the preparation of another Bank operation;[24] and found acceptable to the Bank. Project specific FM arrangements will be supplemented by PBA government-wide financial management arrangements, which provide a sound control framework though with some overlapping functions. Moreover, the proposed project will follow the same FM arrangements as those for previous WB-financed operations[25] implemented by PBA including the roles played by the Ministry of Economy responsible for Financial Management and by the Ministry of Infrastructure and Public Services being responsible for making payments of project eligible expenditures through the PBA's Treasury Single Account (TSA). Previous Bank operations with PBA have been consistently assessed satisfactory and the Bank received acceptable audits on time.

9. **Organization and staffing.** PBA has well established Budget, Accounting, and Treasury Offices that cover basic PFM functions and systems such as budgeting, accounting, and treasury. The Ministry of Economy (MOE) will be responsible for the Project FM function. The MOE Provincial Directorate of Multilateral and Bilateral Financing (*Dirección Provincial de Organismos Multilaterales y Bilaterales,* DPOMFB*)* will retain the overall project FM responsibilities comprising: accounting records keeping and preparation of financial reports of project transactions; managing the Designated Account (DA) and requesting disbursements from the Loan and documenting expenditures to the Bank, as well as project auditing arrangements. The Ministry of Infrastructure and Public Services (MIPS) through its Unit for Coordination of Project and Works (UCEPO) will be the executing agency of all project components and activities playing also the overall project-coordinating role. The Ministry of Infrastructure and Public Services (MISP) will be also responsible for making payments of project eligible expenditures through the PBA's Treasury Single Account (TSA), including reimbursement of operating costs incurred by any entity that will provide technical support to the Borrower in the carrying out of Component 1 of the Project.[26] The MOE through DPOMFB continues to have qualified FM professionals who are widely experienced in implementing Bank-financed projects.

10. **Budgeting arrangements**. All project operations will flow through the province's System of Public Accounts, which operates under the responsibility of the Province's Accountant General and is thereby subject to the government-wide budgeting arrangements and control framework. As such, all fund uses are reviewed

[24] (P159843) AR AMBA Urban Transformation Project. Board Date: February 27, 2017.
[25] AR- Buenos Aires Infrastructure SDP APL1 (P82032) Ln 7268-AR $ 200 million; Ln 7947 $ 50 million closing date May 30, 2015. AR- Buenos Aires Infrastructure SDP APL2 (P105288) Ln 7472-AR 270 million, closing date December 30, 2013
[26] Instituto Meteorológico Nacional (SMN); Instituto Nacional de Tecnología Agropecuaria (INTA); Instituto Nacional del Agua (INA); Organismo Provincial para el Desarrollo Sostenible (OPDS); el Ministerio de Agroindustria y cualquier otra entidad aceptable para el Banco.

and approved a priori by the Accountant General's representatives. PBA budget control distinguishes various stages in the expenditure process including commitment. The budget structure uses program classification and functional classification of expenses and provides for coding of the source of funding, and type of expenditure.

11. **Accounting and financial reporting.** Interim and annual financial reports will be prepared by the DPOMFB who will be responsible for submission of financial reporting to the Bank. Project accounts will be maintained in the UEPEX[27] system. Project transactions will be recorded on a cash basis using a chart of accounts that reflects disbursement categories, program components and sources of funding. The DPOMFB will also prepare bi-annual Interim Unaudited Financial Reports (IUFRs).

12. **Internal controls**. Internal controls for non-salary expenditures are effective. They are implemented by the General Accounting Office (GAO), and the General Government Advisory Unit. In addition, the Office of the Public Prosecutor may participate in the ex-ante control process in fewer cases. However, there is some overlap of controls, which could potentially generate delays and reduce the effectiveness of budget execution.

13. **Annual financial audit.** The Project's annual financial statements will be audited under TORs prepared according to Bank guidelines and performed by an independent auditor following standards acceptable to the Bank. Audited financial statements will be furnished to the Bank no later than six months after the end of each fiscal year—or another period agreed upon with the Bank (not exceeding 18 months)—when, due to project circumstances, it is more cost effective to join periods to be audited. Auditors should submit: (a) an opinion on the project financial statements; and (b) a Management Letter. Audit terms of reference will be included in the project Operational Manual. In accordance with the Bank's Access to Information Policy, upon receipt of the annual audited financial statements of the project, they will be made available to the public by the Bank. The borrower agrees to disclose the audited financial statements to the public on time.

14. **Risk assessment.** The overall FM risk at PBA MoE is moderate before mitigation measures. based on the following considerations: i) The PBA Ministry of Economy (MOE) through its Directorate of Multilateral Financing and Bilateral Financing (*Dirección Provincial de Organismos Multilaterales y Bilaterales*, DPOMFB) has strong FM capacity and satisfactory experience taking responsibility for the FM aspects of 2 previous Bank operations; ii) the MOE Directorate of Multilateral Financing and Bilateral Financing (*Dirección Provincial de Organismos Multilaterales y Bilaterales*, DPOMFB) FM professionals are qualified and experienced in the implementation of WB-financed projects. Fiduciary risk has also been rated moderate. Proposed mitigation measures that are expected to cope with the Project moderate FM residual risk include: (i) annual financial audit to project's financial statements conducted under terms of reference acceptable to the Bank; (ii) preparation of a project's operational manual including fiduciary procedures and controls as well as inter-institutional coordination arrangements; (iii) provision of ad-hoc fiduciary training, and if applicable; (iv) other technical assistance measures aimed at increasing the financial reporting, internal control and oversight institutional capacity..

15. Disbursement are described in the table below.

Table A2-1. Disbursement Arrangements

Retroactive expenditures	Eligible payments. Are paid up to one year before the date of loan signing. • Do not exceed 20 percent of the loan amount; and

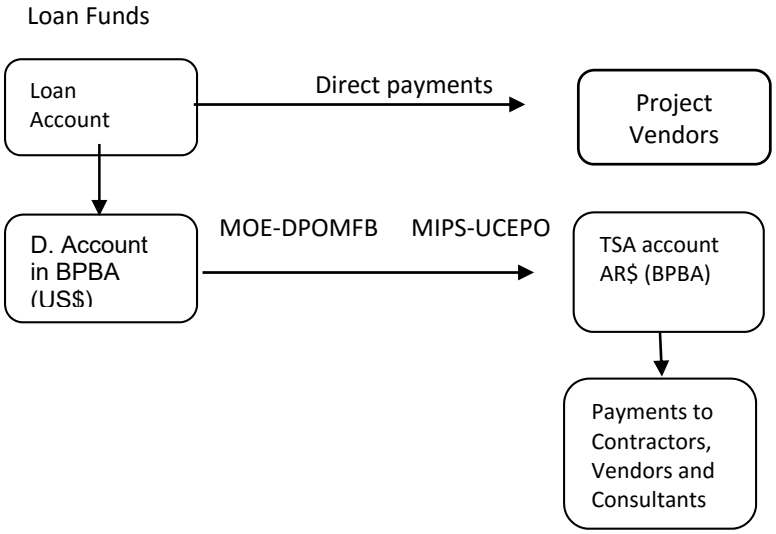
[27] UEPEX is the IT solution developed by the government of Argentina to maintain accounting records and issue financial reports of externally-financed projects. It is acceptable to the Bank and its use is mandatory for all implementing agencies.

	• Apply to items procured in accordance with applicable Bank procurement procedures. • It is expected to finance advance payments to contractors during the period up to loan signing.
Other Disbursement Methods	Advances: To a segregated designated account in US$ managed by MOE, in the official bank of PBA or *Banco de la Provincia* de Buenos Aires (BPBA), with a ceiling of US$50 million for the entire project advances. Direct payments to suppliers. The minimum application size for direct payment requests is defined in the Disbursement Letter (DL).
Supporting documentation	Statement of Expenditures[28] Records (supplier contracts, invoices, and receipts)

Flow of Funds Chart

16. The following chart describes the flow of funds process for payments of project eligible expenditures incurred by the Province of Buenos Aires:

Figure A2 - 1



17. PBA Loan proceeds will be disbursed against the following expenditure categories:

[28] The borrower, through the MOE, shall retain all records (contracts, orders, invoices, bills, receipts, and other documents) evidencing expenditures under the project until at least the later of (a) two years after the Bank has received the audited financial statements covering the period during which the last withdrawal from the loan account was made and (b) three years after the closing date. The borrower and the DCP shall enable the Bank's representatives to examine such records.

Table A2-2. Disbursements per Expenditure Category

Category	Amount of the Loan Allocated (expressed in USD)	Percentage of Expenditures to be financed (inclusive of Taxes)
(1) Goods, works, non-consulting services, consultants' services, Training and Operating Costs for the Project	299,250,000	100%
(2) Front-end Fee	750,000	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 2.08(c) of this Agreement
TOTAL AMOUNT	**300,000,000**	

18. **Implementation support**. FM implementation support will include on-site and off-site supervision. On-site missions will be carried out at least once a year and later calibrated following assessed risk and project performance. Off-site implementation support will comprise desk reviews of interim financial reports and audited financial statements; and ad-hoc support through email and phone calls as needed.

19. All financial management documents including financial reports and disbursement reports; chart of accounts; flow of funds charts; and terms of reference for the financial statements audits will be included in Operations Manuals to be prepared by MOE and the UCEPO-MIPS in PBA.

Procurement

20. Procurement will be conducted according to the World Bank's Procurement Regulations for IPF Borrowers, issued in July 2016, for the supply of goods, works, non-consulting services and consulting services. The World Bank's Standard Procurement Documents will govern the procurement of World Bank-financed Open International Competitive Procurement. For procurement involving National Open Competitive Procurement, the Borrower will use Standard Procurement Documents acceptable to the World Bank that will be included in the Operational Manual.

21. A procurement capacity assessment of the implementing agency is under way by the Bank's Team. Such assessment is being carried out over UCEPO within the Ministry of Infrastructure; although the Unit has extensive experience implementing infrastructure projects with external financing, its procurement area was recently created, and the professional that will be in charge of the this Unit has been already identified, and counts with extensive experience in procurement under Bank's Guidelines and procedures Functions, responsibilities and the interaction between each involved party in the implementation of the project will be detailed in the Operational Manual.

22. A full Project Procurement Strategy for Development (PPSD) has been developed by the Borrower, establishing the best procurement arrangements that will ensure the delivery of value for money while efficiently achieving the agreed PDOs. The PPSD is focused on the high value contracts financed under Component 2,

namely, the canalization and river dredging and the construction of seven bridges. Based on lessons learnt from previous similar experiences, the final analysis concluded that the best approach is to proceed with two independent bidding processes: the first one to contract the construction of the bridges, and the second one for the canalization and dredging of the river. This depends mainly on the different nature and complexity of the two types of construction and to the need of ensuring that the bridges are completed well before the start of the canalization works.

23. Regarding the contract for the river training works, the final analysis concluded that the most appropiate procurement approach is to carry out an open international competitive process through a Request of Bids divided into 4 lots (being this the optimum number that arises from the analysis of the local market and technical requirements). A prequalification process is not justified in this case, given that the complexity of the works is low, with standars Technical Specifications and few components of work to quote; for this reason the preparation of the bids will not require much time or effort for the eventual bidders, nor will the evaluation of those bids for the Evaluation Committee. In this case, a prequalification porcess would increase the time of contracting without granting any advantages in the selection of the concurrence of bidders. Procurement arrangements for these and the rest of the activities that are expected to be carried out during the first 18 months, are detailed in the Procurement Plan approved by the Bank.

24. In addition to the prior review supervision to be carried out from Bank offices, the capacity assessment of the implementing agency has recommended (i) close procurement support and guidance in the high value/risk bidding processes, and (ii) annual supervision missions in the field to carry out the post review of procurement actions.

