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IMPLEMENTATION COMPLETION AND RESULTS REPORT

TF015041

ON A

SMALL GRANT

IN THE AMOUNT OF US\$3.96 MILLION

TO THE

ARGENTINE REPUBLIC

FOR

ADAPTATION FUND: INCREASING CLIMATE RESILIENCE & ENHANCING SUSTAINABLE LAND
MANAGEMENT IN THE SOUTHWEST OF THE BUENOS AIRES PROVINCE
(P125804)

March 31, 2020

Environment, Natural Resources, and the Blue Economy Global Practice
Latin America And Caribbean Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective: July 22, 2013 / Sep 30, 2019)

Currency Unit = Argentine Peso (ARS)

5.41 ARS = US\$1 (at Appraisal)

64.1 ARS = US\$15.41 (at Completion)

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AF	Adaptation Fund
AGN	Argentine Supreme Audit Institution (<i>Auditoría General de la Nación</i>)
CERZOS	Center of Renewable Natural Resources in Semiarid Zones (<i>Centro de Recursos Naturales Renovables de la Zona Semiárida</i>)
CONICET	National Center of Scientific and Technical Research (<i>Consejo Nacional de Investigaciones Científicas y Técnicas</i>)
CORFO	Development Corporation of the Colorado River in Bonaerense Valley
CPS	Country Partnership Strategy
EIRR	Economic Internal Rate of Return
ESMF	Environmental and Social Management Framework
FAO	Food and Agricultural Organization
FM	Financial Management
GEF	Global Environment Facility
GIA	Geographic intervention Area
GIRSAR	Integrated Risk Management in the Rural Agroindustrial System
GoA	Government of Argentina
ICR	Implementation Completion and Results Report
IEWS	Information and Early Warning System
ILO	International Labour Organization
INTA	National Institute of Agricultural Technology (<i>Instituto Nacional de Tecnología Agropecuaria</i>)
ISR	Implementation Status and Results Report
LADA	Land Degradation Assessment in Dryland
M&E	Monitoring and Evaluation
MAI	Ministry of Agroindustry of the Province of Buenos Aires
MAyDS	Ministry of Environment and Sustainable Development (<i>Ministerio de Ambiente y Desarrollo Sostenible</i>)
MAGyP	National Ministry of Agriculture, Livestock, and Fisheries (<i>Ministerio de Agricultura, Ganadería y Pesca</i>)

MSD	Ministry of Social Development
MTR	Midterm Review
NDC	Nationally Determined Contribution
NDVI	Normalized Difference Vegetation Index
NPV	Net Present Value
ONDTyD	National Observatory on Land Degradation and Desertification (<i>Observatorio Nacional de la Degradación de Tierras y Desertificación</i>)
OPDS	Provincial Sustainable Development Agency (<i>Organismo Provincial para el Desarrollo Sostenible</i>)
PAD	Project Appraisal Document
PDSO	Development Plan of the Southwest of Buenos Aires Province (<i>Plan de Desarrollo del Sudoeste Bonaerense</i>)
PIU	Project Implementation Unit
PROSAP	Provincial Agricultural Services Program
PP	Project Paper
PT	Project Team
RF	Results Framework
SIS	Specific Intervention Site
SLM	Sustainable Land Management
SNC	Second National Communication
SMN	National Meteorological Service (<i>Servicio Meteorológico Nacional</i>)
SWBA	Southwest of the Buenos Aires Province
ToC	Theory of Change
TNC	The Nature Conservancy
TTL	Task Team Leader
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
UNS	National Southern University (<i>Universidad Nacional del Sur</i>)

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P125804	Adaptation Fund: Increasing Climate Resilience & Enhancing Sustainable Land Management in the Southwest of the Buenos Aires Province
Country	Financing Instrument
Argentina	Investment Project Financing
Original EA Category	Revised EA Category
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
The Argentine Republic, Ministry of Treasury	Ministry of Environment and Sustainable Development

Project Development Objective (PDO)

Original PDO

The PDO is to contribute to reducing climate and man-made vulnerability of the agroecosystems in the Southwest of the Buenos Aires Province by increasing adaptive capacity of key local institutions and actors and piloting and disseminating climate resilient and sustainable land management practices.

**FINANCING**

	Original Amount (US\$)	Revised Amount (US\$)	Actual Disbursed (US\$)
Donor Financing			
TF-15041	3,960,200	3,960,200	3,889,341
Total	3,960,200	3,960,200	3,889,341
Total Project Cost	3,960,200	3,960,200	3,889,341

KEY DATES

Approval	Effectiveness	Original Closing	Actual Closing
20-Sep-2013	27-May-2014	30-Dec-2018	30-Sep-2019

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US\$M)	Key Revisions
23-Jan-2018	1.97	Reallocation between Disbursement Categories
19-Dec-2018	3.49	Change in Results Framework Change in Loan Closing Date(s) Change in Procurement Change in Implementation Schedule

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Satisfactory	Satisfactory	Modest