Environmental and Social (including safeguards)

25. The environmental management of Component 2 will rely on the Department of Environmental Studies (DES) of the DPOH. This department has a small inter-disciplinary team of competent professionals in charge of the environmental impact assessments and monitoring of the sustainability of the river training works along the Salado River. Based on the available information, past experience, and the WB assessment, including initial consultations with three NGOs involved in conservation in this ecoregion; “Fundación Vida Silvestre”, “Aves Argentinas”, and “Fundación Humedales”, there are no outstanding environmental or social liabilities or observed negative impacts or raised complaints related with the thus far execution of the PMI works. The DPOH has a solid capacity in and significant experience with the environmental and social management of the structural PMI works that include formal and informal mechanisms of public involvement in place since the initial implementation of the PMI works in 2002. The Bank has conducted safeguards related “due diligence” on the already conducted downstream works based on desk review of relevant documents, discussions with the DPOH personnel, and field visits. No issues have been identified that would warrant concern in terms of the DPOH performance on the environmental and social management of the river training works to date. In particular, the river training works along the first 26km of leg IV-1-A, which will be financed by the National Government and are expected to be executed partly parallel to the Project-financed works, are covered with the same environmental and social management procedures as the Project-financed works. Beyond the same overall approach, each river section and stage implies site-specific measures as pertinent to the site-specific natural and social features.

26. The social management of Component 2 will rely on the DPOH, which has a vast experience executing the works on the previous 223 km using communications and negotiations with landowners. Although in previous

sections, there has been no formal grievance mechanism established, affected farmers and the DPOH supervision team have had a clear and timely communication system in place. The ESMP includes a Communication Program that foresees communication actions for each phase of the works to secure timely interaction with the adjacent communities. Component 2 will also have a Grievance Redress Mechanism (GRM) as one of the ESMP programs. The GRM establishes the mechanisms to submit grievances and receive responses, stating the number of days it can take to receive a response. The GRM identifies two different levels of conflict resolution before complaints reach the judicial court system. Component 1 will also count with a GRM in order to secure pertinent mechanisms are in place.

27. Consistent and systematic environmental monitoring of the dredging works is being conducted by the DPOH. Nevertheless, limited understanding of the hydro-ecological dynamics in wetlands in general, and of aquatic and bird life in particular, has been identified as a weakness of PMI implementation. The PBA will assign project funds under Subcomponent 1.2 to improve this understanding and to support preparation and initial implementation of the Environmental and Wetlands Management Plan at the basin level. Implementation of the Subcomponent 1.2 will be overseen by a working group of at least the three primary agencies involved (DPOH, OPDS, ADA), and the Ministry of Agroindustry which will determine responsibilities for the implementation of the different measures included in the plan, based on the mandates of each institution.

28. Based on the assessment of the institutional capacity needed to implement the Project's environmental and social risk management for the river training works under Component 2, and to supervise preparation of the Environmental and Wetlands Management Plan for the SRB, DES/DPOH will hire (i) a social specialist with a profile of anthropology to manage the negotiation processes with the affected land owners as well as the grievance mechanisms; (ii) an environmental specialist with experience in environmental technologies and environmental management in urban areas; and (iii) a specialist in GIS to strengthen systematization and access to information regarding the environmental and social management of the river training works, as well as the basin-wide information to be generated. Environmental and social staff will be contracted for UCEPO and ADA.

Monitoring and Evaluation

29. The UCEPO will have overall responsibility for the project's monitoring and evaluation (M&E). This unit, as PIU, will monitor and evaluate the Project based on the results framework in Section VII. The UCEPO will prepare semiannual progress reports during Project implementation in a manner and format acceptable to the Bank. These reports will describe the overall progress made and current status of all components and activities and specifically, progress towards achievement of the PDO and other content specified in the Operational Manual. Furthermore, UCEPO will conduct a midterm evaluation to analyze progress with respect to the results framework, relevant actions to reduce implementation risks, and identify pertinent project restructuring in the event that dynamics on the ground necessitate changes to achieve the PDO indicators. UCEPO will also carry out a final evaluation to determine whether the Project achieved its PDO, and analyze implementation performance and lessons learned. UCEPO will include M&E and planning staff to report directly to the project coordinator.

Role of Partners (if applicable)

30. The PBA has engaged with several multilaterals and donors to make important investments in IWRM throughout its territory. IDB is currently financing the Reconquista River Sanitation (3256/OC-AR) that is the follow-up project of the Reconquista River Project (797/OC-AR). This second stage focuses on integrated environmental sanitation activities, while the first stages focused on flood risk management. CAF has recently approved a US$100 million loan to reduce the impacts of flooding in the Lujan Basin, starting with the

implementation of the Lujan Basin Integral Management Plan. Additionally, the Province has received the support of the Dutch government through expert visits and advice that have recommended actions to implement in the Salado River. Finally, the PBA is currently in discussions with the Chinese construction sector to finance up to almost US$1 billion in civil works on the upper Salado basin.

31. All these actors play a key role in strengthening Provincial and local institutions, as well as providing financing, to promote IWRM. The Province has been very active in organize all multilateral and foreign support, while the Bank has been aware of all these actions, and is making sure synergies are put in place, avoiding duplication of work. Particularly, Dutch support has been closely coordinated and several meetings have been held with Bank participation to maximize synergies.

Action Plan

32. The PBA has committed to ensure parallel implementation of structural and non-structural components of the Project. To avoid the risk of delays of key activities in component 1, the following Action Plan with specific milestones to have the key consultancies in place for hydrologic planning, institutional strengthening and establishment of the hydromet system, has been agreed with the Ministry of Infrastructure. This Action Plan will be included in the Operations Manual and covenanted in the Legal Agreement. These milestones are set up aiming at having these activities under implementation within the first year after the loan becomes effective.

Table A2-3: Action Plan for Parallel implementation of Components 1 and 2

Action 1. Procurement process for Consultancy Firm for Institutional Strengthening of WRM Institutions launched before contract signature for river training works *Milestones* A. TORs finalized with Bank N.O.: April 2017 B. Publication of RfP: May 2017
Action 2. Procurement process of Consultancy Firm on Planning and Risk Management launched before August 30, 2017 *Milestones* A. TORs finalized with Bank N.O.: May 2017 B. Publication of RfP: June 2017
Action 3: Procurement process for acquisition of hydromet stations launched before November 30, 2017 *Milestones* A. Finalization of Technical specifications with Bank N.O.: August 2017

B. Publication of RfP: October 2017

ANNEX 3: IMPLEMENTATION SUPPORT PLAN

COUNTRY : Argentina
Salado Integrated River Basin Management Support Project

Strategy and Approach for Implementation Support

1. The approach for the implementation support plan was built on the experience gained from the previous projects with the Province and the experience from ongoing projects in Argentina. It has also been developed based on the nature of the Project and its risk profile.

Implementation Support Plan and Resource Requirements

2. Most of the team members are based out of the Argentina country office, which ensures timely and effective implementation support to the client.

3. *Technical.* Specialized engineering, flood risk management and communications, inputs are required to revise bid documents to ensure fair competition through proper technical specifications and a fair assessment of the technical aspects of the bids. During preparation and construction, high quality technical supervision will be needed to ensure that contractual obligations and quality requirements are met, as well as to review any requested change in the selected technical method or design. The team made of highly qualified national and international technical specialists in engineering, hydromet, Institutional setting for IWRM, Hydrology and Hydrogeology, and environment will conduct site visits on a semiannual basis throughout project implementation.

4. *Fiduciary*. Training will be provided by the Bank's FM and procurement specialists during project implementation. The team will also help the implementation unit identify capacity-building needs to strengthen the FM capacity and improve procurement-management efficiency. Both FM and procurement specialists will be based out of the country office to provide timely and continuous support. Formal FM supervision will be carried out semiannually and procurement supervision will be carried out on an as-needed basis as required by the client.

5. *Safeguards.* The Bank team will closely supervise implementation of the social and environmental management instruments and provide guidance to the implementation unit to address any issues. It is envisioned that safeguards specialists will be available to minimize potential social and environmental risks; thus local-based staff should be involved.

6. *Thematic support*. The scope, nature, and objectives of the Project indicate that there will be a continuous need for dialogue, particularly in the areas of planning, institutional arrangements, and meteorological and hydrological services. The Bank team expects that most of the dialogue will be led by Bank sectoral specialists.

Time	Focus	Skills Needed	Resource Estimate	Partner Role

First twelve months	Technical and procurement review of bidding documents Procurement training Safeguards training I	Technical Bank procurement Bank safeguards	Supervision budget	N.A.
12-48 months	Supervision and management of construction contracts Environmental and social monitoring Financial	Technical/construction experts Bank procurement FM M&E Social Environmental	Supervision budget	N.A.
Other	Drawing lessons learned and mainstreaming good practice	M&E Technical	Supervision budget	N.A.

Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Task team leaders (2)	24	2	Based in HQ and CO
IWRM specialist	2	2	Based in HQ
Environmental specialist (2)	10	2	Based in CO and HQ
Social Specialist	5	2	Based in CO
Operations Officer	6	2	Based in HQ
Lead social specialist	1	0	Based in HQ
Procurement specialist	8	0	Based in CO
FM specialist	4	0	Based in CO
Technical experts	4	1	Consists of 5 members of different technical disciplines

Note CO : country office, HQ: Headquarters

ANNEX 4: PROVINCE OF BUENOS AIRES PUBLIC DEBT SUSTAINABILITY ANALYSIS

COUNTRY : Argentina
Salado Integrated River Basin Management Support Project

1. **The Province of Buenos Aires (PBA) has experienced a strong public debt reduction in the last decade, leading to a historically low debt/Gross Provincial Product (GPP) ratio.**[29] Following similar trends at the national and sub-national levels, the PBA has reduced its debt-to-GPP ratio from 25 to less than 7 percent since 2002; total public debt was estimated at AR$152 billion (6.8 percent of GPP) by mid-2016. In terms of recurrent revenues, the public debt/recurrent revenues ratio fell steadily from over 200 percent in 2003 to 55 percent in 2015. Accordingly, interest payments are also a small portion of total expenditures (3 percent in 2015).

2. **The weight of bonds in public debt has increased since 2006, and is expected to increase further.** As of mid-2016, 64 percent of the total public debt was in bonds (up from a 30 percent average in 2003-2009), 28 percent to the national government and less than 8 percent owed to international financial institutions (IFIs). Following the return of Argentina to international capital markets under the new federal administration, the PBA is expected to further increase its debt issuances in order to face strong social infrastructure demand.