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)
01	04-Jan-2014	Moderately Satisfactory	Moderately Satisfactory	0.00
02	16-Aug-2014	Moderately Satisfactory	Moderately Satisfactory	0.00



03	31-Aug-2015	Moderately Satisfactory	Moderately Satisfactory	0.50
04	13-Jun-2016	Moderately Unsatisfactory	Moderately Unsatisfactory	0.50
05	10-Feb-2017	Moderately Satisfactory	Moderately Satisfactory	1.16
06	17-May-2018	Satisfactory	Satisfactory	2.81
07	19-Dec-2018	Satisfactory	Satisfactory	3.49
08	29-Sep-2019	Satisfactory	Satisfactory	3.89

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. **At project appraisal, Argentina faced high vulnerability to climate change impacts with increased risks for land degradation and desertification.** According to the Second National Communication (SNC 2007) to the United Nations Framework Convention on Climate Change (UNFCCC), Argentina was to face increases in mean and extreme temperatures and changing precipitation patterns. Temperature increases were to have negative effects on several natural systems, including retreat of glaciers and higher evapotranspiration in most areas. Increments in maximum temperatures, accompanied by a concentration of the rainfall regime, were projected in the north and central parts of the country. The mean rainfall levels were expected to stay at prevailing levels, but higher temperatures were to intensify aridity. Climate-induced events with the greatest impact on land were to include (a) flooding and wind erosion from intense storm events damaging crops, cattle, and agricultural soils and (b) irregular rainfall leading to cyclic droughts and floods. Natural hazards were of critical concern, as 58 percent of all economic losses over the last 50 years resulted from increasing hydrometeorological hazards like floods and droughts.¹ The combination of severe weather changes from El Niño Southern Oscillation and climate change were projected to lead to further droughts, land degradation, and desertification in already affected areas. The country's combined vulnerability and readiness ranking Index is 69 out of 181 ranked countries.¹

2. **Agroecosystems were and continue to be highly susceptible to climate change with direct impacts on agricultural activities.** Agriculture is a key pillar of the Argentina's economy as 80 percent of the national territory is occupied by agricultural, livestock, and forestry activities. Tight integration in international markets, geographical features, and agroecological circumstances expose the Argentine agricultural sector to a wide array of macro-policy, price fluctuations, and production risks, including those from climate change. Over the past century, significant agricultural intensification has taken place with limited consideration to environmental sustainability. This has increased aridity and intensified desertification processes in arid, semiarid, and sub-humid dry zones (MAyDS 2017). Agricultural systems in these areas have lost their natural resilience and adaptive capacity. The extreme droughts in the mid-2000s devastated livestock production in these zones. Cattle production was reduced by 15 percent from 58.7 million in 2007 to 49.9 million in 2012.¹

3. **Both agricultural livelihoods and related climate threats are significant in the Buenos Aires Province.** The population of the Southwest of the Buenos Aires Province (SWBA)² is highly dependent on small- and medium-scale agriculture and cattle ranching. The region is characterized by a semiarid climate and marginal lands with biophysically fragile soil. Soils have been subject to unsustainable land management practices and are highly vulnerable to eolic erosion, droughts, dust plumes, salinization of irrigated areas, and significant damage and loss of natural climate resilience. These phenomena have led

¹ Based on the Notre Dame Global Adaptation Initiative (ND-GAIN) in the Project Appraisal Document (PAD) of Argentina Integrated Risk Management in the Rural Agroindustrial System (GIRSAR) Project (P162316), May 2018.

² The SWBA occupies a territory the size of Lithuania and has around 550,000 inhabitants. The project targeted Municipalities of Villarino, Puan and Patagones that comprise an area bigger than Belgium and has a population of around 80,000 inhabitants.



to mass abandonment of productive establishments and migration of rural population and particularly women to urban centers. The SWBA was affected severely during the 2009 drought, highlighting the fragility of the agroecosystems and its need to adapt to more frequent and intense episodes of climate variability.

4. **Farmers in the SWBA had tried diverse coping strategies in response to worsening climate conditions but in most cases, they did not enhance but rather decreased resiliency of the agroecosystems.** The lack of an adequate political, social, and economic framework was a key limiting factor in supporting identification and adoption of appropriate climate strategies. Climate-related information was also scarce to guide local decision making. Although some agencies, for example, the National Institute of Agricultural Technology (*Instituto Nacional de Tecnología Agropecuaria*, INTA), National Southern University (*Universidad Nacional del Sur*, UNS), and Agricultural Risk Office, at the national level carried out isolated activities, there was no specific, coordinated system at the subregional level to assess desertification dynamics considering climate change. It was also clear that convincing farmers to change their productive practices is not easy and requires technical validation of improved practices to eventually socialize them.