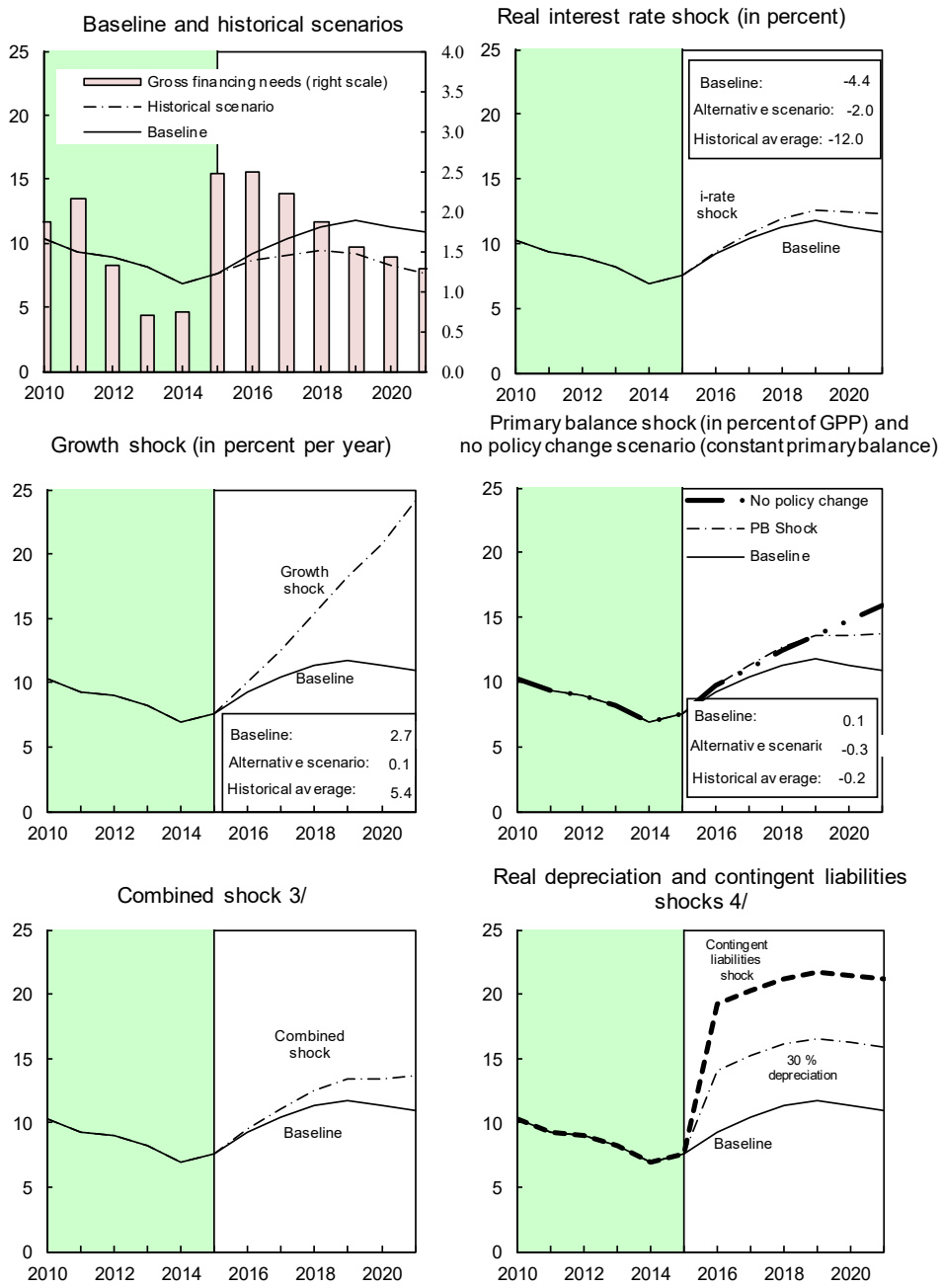
3. **The PBA is the second least dependent sub-national government on federal tax-sharing transfer system (following Ciudad de Buenos Aires).** PBA's own revenues account for 53 percent of total revenues in 2015. In the last 20 years, the PBA has been losing ground in the federal tax transfer distribution. It receives today around 18 percent of total automatic transfers from the Federal Government, while accounting for more than 30 percent to GDP. 40 percent of total population and 35 percent of households have unsatisfied basic needs. In that context, despite a strong increase in fiscal pressure (fiscal revenues over GPP almost doubled since 2005, from 5.6 percent to 10.2 percent of GPP[30]), fiscal balance has been negative every year in the last decade.

4. **The debt sustainability analysis (DSA) carried out by the Bank shows that public debt is considered sustainable in the medium to long term.** The DSA conducts a series of tests to simulate the effect in the debt-to-GPP ratio of changes in the current conditions, and compares this ratio to the historical performance and baseline assumptions of key variables. The assumptions used for the baseline scenario are based on information provided by PBA and projections for Argentina used by the WB. The DSA shows that an increase in interest rates would not affect PBA's public debt significantly. Similarly, a deterioration in the primary fiscal balance would not shift the debt-to-GPP ratio significantly either. However, a permanent growth shock would have a significant impact, especially in the long run, since lower growth both increases the primary deficit and decreases the path of GPP.[31] Since debt denominated in foreign currency represents almost 60 percent of the total debt, a 30 percent depreciation (in addition to the nominal depreciation already assumed in the baseline) would have a relevant impact on the level of debt of approximately 7 percentage points of GPP. Therefore, PBA debt management may

[29] As no data was available to distinguish between foreign currency and local currency interest payments, this DSA was conducted assuming that interest payments followed a similar currency composition as to the total debt.
[30] Including social security contributions.
[31] The growth shock simulation consists of a permanent growth slowdown of 50 percent of the historical standard deviation. Given the high volatility of GPP growth in the PBA, this results in a particularly strong permanent growth slowdown, from 3.5 percent to 0.8 percent. This has two effects on debt-to-GPP ratio dynamics. First, the nominal primary deficit increases, under the assumption that nominal revenues decrease with respect to the benchmark scenario, but nominal expenditures are unchanged. Second, lower GPP growth results in a permanently lower denominator. Both effects increase the debt-to-GPP ratio to close to 25 percent in a 5-year period.

face additional challenges in a context of strong pressures on the Argentine peso.

Provincia de Buenos Aires: Public Debt Sustainability: Bound Tests 1/ 2/
(debt as percentage of GPP)



Sources: Gobierno de la Ciudad de Buenos Aires, Direccion de Coordinacion Fiscal con las Procvincias.

1/ Shaded areas represent actual data. Individual shocks are permanent one-half standard deviation shocks. Figures in the boxes represent average projections for the respective variables in the baseline and scenario being presented. Ten-year historical average for the variable is also show n.
2/ For historical scenarios, the historical averages are calculated over the ten-year period, and the information is used to project debt dynamics five years ahead.
3/ Permanent 1/4 standard deviation shocks applied to real interest rate, grow th rate, and primary balance.
4/ One-time real depreciation of 30 percent and 10 percent of GPP shock to contingent liabilities occur in 2016, w ith real depreciation defined as nominal depreciation (measured by percentage fall in dollar value of local currency) minus domestic inflation (based on GPP deflator).

Public Sector Debt Sustainability Framework, 2010-2021
(In percent of GDP, unless otherwise indicated)

	Actual											Projections					
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Baseline: Public sector debt 1/	14.7	13.6	12.1	10.7	11.8	10.3	9.3	9.0	8.2	6.9	7.6	**9.2**	**10.4**	**11.3**	**11.7**	**11.3**	**10.9**
o/w foreign-currency denominated	5.2	5.1	4.7	4.1	4.4	4.1	4.1	4.1	4.3	4.1	4.3	5.4	5.1	5.7	6.1	5.9	5.9
Change in public sector debt	-2.8	-1.1	-1.5	-1.4	1.2	-1.5	-1.0	-0.3	-0.8	-1.3	0.7	1.7	1.2	0.9	0.4	-0.5	-0.3
Identified debt-creating flows (4+7+12)	-1.8	-2.3	-2.6	-1.2	1.5	-2.1	-0.7	-0.1	-0.6	-0.9	-0.2	-0.3	-0.5	-0.7	-0.8	-0.9	-0.9
Primary deficit	-0.6	-0.1	-0.2	0.5	1.1	0.2	0.9	0.5	-0.5	-0.6	0.7	0.7	0.5	0.0	-0.4	-0.8	-0.8
Revenue and grants	11.2	11.0	11.0	11.3	13.4	13.4	13.7	13.9	15.2	15.9	16.8	18.2	18.7	18.4	18.1	18.1	17.7
Primary (noninterest) expenditure	10.7	10.9	10.8	11.8	14.5	13.6	14.5	14.4	14.7	15.3	17.5	19.0	19.1	18.3	17.8	17.3	17.0
Automatic debt dynamics 2/	-1.2	-2.2	-2.4	-1.7	0.4	-2.3	-1.6	-0.6	-0.1	-0.3	-0.9	-1.0	-0.9	-0.7	-0.5	-0.1	-0.2
Contribution from interest rate/growth differential 3/	-1.3	-2.2	-2.5	-2.1	0.0	-2.4	-1.8	-1.1	-1.2	-1.4	-0.9	-1.0	-0.9	-0.7	-0.5	-0.1	-0.2
Of which contribution from real interest rate	-1.3	-1.2	-1.4	-1.5	-0.3	-1.2	-1.0	-0.9	-1.0	-1.4	-0.8	-1.1	-0.7	-0.4	-0.1	0.3	0.2
Of which contribution from real GDP growth	0.0	-1.1	-1.1	-0.6	0.3	-1.2	-0.8	-0.3	-0.3	0.0	-0.1	0.1	-0.3	-0.3	-0.3	-0.4	-0.4
Contribution from exchange rate depreciation 4/	0.1	0.1	0.1	0.4	0.4	0.2	0.3	0.5	1.1	1.1	2.0	0.7	0.8	0.7	0.6	0.3	0.3
Other identified debt-creating flows	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Privatization receipts (negative)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recognition of implicit or contingent liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other (specify, e.g. bank recapitalization)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residual, including asset changes (2-3) 5/	-1.1	1.2	1.1	-0.3	-0.3	0.6	-0.3	-0.2	-0.2	-0.4	0.9	1.9	1.6	1.7	1.2	0.4	0.6
Public sector debt-to-revenue ratio 1/	130.6	124.0	109.8	94.3	88.2	76.9	68.0	64.6	53.9	43.4	45.1	50.6	55.7	61.7	64.7	62.1	61.6
Gross financing need 6/	0.4	1.3	0.9	1.5	2.1	1.9	2.2	1.3	0.7	0.7	2.5	2.5	2.2	1.9	1.6	1.4	1.3
in billions of U.S. dollars	301.7	1033.0	917.6	1811.1	2238.2	2474.6	3450.1	2312.6	1243.4	1145.1	4368.8	3485.9	3050.2	2774.2	2493.9	2388.1	2206.4
Key Macroeconomic and Fiscal Assumptions Underlying Baseline																	
Real GDP growth (in percent)	0.1	8.9	10.2	6.3	-3.3	13.6	10.1	3.5	3.5	0.4	1.1	-1.0	3.5	3.5	3.5	3.5	3.5
Average nominal interest rate on public debt (in percent) 8/	1.7	2.6	2.7	2.7	3.2	4.1	4.7	5.8	6.1	8.4	11.2	11.7	11.7	11.0	9.3	8.0	7.0
Average real interest rate (nominal rate minus change in GDP deflator, in percent)	-8.3	-8.7	-11.7	-13.9	-3.4	-11.0	-11.1	-10.6	-12.6	-22.0	-15.3	-18.3	-8.3	-4.0	-0.7	3.0	2.0
Nominal appreciation (increase in US dollar value of local currency, in percent)	-1.9	-1.2	-2.6	-8.8	-9.0	-4.5	-7.6	-12.5	-24.6	-23.8	-36.7	-15.6	-14.0	-13.0	-9.1	-4.8	-4.8
Inflation rate (GDP deflator, in percent)	10.0	11.3	14.4	16.6	6.7	15.1	15.8	16.4	18.7	30.4	26.5	30.0	20.0	15.0	10.0	5.0	5.0
Growth of real primary spending (deflated by GDP deflator, in percent)	15.4	11.3	9.7	16.0	18.6	6.1	18.0	2.4	5.7	4.5	15.6	7.3	4.4	-0.7	0.4	0.9	1.3
Primary deficit	-0.6	-0.1	-0.2	0.5	1.1	0.2	0.9	0.5	-0.5	-0.6	0.7	0.7	0.5	0.0	-0.4	-0.8	-0.8

1/ Indicate coverage of public sector, e.g., general government or nonfinancial public sector. Also whether net or gross debt is used.
2/ Derived as $[(r - \pi(1+g) - g + \alpha\varepsilon(1+r)]/(1+g+\pi+g\pi))$ times previous period debt ratio, with r = interest rate; π = growth rate of GDP deflator; g = real GDP growth rate; α = share of foreign-currency denominated debt; and ε = nominal exchange rate depreciation (measured by increase in local currency value of U.S. dollar).
3/ The real interest rate contribution is derived from the denominator in footnote 2/ as $r - \pi(1+g)$ and the real growth contribution as -g.
4/ The exchange rate contribution is derived from the numerator in footnote 2/ as $\alpha\varepsilon(1+r)$.
5/ For projections, this line includes exchange rate changes.
6/ Defined as public sector deficit, plus amortization of medium and long-term public sector debt, plus short-term debt at end of previous period.
7/ The key variables include real GDP growth; real interest rate; and primary balance in percent of GDP.
8/ Derived as nominal interest expenditure divided by previous period debt stock.
9/ Assumes that key variables (real GDP growth, real interest rate, and other identified debt-creating flows) remain at the level of the last projection year.

ANNEX 5: ECONOMIC AND FINANCIAL ANALYSIS

COUNTRY : Argentina Salado Integrated River Basin Management Support Project

Overview

1. **A cost benefit analysis (CBA) evaluated the economic viability of the structural interventions envisioned under the Integrated Salado River Basin Management Plan (PMI).** This Project, which would finance investments on the middle section of the Salado River, forms an integral part of the PMI and is essential to obtain the expected benefits at basin scale. The CBA highlights benefits linked to the drainage and flood risk mitigation measures envisioned under the PMI, having an internal rate of return (IRR) of approximately 11.7 percent over a 30 year period. As such, the investments proposed by the PMI are considered economically sound. Climate change will likely increase the intensity and frequency of flood events, increasing the resilience dividend of existing infrastructure.

2. **High social and economic costs of recurrent flood events in the Province of Buenos Aires (PBA) have made flood risk management a priority for citizens and public officials.** From 2000 to 2011 in the PBA, floods caused nearly US$4.5 billion in losses and affected 5.5 million people. During severe flood events in the 1980s, over 30 percent of the total area of the province was flooded, and submersion lasted 11 consecutive months in the hardest hit areas. During a 2001 event, 2,000,000 ha were flooded resulting in losses of US$700 million in the agriculture and livestock sector. The economic impacts of a 2015 flood, which over 800,000 ha of farmland in the Salado River Basin, were severe. Using an average production value of one agricultural hectare (US$810), the damage for the agricultural sector was estimated at about US$648 million. The flood killed some 6,000 cattle, with an estimated value of approximately US$3.87 million.

3. **The Government of the Province of Buenos Aires provides direct financial support for emergency recovery and reconstruction following floods.** In response to 2013 flooding in La Plata, the provincial government authorized US$91 million in new public debt to finance reconstruction of damaged infrastructure.[32] The provincial government has a framework in place to respond to declared 'agricultural emergencies' that outlines specific programs for agricultural producers that includes waving various tax obligations and concessionary loans.[33] The state owned Banco de la Provincia extends concessional credits, including with negative real interest rates, for families and business affected by flooding in the PBA. Following a flood event in January 2017, Banco de la Provincia issued some ARS70 million in concessional credits.[34] At the national level, the Consejo Federal de Inversiones also offers concessionary loans to support post-flood recovery.[35] Improved flood risk mitigation information, infrastructure, and institutions would decrease losses from extreme hydrological events and free up these public resources for other uses.

4. **Infrequent use of insurance products among households and businesses in Argentina increases the economic value of flood risk mitigation infrastructure for residents given that structural measures are the**

[32] Law 14778, Province of Buenos Aires, *http://www.gob.gba.gov.ar/legislacion/legislacion/l-14778.html*.
[33] *Benficios a Productores en Emergencia Agropecuaria*; Ministry of Agro-Industry of the Province of Buenos Aires; *http://www.maa.gba.gov.ar/2010/images/GACETILLA_BENEFICIOS_A_PROD_EN_EMERGENCIA_PILAR_CURVAS.pdf*.
[34] *http://www.cronista.com/economiapolitica/Banco-Provincia-otorgo--70-millones-para-los-afectados-por-inundaciones-en-Buenos-Aires-20170204-0016.html*
[35] *http://cfi.org.ar/nota/creditos-del-cfi-para-situaciones-de-emergencia-yo-desastre/*.

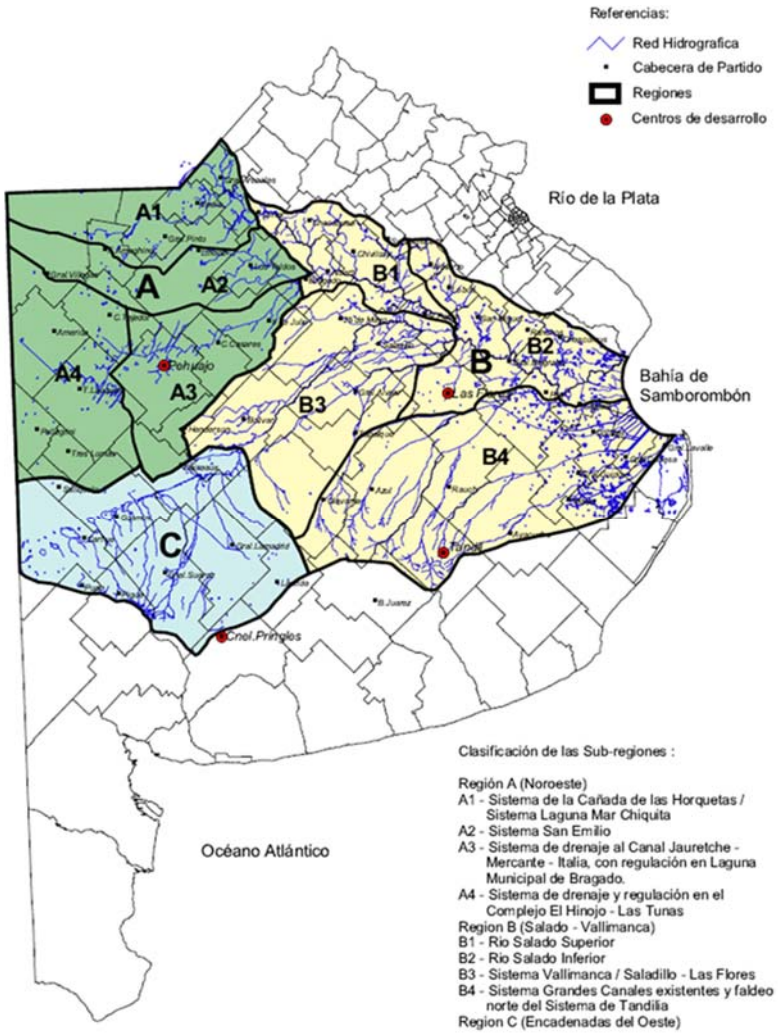
only loss mitigation mechanism in place for most residents. A flood event in the cities of Buenos Aires and La Plata in April 2013 affected more than 3,900 small businesses, 200 small scale industrial firms, and 78,000 residences. The damages of this event were evaluated at US$1.6 billion. A study from the Swiss Reinsurance Company[36] highlights that for the 2013 flood event, less than 5 percent of the total damage to households and small businesses in La Plata and Buenos Aires was insured. Given low insurance density, the households and business rely heavily on flood protection infrastructure to mitigate losses.

5. **A record flood in 2015 in the Salado River Basin confirmed the relevance of the PMI and associated river training works to markedly reduce the impact of extreme weather events.** As of late 2016, some 223 km of river training works had been completed downstream of the proposed Project site. During the 2015 flood event, the largest on record in the basin, floodwaters on the lower Salado River—where river training works on sections I, II, and III had already been completed—drained in six weeks. By contrast, the same flood event took some three to six months to fully recede from middle sections of the Salado River where works have yet to commence. The Project would finance the extension of the existing works and enable the continuation of works in the upper section of the basin.

6. **A thorough analysis of alternatives for the project found that the number of beneficiaries and the magnitude of returns from the works both have increasing returns to scale, and that the sequencing of works is highly path dependent.** The analysis conducted under the PMI considered rates of return for alternative scenarios for the scope of the interventions within the basin; the most cost effective level of flood protection; and the associated environmental impacts of the various approaches. The study confirmed the path dependency of interventions in the basin—the efficacy of flood risk mitigation works in the northwest portion of the basin (Region A of
7. Figure **1**) depends on completion of the works in the lower basin on the main stream of the river. Indeed, the study found increasing economies of scale as flood risk mitigation measures are developed further up the basin. Similarly, the analysis found that the economic rates of return were consistently higher for interventions designed for a ten year recurrence period than for a five year recurrence period. It is important to note that flood risk reduction benefits continue to provide protection beyond ten year flood events—the works will continue to reduce the depth and duration of high return period floods, albeit with diminishing effectiveness. The interventions on the Salado River use least cost engineering approaches to implement the PMI.

Figure 1. Regions of the Salado River Basin. Source PMI

[36]" Staying afloat – Flood Risk in Argentina," Swiss Re, *http://www.swissre.com/latin_america/staying_afloat_flood_risk_in_argentina_flood_insurance.html*.



8. **Given the path dependency of investments in the Salado River Basin, the completion of activities to be financed by the Project is necessary to enable sequential activities and associated benefits upstream.** The river training works on the 34 km long section IV-1-B of Salado River to be financed by the Project are located in Region B1 of

9. Figure **1**. The PMI calls for extending the river training works some 300 km upstream from the Project site, which would benefit an additional 382,743 residents. Section IV-1-B sits on the critical path to expand drainage works further up the main stream of the Salado River, as well as to expand to secondary and tertiary canals within the basin. The works that will be enabled upstream will allow for improved flood protection of several small towns as well as drain large productive areas. Some drainage works (sub-region A1, 1.2 million ha) have already begun and others (sub-regions A2, A3 and A4, totaling 4.3 million ha) will not be implemented until the reception capacity of the Salado River has been enhanced in section IV-1-B. The particularly capital intensive investment phase to be financed by the Project amounts to frontloading the investments needed in the basin by enabling less costly investments upstream, on tributaries, and on secondary and tertiary canals. The full benefits of the PMI can only be realized once the full program has been implemented (section IV and V after the already implemented sections I, II and III).

Public Sector, Financial Sustainability, and World Bank Value Added

10. Flood risk management is a priority for the national and provincial governments. The public good nature of flood mitigation infrastructure services, coupled with the large capital outlays required for their construction, justifies public financing of these investments. Strong public institutions are required to supervise and operate this infrastructure. Similarly, the provision of timely and reliable hydrometeorological information is considered a public good that warrants public sector involvement. Enhanced flood risk management and improved knowledge of hydrometeorological conditions will create conditions for private sector growth in the basin.

11. In response to the substantial capital expenditure required for such water resources and flood risk management infrastructure, the national government created the *Fideicomiso de Infraestructura Hídrica*, or Water Infrastructure Fund, as a dedicated funding mechanism for the sector.[37] The fund has generated some ARS10.4 billion between 2002 and 2015 primarily through a gasoline tax which the national government then transfers to the provinces for investments in water infrastructure.[38] Provinces complement national transfer with local funds. There are currently mechanisms in place for ADA, as the designated agency, to collect fees from agricultural users. The application of these instruments could help reduce the burden on budget allocations for water resources management. However, they have not been implemented yet, and will be assessed and promoted under the Project. Therefore, opportunities exist to establish an equitable payment system that would strengthen the financial sustainability of water resources management in the PBA.

12. **Specific World Bank Value Added.** The Bank has wide experience in flood risk management and integrated basin management in Argentina, Latin America, and globally. Provincial authorities have explicitly stated that they sought out Bank engagement not only to finance river training works, but also to support institutional development that will permit sector authorities to more effectively operate and maintain flood risk management infrastructure financed by third parties, in addition to managing water resources at the basin scale. This support will take place within the context of the operationalization of the Bank-supported PMI. The Bank is well-placed to share emerging global experience with the Province as it continues to address basin and flood risk management challenges.

Economic Analysis of the PMI

13. **The PMI, originally conducted in 1999, included an economic analysis of the envisioned drainage and rural flood protection measures at the basin level.** The study entailed an analysis of the direct benefits (cost avoided) associated with (i) the reduction of losses of agricultural production and livestock production, (ii) the reduction of damages to the private and public rural infrastructure, and (iii) land use change and potential appreciation resulting from the river training works.[39] The benefits (cost avoided) linked to the project are mainly due to two aspects: (i) the reduction of the level of water in the flooded areas (proportional with damages) and (ii) the reduction in the duration of the flood events in those areas. The analysis calculated an IRR of 13.4 percent for the entire program of river training works envisioned under the PMI. Given that completion of section IV-1-B both depends on completion of downstream works and is needed to enable completion of upstream works, economic analysis of the section is conducted within the context of the

[37] *Marco Legal— Fideicomiso de Infraestructura Hídrica*, *http://www.ucofin.gob.ar/documentos/Marco_Legal_Hidrico_web.pdf*
[38] *http://www.infobae.com/2015/08/13/1748076-inundaciones-el-estado-tiene-un-fondo-millonario-obras-que-casi-no-ejecuto/*
[39] The study hypothesizes that land owners will adopt more advanced agricultural technologies that increase yields as a result of decreased flood risk.

broader PMI, rather than in isolation.