5. **Rationale for World Bank support.** The World Bank had been deeply engaged in various aspects of the climate change agenda in Latin America for years. In Argentina, it supported the Government of Argentina (GoA) in the preparation of the Second National Communication (SNC) (P078143) and the Third National Communication) (P116974) to the UNFCCC.³ Regarding agriculture, the portfolio in Argentina included the Provincial Agricultural Services Program (PROSAP I and II, P102316 and P106684) supporting irrigated agriculture linked to emerging climate change concerns. In Uruguay, the World Bank was implementing a related project titled Sustainable Management of Natural Resources and Climate Change (P124181), which promoted adoption of improved, environmentally sustainable, and ‘climate-smart’ agricultural and livestock practices. On the other hand, for the World Bank, the project was the first pilot financed by the Adaptation Fund (AF), while adaptation investments were globally still at their early stage of implementation. Given the political and macroeconomic situation in Argentina, until the Country Partnership Strategy (CPS) FY15–FY18⁴, was approved by the World Bank Board, grant operations approved by the Regional Vice President were the only operations that the World Bank was able to prepare for Argentina. The AF grant allowed the World Bank to maintain dialogue and continue collaboration with the GoA on the climate and environment agenda closely linked with the agriculture sector.

6. **The project was aligned with the higher-level objective on sustained growth of the CPS** titled ‘rural development and the environment with a focus on promoting agricultural growth, reducing rural poverty, and improving environmental management’ as defined in the CPS FY10–12⁵, discussed by the Executive Directors on June 9, 2009, and its Progress Report discussed in March 2011.

7. **Higher level objective: Climate change adaptation and mitigation along with conservation of natural resources were and remain important pillars of the GoA.** At appraisal, several national sector programs were aligned to the project objective: for example, the National Climate Change Strategy,

³ The World Bank was the Global Environment Facility (GEF) implementing agency. The SNC was prepared in 2008 and the Third National Communication was under preparation at the time of project appraisal.

⁴ Report No. 81361-AR

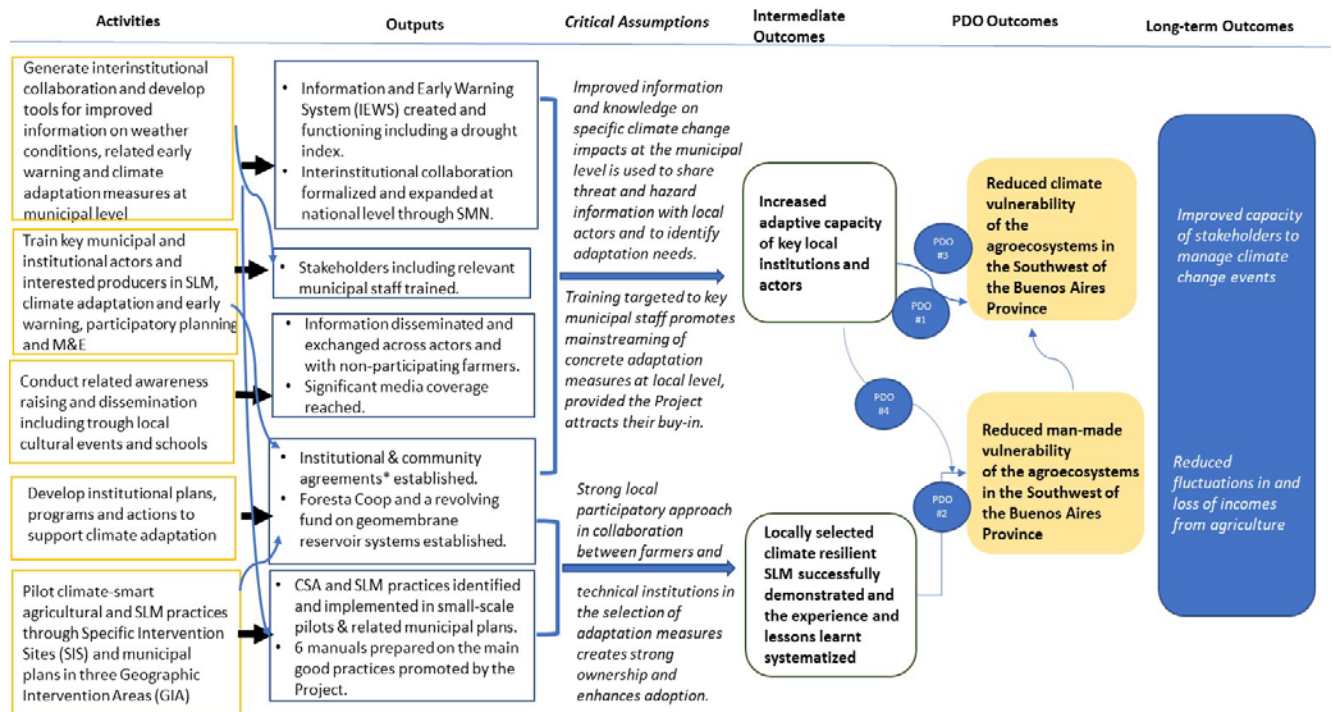
⁵ Report No. 48476-AR



National Action Program to Combat Desertification, and National Strategic Food Plan under the Ministry of Agroindustry that aimed to promote sustainable production systems, particularly in degraded areas. At the provincial level, the Provincial Sustainable Development Agency (OPDS) was operating various related activities. The Development Plan of the Southwest of Buenos Aires Province (PDSO) specifically aimed to support farmers improve sustainable land management (SLM). These initiatives provided an important framework to identify and develop multi-benefit programs and measures that integrate synergies to climate adaptation.