14. **The Province partnered with the National Technical University in 2007 to update the baseline data used in the original economic analysis of the river training works.** The update took into account changes in land use patterns and costs of avoided damages. This exercise was particularly relevant in the wake of the currency crisis and devaluation of the peso in 2001-2002. The revised version of the analysis accounted for changes such as a decrease in the area dedicated to cattle ranching from 78 percent in 1998 to 66 percent in 2005 and a corresponding increase in cropland. The resulting IRR of the updated economic analysis was 11.7 percent. The expected return remains higher than the six percent discount rate recommended by the World Bank.

15. **Floods occur in the Salado River Basin through two mechanisms:** (i) overflowing the banks of the Salado River; and (ii) saturation of the water table and the consequent pooling in low-lying areas or depressions without sufficient surface drainage links with the Salado River. The river training works will reduce floods linked to overflowing of riverbanks, as well as enable faster drainage of floods related to saturation. The economic analysis for flood risk management works accounts for floods from both overflows and from saturation.

16. **In addition to the global CBA conducted for the PMI, a "local" analysis was carried out to estimate the magnitude and distribution of benefits (costs avoided) of the river training works in the Project's direct area of influence and other urban protection infrastructure.** The exercise included the benefits of works for the following sectors: crop production, cattle production, poultry and pork production, rural areas, urban areas, transportation infrastructure, the loss of transportation connectivity and fiscal losses. The analysis also accounts for indirect losses associated with coping with floods, based on an ex-post analysis from a flood in 2003 in the adjacent province of Santa Fe.[40] The value of avoided damages was projected to grow at 1.5 percent per annum to account for economic growth. The IRR for a 30 year return period for the river training works on section IV-1-B is approximately 6.8 percent. A sensitivity analysis was undertaken to estimate a climate change scenario in which the average flood return period doubles (i.e., large flood events become twice as frequent) and found that the IRR would increase to 15.5 percent. The specific works to be financed by the project are considered economically viable on their own, though it is important to reiterate, that beyond flood protection in the immediate area of influence, the works are essential to enable sequential interventions upstream as noted in paragraph 6 of this annex.

17. **Different types of beneficiaries share the benefits of the works, including private citizens, farmers, business, and the government in both rural and urban areas.** In relative terms, benefits at local level are shared as follows: urban areas are the largest beneficiaries of the works with around 35 percent[41] of the costs avoided. It is followed by the agricultural production with almost 25 percent of the benefits. Poultry and porcine production represent 17 percent of the benefits. The benefits for transportation connectivity are representing 10 percent of the total local benefits. The cattle production will benefit from 7 percent of the costs avoided. The longer the duration of the submersion period and the higher the water level, the more the benefits will be important for local actors. Appendix A contains a summary of benefits (costs avoided) by sector for different return period flood events (from 2 to 100 years).

[40] "Evaluación del Impacto de las Inundaciones y el Desbordamiento del Río Salado en la Provincia de Santa Fe, República Argentina, 2003." Comisión Económica para América Latina y el Caribe, 2003.
[41] Including the effect of urban protection infrastructure being financed by the provincial government

Fiscal Space Resulting from Flood Risk Management

18. **Improved flood risk management should increase tax revenues and decrease emergency response and reconstruction costs**. An analysis was conducted to estimate the forgone tax revenue as a result of a flood event. Agricultural producers contribute to the provincial and national government revenue through four main mechanisms: (i) the Rural Property Tax (*Impuesto Inmobiliario Rural*); (ii) a tax on soy export; (iii) a national value added tax (*Impuesto al Valor Agregado*, IVA); and (iv) a provincial gross income tax (*Impuesto a los Ingresos Brutos*).[42] Flood events that result in crop or livestock losses decrease the tax revenue generated from productive activities. Additionally, the provincial government often waves property tax collection following flood events as a way to help producers cope with the financial shock. A reduction in flood related losses due to investments in flood risk mitigation infrastructure, then, would result in an increase in government revenue. The increase in tax revenue due to the works in Section IV-1-B and those future ones enabled by this Project in 43,000 km^2 upstream (sub-regions A2, A3, A4 in

19. Figure **1**), is estimated at US$75.0 million per annum once the next phase of works is fully completed.

20. **Fiscal space created by improved flood risk management could allow the provincial and national governments to target additional resources to poor and vulnerable populations.** The increase in tax revenues would be split between the provincial and national governments. At the provincial level, the increased revenue creates fiscal space for other activities, including healthcare, which a recent Public Expenditure Review carried out for the PBA by the WB highlighted as notably low by national standards. Allocating all of the estimated incremental tax revenue to healthcare would allow for a 2.4 percent increase in per capital healthcare spending. The estimated overall increase in tax revenues underscores the public sector rationale for the Project and supports the sharing of prosperity within the PBA and at the national level.

Other Indirect Benefits

21. **The Project will generate a series of important benefits that cannot be captured in the calculation of the IRR**, including through, inter-alia, (i) institutional strengthening of ADA and DPOH, including potential for expanded cost recovery at ADA, that will indirectly benefit the entire basin and its 1.4 million inhabitants; (ii) increasing land values and corresponding property tax revenue; (iii) creation of conditions for private sector development beyond agriculture, particularly in the tourism sector; and (iv) improving access to public services and income generating activities for urban residents left isolated by floods. On this last point, an estimation of the days of work lost due to flood events has been made for three sectors (agriculture, industry, services) on the basis of average salaries for each sector. From the values of number of jobs and wages, the losses per day of work lost due to floods has been evaluated for the portion of the population (part of the 75,000 inhabitants) potentially impacted. The total cost has been evaluated at 4.2 million pesos per day (US$275,000 per day).

22. Therefore, benefits captured by the IRR from the CBA of the PMI are underestimated, as actual benefits are beyond those presented in this evaluation. Table provides an overview of the types of benefits that have been quantified and non-quantified benefits in the analysis.

[42] Maria Marta di Paola; *Los impuestos y el sector agropecuario*; http://www.agro.uba.ar/apuntes/no_3/impuesto.htm.

Table 1. Quantified and Non-Quantified Benefits

Quantified Direct Benefits (Damages Avoided)	Indirect, Non-Quantified Benefits
Damages to agricultural production (grains, bovine, poultry, pork)	Institutional strengthening
Damages to transportation infrastructure	Environmental
Damages to urban infrastructure	Human health, wellbeing, and quality of life
Reduction in productive/business activities	Property tax revenue due to land appreciation
Hydrometeorological services (benefits estimated in local CBA described below)	Private sector mobilization
	Improved agricultural methods and technologies
	Reduced damages to public services (water supply and sanitation, electric grid)

23. **The impact of flood protection works can lead to an at least temporary increase in land values as the benefits of the infrastructure are capitalized into land prices.**[43] Interviews with local landowners indicate that with the proposed flood mitigation works in place, they might shift to higher value crops; adopt new technologies; expand into currently idle parcels; or move to more intensive land use, including feedlots for cattle, all of which could result in increased returns for land.[44] Nevertheless, land value appreciation has not been quantified in the case of the Salado River, due to the complexity of the evaluation methodologies and to its short term impacts. A review of literature shows that floods could have an adverse impact on land value, at least on the short term. An April 2016 study from Malaysia[45] takes a state of the art approach to the evaluation of land appreciation. The authors use a Hedonic Pricing Model (HPM) approach to evaluate the effects of flood on agricultural and industrial land, though indicate that only a few studies address the effects of flood disaster on land property values, due to the fact that it is difficult to measure the value of land itself. The results of this study are consistent with the previous studies stating that flood duration had adversely affected the value of land. A 2009 study from the United Kingdom found that the impact of flood event on property values is only temporary, as after three years prices have returned to their normal market level.[46] This is often due to the fact that in case of flood event people are expecting that damages would be partly covered by the state or by the insurance system.

24. **Quantifying the benefits of the institutional strengthening activities under Component 1 presents particular methodological challenges.** It is important to note that IWRM objectives largely focus on ensuring the long-term protection and sustainable use of the water resources while preventing further deterioration. When examining the proportionality of costs required for achieving the objectives, these benefits can and should be taken into account. Some examples of such benefits are listed below:

- Protection and enhancement of health and biodiversity of the aquatic ecosystem
- Protection of human health through water-related exposure (e.g. through drinking, food production,

[43] "The Triple Dividend of Resilience", World Bank 2015, *https://www.gfdrr.org/sites/default/files/publication/The_Triple_Dividend_of_Resilience.pdf*.
[44] "Dutch Risk Reduction (DRR) Team Mission Report – Argentina October 11-15, 2016;" *http://www.drrteam-dsswater.nl/wp-content/uploads/2016/06/DRR-2nd-mission-Report-Argentina_final.pdf*.
[45] "Flood and Land Property Values;"
Nur Hafizah Ismail1, Mohd Zaini Abd Karim1 & Bakti Hasan Basri
[46] "What is the impact of flooding on property values? Some evidences from UK" Jessica Lamond University of Wolverhampton

bathing and consumption of fish, shellfish and seafood).

- Lower costs for water uses, e.g. water supply or fisheries and more cost effectively achieved improvements by reducing treatment and remediation costs (e.g. drinking water supply, Sediment pollution).
- Improvement of efficiency and effectiveness of water policy based on the "polluters-pays principle" (in particular by adequate water and drainage pricing policies and cost-effectiveness assessments).
- IWRM should also help authorities to maximize the economic and social benefits derived from water resources in an equitable manner, rather than a one-off approach.
- Improvement of residents' quality of life by increasing the amenity value of surface waters (e.g. for visitors, tourists, water-sports users, conservationist) and by increasing its non-use value and all non-market benefits associated.
- Mitigation of impacts from climate change and security of water supplies (e.g. by forward planning in river basin management, water demand and supply management and mitigation of flood and drought events)
- Mechanisms to address conflicts and regional disadvantages by balancing interests of different water users (countries) and creating a level playing field for water users.
- Potential promotion of sustainable uses thereby creation of new jobs (e.g. in ecotourism, fisheries and nature conservation sector).

25. Some of the benefits above are financial, e.g. the saving of costs for water supply (economic benefits), and therefore can be expressed in monetary terms. On the basis of existing methodologies, it is difficult to attribute a monetary value to many types of environmental and social benefits, though it is important to note that the Project will generate these non-quantifiable benefits.

Benefits from Support for Hydrometeorological Observation Network and Early Warning System

26. **The improvement in hydrometeorological observation network and establishing the groundwork for an Early Warning System will facilitate forecasting of floods and droughts in the entire river basin (1.4 million inhabitants).** This will allow for reducing or avoiding significant damages particularly for livestock ranches by providing time to take preventive measures (saving livestock). For instance, the early warning system would provide some additional time for farmers to relocate animals to higher ground. Additionally, hydrometeorological data, interpreted and disseminated by a robust meteorological agency, can help farmers make better decisions about when and what to plant.

27. **The methodology for evaluation of the benefits from hydrometeorological observation networks and Early Warning Systems is still evolving, though recent analytical work suggests that benefits can outweigh costs by 10 to 1**.[47] An innovative benchmarking approach has been proposed by Hallegatte (2012) in a European Union-wide study that focused on three items (a) reduction of asset losses; (b) reduction of human losses; and (c) other economic benefits such as productivity enhancements.[48] The study presented

[47] "Strong, Safe, and Resilient: A Strategic Policy Guide for Disaster Risk Management in East Asia and the Pacific," World Bank, 2013, *http://documents.worldbank.org/curated/en/230651468036883533/pdf/758470PUB0EPI0001300PUBDATE02028013.pdf*.
[48] "A Cost Effective Solution to Reduce Disaster Losses in Developing Countries. Hydro-Meteorological Services, Early Warning, and Evacuation," Stéphane Hallegatte, The World Bank Sustainable Development Network, Office of the Chief Economist, May 2012, Policy Research Working Paper 6058. Available at: *http://documents.worldbank.org/curated/en/190261468181486694/pdf/WPS6058.pdf*.

the benefits as reduction of asset losses in terms of percentage of GDP. The study found that a well-functioning, modern early-warning system (European-like) could reduce disaster-related asset losses by between 0.003 percent and 0.017 percent of GDP. The Hallegatte study then considers four groups of countries by income level and a methodology to benchmark the potential benefits of hydrometeorological services vis-à-vis the European context. In low-income countries, benefits are estimated at 10 percent of European levels; 20 percent in lower-middle income countries; 50 percent in upper middle income countries (as is the case for Argentina); and 100 percent in high income countries.

28. **Applying the benchmarking methodology to the Salado River Basin has some limitations** such as: the benchmarking and transfer of value form Europe, and the fact that this approach is mainly calibrated for urban areas, in a case of flash floods, where important impacts on assets and human life can be seen. In the case of the Salado River the impacts are mostly coming from long lasting flood events, and an important part of the benefits of the hydrometeorological services, would be more dealing with the additional time provided to put animals in safe places and to give more time to some citizens to save assets. The proposed benchmarking approach, even if not perfect, allows for quantifying benefits (preventive measures) that are often not taken into account.

29. **Estimation of benefits within the Salado River Basin.** The gross provincial product of the portion of the PBA situated with the Salado River Basin is estimated at US$18.4 billion. The number of inhabitants in the Salado River Basin is about 1.4 million people. As a middle income country (GDP per capita was approximately US$13,431 in 2015), the expected benefits of improved hydrometeorological services would be 50 percent of the potential in Europe. Applying the methodology outlined above, the annual benefits (costs avoided) due to efficient hydrometeorological services in the Salado River Basin would be between a minimum of US$0.28 million and a maximum of US$1.57 million per annum.

Appendix A: Estimation of Benefits (Damages Avoided) in the Project's Direct Area of Influence

Sector	Recurrence Period (years)	Expected Annual Damages (US$, thousands)[49]		Expected Annual Damages Avoided (US$, thousands)
		Without Project	With Project	With Project
Benefits (damages avoided) for Farmers				
Agricultural Production: soybeans, corn, barley, oats, sunflower, sorghum	2	2,270.0	2,152.0	118.0
	5	23,216.9	12,896.8	10,320.0
	10	37,404.5	24,461.0	12,943.5
	25	44,574.3	32,080.0	12,494.3
	50	47,951.3	37,849.7	10,101.5
	100	51,104.6	43,817.2	7,287.4
Bovine Production	2	334.1	316.8	17.3
	5	3,676.2	1,512.3	2,163.9
	10	8,589.2	4,802.5	3,786.7
	25	10,235.6	7,323.1	2,912.5
	50	11,011.1	8,691.4	2,319.6
	100	11,735.2	8,008.3	3,726.8
Poultry and Pork Production	2	232.1	230.6	1.5
	5	2,400.4	1,086.1	1,314.3
	10	20,456.8	4,698.8	15,758.0
	25	25,087.6	11,186.1	13,901.5
	50	26,988.2	18,327.3	8,660.9
	100	28,763.0	24,616.5	4,146.5

[49] The exchange rate used for the conversion from pesos to dollars was 15.2 pesos = 1 US dollar, from late 2016.

Sector	Recurrence Period (years)	Expected Annual Damages (US$, thousands)[49]		Expected Annual Damages Avoided (US$, thousands)
		Without Project	With Project	With Project
Benefits (damages avoided) for Rural Areas				
Rural Productive Infrastructure: Machines, Buildings	2	498.1	466.4	31.7
	5	1,294.4	890.6	403.8
	10	2,051.5	1,316.9	734.7
	25	2,444.8	1,826.1	618.7
	50	2,630.0	2,142.5	487.5
	100	2,802.9	2,469.8	333.1
Transportation Connectivity: isolation due to flooded roads	2	0	0	0
	5	0	0	0
	10	32.9	0	32.9
	25	7,440.4	0	7,440.4
	50	24,562.2	0	24,562.2
	100	34,943.6	0	34,943.6
Transportation Infrastructure: rural roads, railroads, bridges	2	2.6	0	2.6
	5	637.5	1.0	636.5
	10	3,458.0	117.9	3,340.0
	25	6,776.8	2,028.9	4,747.9
	50	9,266.0	2,888.7	6,377.4
	100	12,138.8	3,931.6	8,207.2
Benefits (damages avoided) for Urban Areas[50]				
Urban Areas: inter alia, apartments, houses, shops	2	0	0	0
	5	0	0	0
	10	19,023.5	0	19,023.5
	25	36,264.7	0	36,264.7
	50	42,964.8	0	42,964.8
	100	45,678.8	0	45,678.8
Productive Activities and Services	2	0	0	0
	5	0	0	0
	10	941.7	0	941.7
	25	2,302.9	0	2,302.9
	50	3,534.0	0	3,534.0
	100	4,849.9	0	4,849.9

[50] The reduction in flooded urban areas are the result of ongoing government investments in urban flood risk mitigation coupled with the river training works to be financed by the Project. As such, avoided costs for urban areas are only partially attributable to the Project.

ANNEX 6: ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

COUNTRY: Argentina
Salado Integrated River Basin Management Support Project

1. This Annex presents a summary of the Environmental and Social Impact Assessment (ESIA) of the Project works[51] both for construction and operation/functioning phases. The ESIA was prepared based on the PMI and using information generated through environmental and social studies in the Sub-regions[52] A1, A2, A3 and B1. This ESIA also establishes a basis for the Salado River Basin (SRB) Environmental and Wetlands Management Plan that will be developed under Component 1.

Analysis of Alternatives

2. The PMI balances the technical proposals, economic viability and environmental impacts of the different alternatives with respect to addressing the problem of flooding in the SRB. To this end, diverse strategic alternatives were proposed, evaluated, and rejected or maintained. The following process was carried out:

- **Initial analysis:** a "long list" of alternatives and potential PMI components was compiled in June 1998. Subsequently, the list was narrowed down to a "short list" of alternatives in order to carry out additional analysis and development of said alternatives.

- **Preliminary Environmental Impact Assessment (EIA):** a preliminary EIA of the short-listed alternatives was conducted, concluding in the initial outline of the PMI in March 1999.

- **The strategic options considered as part of the PMI preparation** were essentially differences in scope of the same structural and non-structural components of the PMI. The strategic options included the baseline "Do Nothing/Without Project" option and four "With Project" options are presented below:

  A. Do Nothing/Without Project. The expected impacts would be:
  - No strategic structural, institutional or non-structural interventions;
  - Continued ad-hoc structural interventions at local level; and
  - Non-planned, scattered evolution of institutional changes and associated non-structural interventions.

  B. Strategic Option to Do the Minimum. This option concentrated on:
  - Programs with limited institutional changes, possibly concentrated in a pilot sub-region;
  - Small soil improvement measures;
  - Implementation of key agricultural improvement measures;
  - Limited implementation of non-structural environmental measures;

[51] Project works are located in the upper Salado River, section IV-1-B.
[52] For a map the regions, see figure 1 in Annex 5.

- Potential implementation of limited structural measures (mostly new drainage works in one sub-region, A1, of the SRB, additional to rehabilitation and extension of existing canals); and
- Implementation of urban defense schemes against floods and improvement of rural roads, only in high priority sites.

C. Limited Strategic Option.

- A substantial program of institutional changes;
- Broader measures of soil and agricultural improvement;
- Public awareness and education programs;
- Greater implementation of non-structural measures for environmental improvement, tourism, fisheries management, etc.;
- Drainage works in two sub-regions in the northwest SRB (A1/A3 or A3/A4); and
- Embankments for flood protection on upper Salado and other improvement works in lower Salado.

D. Intermediate Strategy. This concentrated on implementation of the measures described under the previous option, including additionally:

- A complete program of institutional changes;
- Broader non-structural measures of environmental management;
- Drainage works in the entire northwest SRB (A1, A2, A3 and A4);
- Attenuation/storage of floods in reservoirs/lagoons in the northwest SRB and in Las Flores Grande and Vichahuel areas;
- Expanded construction and improvement of canals at the mouth of the Salado River; and
- Greater implementation of urban flood control works and improvement of rural roads.

E. Extensive Strategy. This includes full implementation of the PMI measures that calls for extensive interventions throughout the basin and in secondary canals. This alternative comprises a set of interventions and works that aim at managing and mitigating the impacts of the floods in the SRB in order to protect the affected cities and infrastructure and increase the level of safety of the local populations and economic activities.[53]

3. **Results of the analysis of alternatives.** The analysis of alternatives concluded that the "Do Nothing/Without Project" option is not desired, as it would not solve any of the existing environmental, social or economic problems in the SRB. The most likely outcomes of this alternative were:

- Continued flooding in urban and agricultural areas, resulting in continued economic losses and unacceptable social impacts;

- Inability of the province to increase current levels of agricultural and cattle production, resulting in the loss of market share in international markets and incapacity to take advantage of expected openings in these markets;

[53] The PMI-based documents refer to river training works, yet in practice the works only imply the extension of the Salado River capacity, which does not imply changes to the river course and neither construction of any type of concrete structures.

- Continuation or increase in the environmentally negative use of agrochemical products, resulting in the deterioration of water quality and in potential adverse impacts on drinking water; and

- Continuation of the inadequate, ad-hoc management/over-exploitation of natural resources, including rare species, protected sites and fisheries.

4. With respect to the other "With Project" alternatives, the analysis concluded in favor of the extensive strategy (global project), as showing the highest benefit cost ratio. This alternative generates a series of effects that contribute to reduce the environmental and social impacts of both floods and droughts.

5. During high rainfall periods, this alternative will drain surplus water through the network of canals, limiting the extent and duration of flooding, generating positive impacts to economic activities (extension of productive surfaces, improvement of soil quality in *recintos*, etc.) and to the quality of life of the inhabitants of the basin (through decreasing flood related health issues and improving access to services that was limited when the infrastructure is damaged or blocked by water).

6. The analysis showed that the most significant potential adverse impact generated by this alternative the increase of water conductivity during high rainfall periods that could alter aquatic ecosystems. The water entering the upper Salado River (Sub-region B1), comes from the northwest region, which is home to extensive farming activity. The river training works in the Sub-region B1 could increase the flow of nutrients, fertilizers and salts affecting the overall water quality in the River in an adverse and cumulative way. To mitigate this adverse impact, the PMI incorporated different mechanisms of flow regulation in the design to increase the existing management options. This facilitates the management of the ecological and recreational functions of the Salado River, as well as avoidance of flood risks and the downstream recirculation of nutrients and salts.

7. With respect to the effects of the global project during dry seasons, the PMI strategy implied the creation or extension of permanent water bodies that serve as reservoirs. Canals would be designed in a way that, by means of regulation structures, they would reduce water drainage at times of drought, thus maintaining wet conditions. In turn, this reduces agricultural losses, erosion and soil degradation during dry times.

8. **Alternatives analyzed for the preferred option of the river training works.** During the final design of the river training works, different alternatives were considered and analyzed. Possible direct impacts of the river works were considered such as possible damage to: productive land, natural habitats, the hydro-dynamics of the riverine system, and to the population as a whole. Likewise, it is worth mentioning that the final design and the initial execution of the works on the main course of the river took place when the PBA was under a flood emergency.

9. Originally, the PMI proposed the construction of parallel embankments on both riverbanks in order to keep the excessive runoff contained between within the channel. Nevertheless, this proposal (common worldwide) entails the following disadvantages:

- Tributaries that laterally discharge to the river could be constrained due to differences of existing levels with the main river, with the consequent impacts during high flow events in areas bordering the

river. Solutions to fix this would require numerous hydraulic control infrastructure (such as pumping stations), making the embankments economically inviable.

- Subsequent legal conflicts between individuals or with the provincial government could arise due to presumed or real management or maintenance issues of the hydraulic control structures.
- Urban floods in some cities, including Roque Perez, could worsen due to an inability to drain excess water toward the river given that to the city would be located below the water level on the river expected during flow peaks.

10. Based on the problems described above, DPOH defined a new alternative consisting of extending the capacity of the river's main course within a given section. Along the entire length of the river, different sections with capacities based on the different flow rates were defined, resulting in variating cross-sections and slopes determined by the characteristics of the morphology of the land and the longitudinal profile of the river.

11. With this new alternative, the dredged material is deposited in selected low-lying areas, called *recintos*. In this alternative, the main impacts are the volume of soil resulting from the river training works on the main channel. With the *recinto* solution, the impact is transformed into additional benefit for what had previously been flood prone areas zones by transforming them into productive or pasture zones. The design of the *recintos* takes into account the following factors: They are located between 200 and 800 m from the riverbank, leaving a parallel strip of 200 m of land free to allow the expansion of the river during flood events and to establish/maintain a biological corridor. They cannot be located in areas of wetlands or permanent lagoons. An analysis and a field study will be conducted on potential *recintos* sites (previously identified) before their final selection to ensure that environmental criteria are met.