8. **Theory of Change (ToC); results chain.** Because a diagrammatic ToC was not required in the PAD⁶, a ToC (figure 1) was retroactively constructed for the Implementation Completion and Results Report (ICR) based on appraisal information. Two core issues underline the ToC (annex 7, figure 7.1): (a) the SWBA agroecosystems have suffered significant functional damage due to unsustainable agricultural intensification and overgrazing and (b) the SWBA also experiences extreme oscillations between wet and dry periods that are becoming more extreme and recurrent. The project proposed to address these two issues by building capacity, education, and meteorological monitoring activities along with demonstrative pilots on more sustainable livelihoods to assist communities to better cope with climate variability and change and to find concrete activities to help slow down or even halt the ongoing environmental and socioeconomic deterioration trends in the region.

Figure 1. ToC Constructed for the ICR from Documents at Appraisal



*on sustainable forage production, conservation of native pastures and reforestation with native species

⁶ Project Paper (PP) in the case of small recipient-executed trust funds such as the project.



Project Development Objectives (PDOs)

9. The PDO as stated in the PP was “contribute to reduce climate and man-made vulnerability of the agroecosystems in the Southwest of the Recipient’s Buenos Aires Province by increasing adaptive capacity of key local institutions and actors and piloting and disseminating climate resilient and sustainable land management practices.”

Key Expected Outcomes and Outcome Indicators

10. The key expected outcomes as stated by the PDO were to (a) improve adaptive capacity of key local institutions and actors through the generation of climate information, knowledge, capacity building and establishment of adequate political, social, and economic framework to support adaptation efforts (Components 1, 3, and 4) and (b) enhance the climate resiliency of agroecosystems by bolstering and fine-tuning adaptation measures identified and chosen through participatory process and their dissemination to nonparticipating farmers within the SWBA (Component 2).

11. **The key outcome indicators⁷** were (a) number of targeted institutions that reflect institution-specific adaptation needs in their budget allocations to increase their capacity to address climate-related challenges (PDO #1), (b) number of productive agroecosystems in the pilot sites maintained or improved to withstand conditions resulting from climate variability and change (PDO #2), and (c) relevant threat and hazard information generated and disseminated to farmers and other stakeholders on a timely basis (PDO #3). All three are core AF indicators, considering that the information and early warning system (IEWS) was the proposed measure for the latter.

12. **The PDO technically consists of PDO text up to ‘by’: reduce climate and man-made vulnerability in agroecosystems in the SWBA**—for which PDO #1 and PDO #3 are proxies for building adaptive capacity of key local institutions and actors; PDO #2 and PDO #4, added after the midterm review (MTR) (see paragraph 18), are proxies for reducing man-made vulnerability from piloted and disseminated SLM practices that also contribute to increase climate adaptability.

13. At appraisal, potential beneficiaries were defined as 5,075 producers engaged in small- and medium- size agricultural-cattle production in dry lands in the project’s direct intervention zone in the Municipalities of Puan, Villarino, and Patagones, and the indirect intervention zone in nine other SWBA municipalities, representing 65 percent of the farms in the SWBA. Four local technical institutions implementing the specific intervention sites (SISs) were also beneficiaries of the project: INTA managed 8 SISs, while UNS; Center of Renewable Natural Resources in Semiarid Zones (*Centro de Recursos Naturales Renovables de la Zona Semiárida*, CERZOS); National Center of Scientific and Technical Research (*Consejo Nacional de Investigaciones Científicas y Técnicas*, CONICET); and Carlos Spegazzini Agrarian School each managed 1 SIS. The three directly targeted municipalities benefited directly from key capacity-building and institutional strengthening measures proposed by the project. Other beneficiary institutions included the OPDS; National Meteorological Services (*Servicio Meteorológico Nacional*, SMN); Ministry of Social Development (MSD); National Roads Agency; and the Development Corporation of the Colorado River in

⁷ The Grant Agreement only included the PDO without the outcome indicators.



Bonaerense Valley (CORFO). The Buenos Aires provincial government and the National Ministry of Agroindustry also benefited more indirectly from the project.

Components

14. **Component 1: Reducing Institutional and Community-level Vulnerability** (AF contribution US\$1.026 million⁸) sought to improve the response and planning capacity of local institutions and communities by promoting people's engagement in data collection and analysis from interinstitutional to household level. It aimed to develop institutional tools to promote climate resilience and create an IEWS for climate change and desertification for the SWBA in cooperation with the relevant technical institutions together with promoting behavioral changes between the targeted sociocultural and productive ecosystems.

15. **Component 2: Implementing Adaptation Measures in Productive Agroecosystems** (AF contribution US\$2.291 million) aimed to pilot climate-smart adaptation interventions in 11 SISs in three different Geographic Intervention Areas (GIA) within the targeted municipalities: arid, semiarid, and irrigated GIA. The SISs were led by technical institutions (paragraph 13). During preparation, a set of potential climate adaptation measures suitable to the biophysical conditions of the local productive environment and expectations of farmers were initially assessed and collated by the INTA Ascasubi.⁹ The final selection of the specific measures to be piloted in each SIS was planned and conducted through a participatory approach during project implementation.

16. **Component 3: Applying a Participatory Approach to Knowledge Management and Monitoring and Evaluation** (AF contribution US\$0.140 million) aimed to build the capacity of targeted farmers and partner organizations in project monitoring, adaptive management, and dissemination of lessons learned to create public awareness and ownership of the project. People were to be trained and provided with proper tools to participate in developing and tailoring local and even farm/household-specific adaptation strategies. As applicable/relevant, all activities were to contemplate a gender-sensitive approach to adaptation.

17. **Component 4: Developing a Sustainability Strategy** (AF contribution US\$0.194 million) aimed to establish the necessary institutional- and community-level agreements for the piloted measures to be sustained beyond project closure. It contemplated both regulatory and material needs to create an institutional and policy framework to support continuation of key activities by relevant stakeholders as well as a commitment to continue with a dissemination strategy. Continued financing to scale up successful initiatives was to be sought through institutional arrangements that would enable linking the measures to the PDSO, adopted pursuant to provincial law 13647/2007.

⁸ The original amounts for Components 1–4 are earmarked, leaving aside US\$0.110 million of unallocated funds and US\$0.198 million allocated for project execution.

⁹ The technical priorities were (a) developing agriculture in soils with a minimum suitability using adept cultivation methods; (b) increasing the area with permanent pastures; (c) stimulating alternatives contributing nitrogen to the soil such as vetch and alfalfa; and (d) applying no-tillage agriculture according to local needs, considering edaphic-climatic characteristics.



B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

18. Revised PDOs and outcome targets. The PDO was not revised, but the outcome indicators together with the overall Results Framework (RF) were revised and adjusted according to the recommendations made at midterm to improve the quality of the RF and direct project efforts more strategically. The resulting RF restructuring does not trigger a split rating as the revised indicators did not present substantive changes in the scope of the project, as agreed by the AF Secretariat. The main revised actions in the RF are summarized in table 1.

Table 1. Revised Actions in the RF

Indicator	Action According to MTR Recommendations
<i>PDO #1: No. of targeted institutions that the Project has prompted to attend adaptation needs in their structures, human resources composition, work programs etc. to increase their capacity to address climate-related challenges</i>	Revised: The indicator write-up was amplified from the original formulation that only referred to budgets to incorporate other data sources to measure institutional buy-in, given budget allocations are not always reflected in the necessary level of detail to allow direct association to individual actions or programs.
<i>PDO #4: No. of beneficiaries who have adopted an improved agricultural technology promoted by the Project</i>	New/Revised: Upgraded from intermediate level to PDO level and (a) adjusted to ‘number of farmers adopting improved agricultural technology’; (b) upgraded to outcome level, and the target was revised down from 1,400 to 408 to measure the actual farmers participating in the SIS instead of beneficiaries considering an average four-person family; and (c) the measurability of ‘adoption’ was clarified to be a process involving four stages: commitment, implementation, management and evaluation, and adoption (refer to MTR for more details). Given the limited implementation period, it was recognized that monitoring would only be feasible in terms of the two first stages, the results of which will allow to see a trend toward long-term adoption of the promoted technologies.
<i>Intermediate Results Indicator for Component 1: Relevant threat and hazard information generated and disseminated to farmers and other stakeholders on a timely basis</i>	Revised: The focus of the indicator was clarified to be on monitoring proper functioning of the interinstitutional IEWS, yet many other project activities equally contribute to timely generation and dissemination of relevant threat and hazard information.
<i>Intermediate Results Indicator for Component 2: Selected biophysical, social or economic attributes in the pilot sites improved to withstand conditions resulting from climate variability</i> See the two selected biophysical, social, or economic attributes by SIS in the indicator comment in annex 1.	New: The scope of the new indicator was geared to monitor the effect of the piloted practices in the 11 SISs based on verifiable field observations to reinforce monitoring of Outcome 2 using a similar indicator with a proxy index. Both indexes apply a similar method of calculation, where each SIS can present a value of 0, 1, or 2 that are summed up. The maximum value for the 11 SISs is 22, and the target for the intermediate outcome indicator was set at 18.
<i>Output indicator 1.1.3: Regional consultative observatory of public policies on climate</i>	Dropped: Dropped to allow the project to concentrate available human and other resources in further developing and



Indicator	Action According to MTR Recommendations
<i>change and desertification</i>	strengthening the IEWS that was considered to provide the key functions envisioned for the observatory instead of trying to establish a similar network structure that the implied actors were not demanding in the field.
<i>Output indicator 1.2.2: Teacher training program for environmental education</i>	Dropped: Dropped as it was too far reaching and not cost efficient in terms of the long administrative process it would have taken to officially introduce new content in the public teacher training program.