Assessment of Environmental and Social Impacts of Project Works

12. The PMI actions and works aim at the management and mitigation of the impact of floods to protect the cities, farmland and infrastructure in its area of influence, improving the safety of the populations and economic activities.

13. The execution of the river training works for the upper Salado River responds to a need expressed by the communities to implement a set of structural measures that reduce the vulnerability of the municipalities of Roque Perez, Monte, and Lobos in the face of the recurrent flood problems over recent decades.

14. **Methodology.** The environmental and social criteria and measures that have been used to identify and evaluate the potential impacts of the Project works align with the specifications in the PMI, as well as the requirements of the World Bank environmental and social safeguards policies.

15. The ESIA methodology is based on a cause-effect matrix that follows the qualitative evaluation guidelines contemplated in the Manual of Environmental Management for Hydraulic Works of the PMI. The evaluation applied the following procedure:

Table 1. The attributes used in the qualitative valuation of the impact evaluation

1. NATURE		+ Beneficial (blue color)	- Detrimental (red color)	x Foreseeable but difficult to qualify (black color)	
2. INTENSITY	*Degree of Affectation*	1) Low	2) Medium	3) High	
3. EXTENSION	*Area of Influence*	A) Precise	B) Partial	C) Extensive	
4. MOMENT WHEN IT TAKES PLACE	*Impact Timeline*	A) Immediate	B) Mediate	C) Long	
5. PERSISTENCE	*Permanence of the Effect*	1) Temporary	2) Permanent		
6. REVERSIBILITY	*Reconstruction from Natural Processes*	A) In the short term	B) Medium term	C) Long term	D) Irreversible
7. RECOVERABILITY	*Reconstruction by Human Means*	A) Mitigable, totally recoverable, immediate	B) Mitigable, totally recoverable to medium term	C) Partially recoverable	D) Non-recoverable

* In the algorithm the applied sequence was Nature - Intensity - Extension - Moment - Reversibility - Recoverability.

16. The likely impacts on natural and anthropic environments during the construction and operation phases of the Project's river training works were analyzed. An Environmental and Social Management Plan was elaborated to prevent, mitigate and control of the adverse impacts, as well as to maximize positive impacts. The detailed evaluation results are synthesized in an Impacts Matrix included in Annex 3.1 of the ESIA. The approach of the ESIA preparation consisted of the following two steps:

i) Identification of the impacts based on impact units; and
ii) Valuation of the impacts according to different criteria.

Key Baseline Information and the Main Environmental and Social Impacts

17. The SRB is a plain area with very almost no slope, the groundwater table is very high and the river often overflows its banks, creating large floods that take months to drain. The river is not navigable and there are no fishermen whose livelihoods would depend on the river; the fishing along the river is sport/recreational, including several private installations that facilitate sport/recreational fishing. Regarding the application of the World Bank environmental safeguards in the Project area, particular attention was paid to natural habitats and physical cultural resources: Despite the fact that the intervention area largely been impacted by anthropogenic activities, presence of numerous wetlands with important bird populations highlights the environmental value of the SRB. Particularly, the basin includes the Samborombón Bay, approximately 300 km downstream from the leg of the river training works to be financed by the Project, which is a Ramsar site recognized as a wetland of international importance. Otherwise, mapping of the wetlands within the basin and the rest of the PBA remains a pending task that the Project will address among the initial activities to create the SRB Environmental and Wetlands Management Plan. In terms of physical cultural resources (PCR), the basin as a whole is known for paleontological findings, such as a number of prehistoric animal fossils discovered during the severe drought in 2009 in the municipalities of Roque Pérez and Lobos when the Salado River ran dry. There are, however, no known PCR within the Project works' direct area of influence. In terms of land use, the SRB has low population density, the main land use consists of large-scale agriculture and livestock.

18. When considering the global river training works on the main course of the Salado River, the Regional EIA prepared for the PMI identified two types of potential effects at two levels on the natural and human environment: a) those due to the construction and operation of the projected training works along the Salado River, and b) those that arise due to the projected interventions upstream in the northwest region that indirectly affect the fluvial corridor of the river.

19. Potential negative environmental impacts identified for the construction phase relate to alterations in the pattern of water flow that will take place as a result of the excavation in the riverbed and surrounding riverbanks. This will bring about disturbances and losses of habitats in the river and its margins and will affect soils of the flood plain, producing a reduction in soil quality in the riparian zone and the associated benthonic micro-fauna. Likewise, a negative impact on the landscape structure will take place.

20. The works' direct, induced and cumulative impacts on fauna, particularly birds and fish, are considered negative as the river training works will indirectly imply a loss of habitat for the organisms that depend directly or indirectly on the Salado River. The bird and fish species identified in the Project works' direct area of influence do not have vulnerable or threatened status. Overall, the environmental assessment conducted on the Project works' direct area of influence (the second leg of section IV, IV-1-B) presents an absence of any type of natural habitat, as defined by OP 4.04 on Natural Habitats. As per the detailed ESIA baseline (see Chapter 4 of the ESIA report), the Project works' direct area of influence contains mostly rural landscape with significant anthropogenic influence; no wild or pristine areas remain. The loss of habitat due to the Project works is considered localized, temporary and reversible once the works are completed, due to the environmental considerations embedded in the design of the river training works and the overall capacity of the biological/fluvial corridor to restore similar conditions.

21. **The main induced and cumulative environmental impacts** potentially caused by the global river training works relate to: i) water quality (sedimentation and turbidity during the construction phase and potential increases of nutrients and fertilizers due to the increase of drainage from agricultural areas during the operation of the works); and ii) fish populations and recreational fishing activity. However, the Project's contribution to these potential impacts is not considered significant due to the limited size of the Project works: 34 km compared with the 648 km length of the Salado River and the 223 km of the previously trained river sections downstream from the Project's intervention site. The consequence of depositing soil in *recintos* is expected to be beneficial on the affected land in terms of better conditions for agriculture. While *recintos* could contribute to increased use and runoff of nutrients, fertilizers and salts, the effect would be minimal due to the limited area of approximately maximum of 24 km^2 that will be affected,[54] compared with the overall 170,000 km^2 area of the SRB.

22. The design of the global river training project includes measures and actions to decrease the direct, induced and cumulative impacts: (i) a low water canal for the maintenance of an ecological flow that corresponds approximately to the medium annual low water condition, with a permanence of six months. This promotes a canalized flow with speeds that prevent sedimentation; (ii) no modifications of the main river course nor construction of any type of concreate structures, a design characteristic that reduces maintenance needs; and (iii) maintenance/establishment of the biological/fluvial corridor within 200 m from the river edge on both sides as an environmental asset and a valuable landscape element. No *recintos* will be constructed within this corridor in order to facilitate conservation and strengthening of the area's key ecological characteristics and environmental services. Overall, beyond decreasing the flooding risks, the design elements of the works in the Sub-region B1 facilitate the maintenance of the river's ecosystem services, including decrease of downstream pollution by nutrients and fertilizers caused by flooding.

23. The environmental studies to be financed under the Environmental and Wetlands Management Plan under Subcomponent 1.2 will assess the feasibility of establishing a conservation status for the biological/fluvial corridor of the Salado River in order to improve the likelihood that it could facilitate restoration of the critically diminished Pampean grasslands ecosystem. Further to addressing the induced and cumulative impacts, the SRB Environmental and Wetlands Management Plan will also cover initiatives to promote sustainable soil and land use practices and proposals for promotion of sustainable management of fisheries.

24. Regarding other potential negative environmental impacts of the Project works, the establishment and operation of the construction staging areas and storage facilities and the usage and maintenance of equipment could result in contamination of water or soil through oil or lubricant spillage. Construction camps constitute a point source for liquid and solid waste, both domestic and industrial (organic matter, plastics, paper, glass and oils, fuel spill, etc.) that requires adequate management. The movement of workers and equipment (excavators, dredges, etc.) can also alter economic activities related to seedtime and harvests, cattle mobilization, etc. or affect terrestrial riparian vegetation. Further, airborne contamination (i.e., noise, gases and dust), compaction of the ground, and increase of suspended solids in the water with the consequent increase of turbidity and modifications in the aquatic ecosystem will be generated through the use of the excavation and dredging equipment, construction of the *recintos*, bridges, and associated works. Further risks to be managed relate to labor and community safety, the latter mainly due to temporary

[54] 24 km^2 is a preliminary figure that will be revised after the completion of the detailed design of the *recintos*.

modifications on circulation of traffic. These impacts will be temporary and prevented or minimized by proper mitigation measures regulated by the corresponding programs of the ESMP, the fulfillment of which being mandatory for the contractor. All these impacts will be localized, temporary, and fully mitigable.

25. This ESIA also identified and assessed social impacts, which are predominantly positive (improvements to roads and related infrastructure with the consequent change in productivity and regional economy, generation of employment due to the demand of labor and generation of induced economic activities, etc.). On the other hand, the negative social impacts that were identified, such as the temporary modifications of roadways and bridges due to the works, are limited to the construction phase, temporary and mitigable. The related mitigation measures have been included in the ESMP for the works, which is mandatory for the DPOH and the contractor. The ESIA also incorporates a section with recommendations for the Water Resources Management Plan for the SRB financed under Component 1. Among them, a study is planned on implementation of measures that increase the number of registered users and to improve the efficacy of payment instruments. This study will take into account potential negative impacts on poor households and the available tools to address them (existing regulations and potential new regulations could be proposed, etc.).

26. Separate ESIAs and ESMPs will be prepared as described in the Project ESIA for the complementary works to be financed under Component 2 including seven bridges, access roads and works in two recreational beach areas, *balnearios*, in the Municipality of Roque Perez (a new area) and Villanueva (improvement of an existing area).

Environmental and Social Management Plan

27. The Environmental and Social Management Plan (ESMP) included in the ESIA, prepared for the Project works at the preliminary design level, includes a set of institutional and mitigation measures and monitoring targets to: (i) prevent and mitigate adverse environmental and social impacts; and (ii) improve and strengthen environmental monitoring, water quality control, and wetlands management.

28. The ESMP activities include environmental and social management programs for both the construction and operation and maintenance phases. The ESMP (i) lists the environmental and geomorphological criteria for the design of the works to prevent and reduce potential adverse environmental and social impacts; and (ii) presents the required management programs and mitigation measures for the works, which are mandatory for the DPOH and the contractor. Some of the proposed measures aim at adding value to the works' overall performance and reducing its overall costs through minimization of unexpected events, prevention of conflicts as well as a promotion of actions within a wider framework of regional development at the basin level. All these work-level programs and measures will be complemented by a set of activities to be undertaken under the Salado River Basin (SRB) Environmental and Wetlands Management Plan (Sub-component 1.2 of the Project). Implementing this basin-level plan will contribute to identify, monitor, mitigate, and reverse potential cumulative and induced impacts generated through the global river training works on quality of water, fishery and other recreational activities, and the health of the wetlands. It will also address potential social impacts. The plan will be prepared through an inter-institutional and participatory process that includes consultations with local and regional actors on its scope and content. Based on this body of analysis and associated recommendations, this basin-level plan aims at strengthening the capacity for managing the interaction between water resources and other aspects of the environment of

the three principal provincial authorities with responsibilities in this regard (ADA, DPOH, and OPDS).

29. Specifically, the ESIA/ESMP contains detailed information on (i) the institutional framework and general guidelines for environmental and social management of the works; (ii) the measures proposed to prevent and mitigate adverse impacts of both the river training and complementary works; (iii) the applicable monitoring plans; (iv) the respective programming and costs; and (v) the basic guidelines for the development of the SRB Environmental and Wetlands Management Plan. An important environmental aspect of the final design of the Project works implies the hiring of local ornithologists to carry out a specific field-monitoring program on the presence of valuable bird species. The monitoring is planned both in the Project's direct area of influence and upstream of the works to obtain a detailed baseline in both areas prior to the start of the works and to monitor the situation during and after construction. This monitoring is planned for several years to allow the comparison of the monitoring results in the two areas. This will not only serve to guide the environmental management of the Project works, but it will also be a key input for the SRB Environmental and Wetlands Management Plan. Table 2 summarizes the rest of the ESMP measures for the construction and operation phases as well as the responsible institutions.

Table 2: Summary of the Key ESMP Measures during Construction and Operation of the Project's Works

Work Phase	**Measure**	**Responsible**
CONSTRUCTION		
Prior to initiating the works	- Prepare a detailed ESMP at the level of the final design of the works within 90 days of signing of the contract for review and no-objection by the World Bank The above will include, among others, the following key actions: - Process the necessary permits and authorizations and confirm all necessary institutional arrangements for the proper implementation of the final ESMP - Define the location of the *recintos*, final disposal sites for the excavated material, applying the eligibility criteria included in the ESIA - Make agreements with affected land owners following the Voluntary Agreements Protocol - Plan necessary soil movements - Define areas needed to enable and conduct the works - Define personnel responsible for ESMP implementation and supervision - Implement the communication activities within the affected communities - Design and implement a training program for the contractor's personnel to ensure adequate ESMP implementation	Contractor with support and supervision by DPOH and correspondin g TA

During the construction phase	- Secure efficient implementation of the Worker and Community Health and Safety Program aimed first and foremost at preventing any type of accidents - Minimize disruptions of activities in the Project's direct area of influence - Minimize impacts on flora and fauna - Minimize potential contamination - Prevent or minimize negative effects on any chance finds of physical cultural resources - Implement the communication activities within the affected communities, including the grievance redress mechanism - Prepare monthly reports on implementation of the ESMP; DPOH will compile and submit quarterly progress reports to the World Bank	Contractor with support and supervision by DPOH and corresponding TA
After works finalization	- Contractor will prepare a final report on the ESMP implementation - DPOH and the specialized firm will conduct a final environmental inspection on the Project's direct area of influence - Contractor will repair any identified environmental liability caused by the works, as well as any damage caused to the original infrastructure - DPOH will offset any damage caused to any remnant of natural habitat in the Project's direct area of influence; the applicable offset measure(s) will be defined in coordination with the preparation of the SRB Environmental and Wetlands Management Plan and be subject to WB no-objection	Contractor and DPOH with corresponding TA
OPERATION		
Operation and functioning	- Maintain the main river channel, bridges, and complementary works - Implement the Environmental Monitoring Program - Implement the SRB Environmental and Wetlands Management Plan	DPOH and ADA

30. The principal ESMP programs for the river training works will be adjusted or complemented with additional programs based on the respective monitoring results or other management procedures that will be considered necessary to include during Project implementation. The contractor will be responsible for preparing and presenting to the DPOH a detailed version of the ESMP based on the final design of the works within 90 days of signing of the contract. The ESMP will need to include at least the following programs:

1. Social, economic and cultural program

1.1 Voluntary Agreements Protocol with landowners

1.2 Sub-program for social communication
1.3 Sub-program for addressing grievances
1.4 Sub-program for monitoring of the temporary transit systems during the preparation and construction of the works
1.5 Sub-program for attenuation of disruptions to public services and infrastructure
1.6 Sub-program for physical cultural resources

2. Environmental programs

2.1 Sub-program for soil management and vegetation of the *recintos*
2.2 Sub-program for management and disposal of waste (domiciliary, construction, hazardous) and effluents (sewage, sanitary, fuels, lubricants, and hydraulic fluids)
2.3 Sub-program for surface and underground water quality
2.4 Sub-program for air quality to prevent noise, particulate material, gases and vapors
2.5 Sub-program for management of fauna and flora

3. Other programs that the contractor must prepare and implement

3.1 Worker and community health and safety program, including first aid training, personal protection, and fire management
3.3 Environmental and social training program
3.3 Management of contingencies/emergencies that include, among others, control of fuel spills, fire control, flood management, alert system, dissemination and training, and a related manual
3.4 Environmental monitoring program

31. The estimated cost of implementing the ESMP of the Project works during the construction phase, including initial actions and actual execution, totals US$320,000. Regarding the key content of the SRB Environmental and Wetlands Management Plan, see Annex 1.

Public Participation

32. During the development of the PMI and, most recently, regarding the proposed works on the Salado River, there have been different participation instances that allowed the inclusion of community concerns to the global project. In the case of the PMI, the results of the interaction with representatives of the academic sector and nongovernmental organizations (NGO) relevant to the basin informed the formulation of the river training works. As far as works of the second leg of section IV, IV-1-B, a public meeting organized by the Provincial Ministry of Infrastructure was carried out on September 27, 2016, in the City of Roque Perez, PBA. In the meeting, the community was informed about the characteristics of the works. The concerns and questions of the participants were received, responded, and, when feasible – as was the case of the proposals for the works of two recreational beaches in the area, or the interest in potential chance finds of physical cultural resources – these items were incorporated in the Project. An advanced draft of the ESIA report was disclosed in-country and at the World Bank external website on December 7, 2016. It was consulted online from December 15, 2016, to January 12, 2017, including offering opportunity for face-to-face discussion at the DES office from January 10 to 12, 2017. This consultation did not yield any questions or considerations. The final ESIA report was disclosed in country on February 15, and on the World Bank website on February

21, 2017, prior to Project appraisal. Finally, in order to allow for the continuation of community participation during the different stages of the Project, the ESMP foresees communication actions for each stage of the works, and includes a Communication Program and a Grievance Redress Mechanism.

33. Regarding the activities under Component 1, their design will incorporate different levels of participation (e.g. inter-institutional cooperation) and aims to strengthen the participative nature of the overall basin management through Subcomponent 1.3. on Improving Water Governance, including a basin-wide commission and nine sub-basin committees. These participatory processes will incorporate a gender approach to ensure women are adequately represented and a GRM. The design of the works in the *balnearios* and, as appropriate, the upgrading of the seven bridges will ensure universal accessibility as per applicable law (Law 22431, *Sistema integral de protección de discapacitados*, Provincial Law 10.592, and other applicable provincial and municipal regulations).

ANNEX 7: WORLD BANK SECTORAL EXPERIENCE IN ARGENTINA

COUNTRY: Argentina
Salado Integrated River Basin Management Support Project

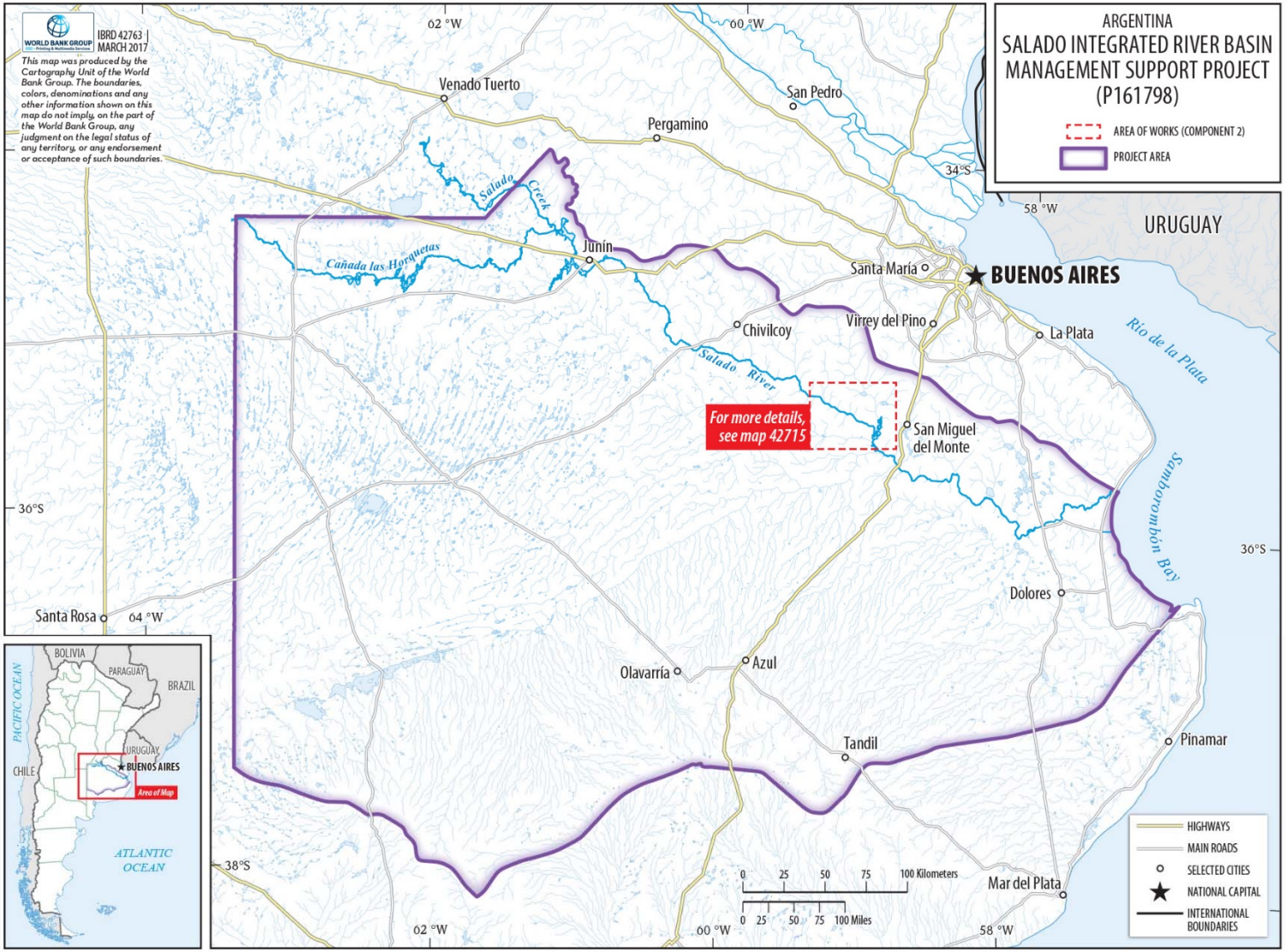
	Early Support (1992–2004)	Strengthening (2005–2016)
Financial Services	**AR-3521 - Flood Rehabilitation Project (PREI) (P006051):** Response to damages from severe floods caused by the 1991/92 El Niño (ENOS). 1993–1998. Prepare the urban flood prevention project in the littoral provinces. US$170 million. Closed. **AR-4117 - Flood Protection Project (PPI) (P006052):** Implement part of the Basin wide strategy for the littoral provinces. Prepare the Hydraulic Master Plan for the city of Buenos Aires and the Salado River PMI. 1997–2006. US$320 million. Closed. **AR-4273 - El Nino Emergency Flood Project (P055935):** Mitigate impacts in the northwestern, Cuyo, and littoral provinces; strengthen institutions to deal with flood hazards. 1998–2004. US$42 million. Closed.	**AR-7289 - APL1-Urban Flood Prevention and Drainage Project APL1 (P088220):** Increase Buenos Aires' resilience through structural and nonstructural measures and design and construction of a new drainage system in Arroyo Maldonado watershed. 2005–2012. US$134 million. Closed. **AR-7382 - APL2-Urban Flood Prevention and Drainage Project APL2 (PIDU) (P093491):** Reduction of exposure to flood hazards in the littoral provinces. 2008. US$70 million. Closed. **AR-8026 - Flood Risk Management Support Project for the Autonomous City of Buenos Aires (P145686):** Strengthen the City's capacity to manage flood in Cildañez, Maldonado and Vega Basins. 2016. US$200 million. Active
Knowledge Services		**AR-TA - Disaster Risk Management (P130674):** Assessment of the National Civil Protection System. 2012–2013. US$175,000. Closed. **AR-TA - Agglomeration Economies and Resilience (P153198):** improve understanding of urban agglomerations and **s**trengthen capacity to formulate policies and implement programs that improve the performance of urban agglomerations. One pillar is risk management. 2015-2016. Closed

ANNEX 8: PROJECT MAPS

COUNTRY: Argentina
Salado Integrated River Basin Management Support Project

Map 1: Location of the Project Area

Map 2: Project Area



Map 3. Area of Influence of the River Training Works