19. **Restructuring.** The project had two Level 2 restructurings. The first one on January 23, 2018, was for (a) reallocation between disbursement categories and (b) change in disbursement estimates, and the second on December 19, 2018, was for changes in (a) RF; (b) grant closing date (from December 31, 2018, to September 30, 2019); (c) disbursement estimates; (d) overall risk rating; (e) procurement; and (f) implementation schedule.

Rationale for Changes and Their Implication for the Original Theory of Change

- The ToC was strengthened but this did not affect its logic.** Indicators were mapped against the expected project outcomes to effectively monitor and present achievement of the PDO. A minor-scale revision of the RF reduced the number of indicators, improved their SMARTness,¹⁰ and strengthened the logical results chain from outputs to intermediate and PDO outcomes. Two output indicators were dropped to consolidate the project efforts on higher efficiency of the results and focus them on farmers as the primary target group (paragraph 18).
- Upgrades and dissemination needs.** Reallocation of funds between disbursement categories was necessary to cover the cost of (a) upgrading the IEWS with three main components: (i) real-time monitoring of the beginning and geographical extent of drought through climatic and satellite data and indexes, (ii) forecasts of the possible temporal evolution of drought, and (iii) participatory design of plans and actions for the issuance of early warnings destined to sectors affected by drought to allow managing the related risks and mitigating the main impacts and (b) systematization and dissemination of the pilot experiences.
- Project extension served various purposes.** A nine-month extension of the grant closing date was necessary to allow the GoA to consolidate results in the field, systematize and disseminate project results and key lessons learned, and strengthen long-term sustainability of the main project results.
- Respond to institutional changes.** The central role originally envisaged for the OPDS at the local level never materialized for varied reasons and the project team (PT) within the current

¹⁰ 'SMART' refers to 'specific, measurable, achievable, relevant, and time-bound'.



Ministry of Environment and Sustainable Development (MAyDS)¹¹ needed to assume the responsibility for working with the targeted municipal governments.

- **Accommodate corporate changes in procurement** to use the Procurement Regulations for IPF Borrowers of July 2016, revised in August 2018.¹²

II. OUTCOME

A. RELEVANCE OF PDOs

20. **Assessment of relevance of PDO and ratings.** The PDO maintained High relevance to the World Bank CPS objectives and national development and environmental agenda throughout implementation. It was particularly relevant to Argentina’s climate change-related policy, institutional framework, and global commitments.

- **At project closing, the PDO was aligned with the World Bank Group CPS for FY19–22¹³** particularly with Focus Area 3, “supporting Argentina achieve its Nationally Determined Contribution (NDC) by reducing vulnerability to climate change and mitigating the country’s global environmental footprint.” The PDO was well aligned with the CPS Objective 9: climate-smart agriculture in the agricultural sector (pages 31–32).
- **During implementation, the PDO was congruent with Pillar 3 of the CPS FY15–FY18 “raising agricultural productivity of small- and medium-size farms in low income regions,”** underpinning the need for adaptation to climate change. Emerging evidence on more intense and frequent extreme weather patterns indicated a likelihood of reduction of crop and livestock yields. The CPS thus indicated (page 39) that explicit criteria in favor of climate-smart agriculture should be considered and was to drive the respective allocation of IBRD resources.
- **The PDO remained aligned to Argentina’s climate change program in the agricultural sector.** The most important sectoral initiative on adaptation is the National Agro and Climate Change Action Plan (2019) aimed at increasing resilience and reducing vulnerability of production systems, improving climate risk management in the sector, and promoting access to information and knowledge management. Further, the Agricultural Emergency Program approached transition into ex ante integrated risk management systems based on a more holistic approach including training, strengthening of information systems, and investing on risk reduction through adopting of climate-smart agricultural technologies and practices, among others. The World Bank GIRSAR Project (P162316) of US\$150 million,¹⁴ approved in May 2018, is an indication of the sector’s commitment to tackle climate risks in integral

¹¹ Prior Secretariat of Environment and Sustainable Development (SAyDS).

¹² Replacing the former Procurement and Consultant Guidelines of January 2011.

¹³ Report No. 131971–AR

¹⁴ The World Bank loan is US\$150 million, while the total project is estimated at US\$187.5 million.



terms, to which the project was able to contribute its relevant experience and lessons learned, particularly on the IEWS.

- **Argentina’s international commitments have consistently supported the PDO.** Argentina became one of the first countries to ratify the Paris Agreement under the UNFCCC, and the NDCs recognize the impacts of climate change on its economy, particularly in the agricultural sector. Promoting the adoption of climate-smart practices by farmers and protecting agricultural production are key pillars for reducing climate impacts in the country’s rural and general economy. Further, the MAyDS reported part of the project activities within the national implementation framework of the United Nations Convention to Combat Desertification (UNCCD) and, toward project closure, contributed importantly to the start of design of a National Drought Plan. An illustration of the project’s importance at the national and international agenda is that the environmental lead of the Argentina Foreign Ministry presented the project at a high-level event as the key action in face of climate change in the agricultural sector during the G20 summit in Buenos Aires in late 2018.
- **The project objectives were highly relevant to the AF Medium-Term Strategy 2018–2022¹⁵.** Approved in March 2018, the desired impact of the AF strategy is “Adaptive capacity enhanced, resilience strengthened and the vulnerability of people, livelihoods and ecosystems to climate change reduced”. The strategy has three pillars and four cross-cutting themes: (i) Action, (ii) Innovation, and (iii) Learning and Sharing, and (a) Engaging and empowering the most vulnerable communities and social groups; (b) Advancing gender equality and the empowerment of women and girls; (c) Strengthening long-term institutional and technical capacity for effective adaptation; and (d) Building complementarity and coherence with other climate finance delivery channels, respectively. The project outcomes contributed fully to the desired impact and the outputs delivered strongly under each of the pillars and the cross-cutting themes (a) y (c).

B. ACHIEVEMENT OF PDOs (EFFICACY)

Assessment of Achievement of Each Objective/Outcome

21. The quality of the PDO, as stated in paragraph 12, was compromised given the inclusion of a higher-level objective, an outcome, and an activity (see more under the Monitoring and Evaluation [M&E] section). The two main project outcomes were (a) reduced climate vulnerability and (b) reduced man-made vulnerability of the agroecosystems in the SWBA. During the retroactive construction of the ToC from a resilience-building perspective and considering the overall project context, two intermediate outcomes were identified to align the project interventions and activities to the referred main outcomes. Based on this exercise, the evidence provided by the PDO indicators on contributions to both outcomes was defined as discussed in the following paragraphs. The conclusions were complemented by achievements from intermediate results (detailed in annex 1, part B) and supporting information from additional sources.

¹⁵ <https://www.adaptation-fund.org/wp-content/uploads/2018/03/Medium-Term-Strategy-2018-2022-final-03.01-1.pdf>



Objective Outcome 1: Reduced Climate Vulnerability of the Agroecosystems in the SWBA (High)

22. Two PDO indicators focus on measuring this outcome: (a) targeted institutions that the project has prompted to attend adaptation needs in their structures, HR composition, work programs etc. to increase their capacity to address climate-related challenges and (b) relevant threat and hazard information generated and disseminated to farmers and other stakeholders on a timely basis (i.e. through the IEWS). Both are the AF core indicators.

23. **Ten institutions incorporated a variety of actions to address climate adaptation (100 percent of the target achieved).** The results reported under the new institutional commitments (see annex 1) include municipal plans for sustainable forage production and conservation of natural pastures and reforestation, instituted by municipal decrees. This is a key accomplishment through substantial support provided to the municipalities in designing the plans and investing in the necessary equipment to operationalize their implementation. Likewise, the immediate benefits generated from the on-farm geomembrane reservoirs in the irrigated project SISs in Pradere and Ascasubi resulted in the establishment of a revolving fund to further promote their construction. Furthermore, the MSD is working toward formalizing a national social program to promote creation of green jobs following the successful collaboration between the MSD, Argerich tree nursery in the Municipality of Villarino, National Roads Agency, and the Foresta cooperative, created and supported during project implementation.

24. **Local institutional capacity was strengthened to better integrate climate considerations in diverse activities.** At the project end, 10 local public employees in the three municipalities and the four technical institutions were trained on aspects related to planning and monitoring. In general, municipalities and technical institutions recognized that longer-term monitoring of soil quality is key to generate solid evidence of the benefits from SLM approaches and to secure political support to promote and replicate good practices. The municipal plans (paragraph 23) integrated key features promoted by the project, including SLM and climate adaptation measures, planning processes, and consideration of M&E aspects. They introduced requirements for a baseline soil measurement and visual observations as part of the selection process of beneficiary farmers. The municipalities also recognized the project's valuable contribution in supporting the systematization of information and building their analytical capacity to better inform long-term policy decisions.¹⁶ A total of 12 institutional representatives from national, provincial, and local governments participated in a Green Employment Course provided by the International Labour Organization (ILO) in October and November 2018 for 12 days. Further, the project prompted Villarino and Patagones to join the Argentine Network of Municipalities to Confront Climate Change¹⁷ to continue and broaden their engagement with the climate change agenda.

25. **The IEWS on climate change and desertification was operating (100 percent target achieved with remarkable value added).** The IEWS was developed in 2016 and improved thereafter through a remarkable interinstitutional effort by INTA, UNS, and CERZOS, convened and supported by the MAyDS. The IEWS represents a joint effort by local researchers and extensionists and an increasing leadership role by the SMN to generate and disseminate relevant climatic information on threats and hazards primarily

¹⁶ A project-financed study to systematize the design and implementation process of the IEWS, municipal plans on sustainable forage production, interinstitutional pilot on promoting creation of green jobs in the SWBA by the National University Tres de Febrero, and presentations in the three closing workshops in the project area.

¹⁷ The network executes municipal, regional, or national projects/programs related to climate mitigation and/or adaptation through local, national, and international funding. See <https://www.ramcc.net/index.php>.



to farmers and other actors in the project's direct intervention area. The IEWS has produced 13 quarterly reports to date, which have been disseminated through different channels including websites of the SMN, INTA, and MAgDS;¹⁸ rural radios; and local institutions, particularly INTA through its extensionists and the beneficiary municipalities. Satisfaction with the IEWS was measured high (87-96 percent rated it as good or very good).¹⁹ About 95 percent of the respondents indicated that they considered the recommendations in their decision making. The project supported the installation of 12 new automatic weather stations that have enriched the availability of real-time climatic data in a 300 km radius (see map in annex 7). This higher resolution information has significantly improved localized measurement of the Normalized Difference Vegetation Index (NDVI) and helped develop a dynamic and innovative localized drought index. This information has been incorporated into a platform financed by the project and hosted by the SMN to provide updates on drought information every five days based on various indexes (NDVI and drought and fire index). Furthermore, the IEWS team participates in the National Drought Protocol led by the National Secretariat of Agroindustry as part of its Agricultural Risk Management Program. Specifically, it provides local field data observations with a fine resolution that helps validate the information generated at the national level with higher resolution. In general, the IEWS serves as an example for other regions nationally, within the Latin American and Caribbean Region, as well as globally.

26. **Outreach activities created climate awareness and promoted know-how among a wider audience.** A lot of work went into communication and knowledge management activities and the project gained visibility in local and international media²⁰ and among stakeholders. A total of 473 project-related articles were registered as produced and disclosed during the implementation period, including growing visibility in social media toward the end of it. The PT was also invited and participated in different workshops where related results, lessons learned, and initiatives were presented and discussed, including, for example, an AF side event to celebrate the 10th anniversary of the AF at the Conference of Parties (COP) 23 in Bonn in November 2017, where the focus of the presentations was on environmental and social risk management.

Objective Outcome 2: Reduced Man-made Vulnerability of Agroecosystems in the SWBA (Substantial)

27. Two PDO indicators focus on measuring this outcome: (a) productive agroecosystems in the pilot sites maintained or improved to withstand conditions resulting from climate variability and change (AF core indicator) and (b) number of farmers adopting improved agricultural technology (World Bank core indicator).

¹⁸ <https://siat-soba.smn.gob.ar/>; <http://ascasubi.inta.gob.ar/siat/>; and <https://www.argentina.gob.ar/ambiente/tierra/bosques-suelos/manejo-sustentable-suelo/sudoesteba>.

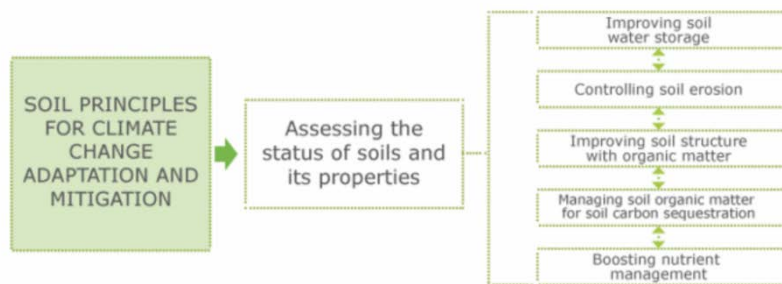
¹⁹ These values are based on surveys done by the project with 86 respondents in 2018 and 51 in 2019.

²⁰ See, for example, a World Bank Feature Story published in December 2018, "Riding the Climate Storm in Patagones, Argentina," available at: <http://www.worldbank.org/en/news/feature/2018/12/04/riding-the-climate-storm-in-patagones-argentina>.



28. **Productive agroecosystems in the pilot sites demonstrated a trend toward maintaining or improving conditions to withstand climate variability (90 percent of the target achieved).**²¹ Lal (2013) indicates that SLM practices adapted to local biophysical and socioeconomic conditions can provide options to revitalize ecosystem functions while slowing degradation and helping climate change mitigation. The project identified 41 practices²² and prioritized 14 of them (see annex 1) through a participatory approach with local farmers and relevant stakeholders based on soil degradation and key climatic issues faced in the three GIAs. The 14 practices piloted in the 11 SISs followed known principles of SLM associated with climate change adaptation as depicted in figure 2. The SIS also evaluated strategies for diversification of agricultural activities to strengthen farmers' climate resilience. The practices promoted by the SIS were not new, but they had not been tested in the SWBA due to lack of seed capital, equipment, and systematized technical support. In the absence of field-based functioning evidence from these practices, the business-as-usual scenario was to continue the use of traditional tillage practices and overgrazing and further degrading the already fragile soil as described in the AF document. The SISs were led, guided, and coordinated by INTA, UNS, CERZOS, and the Agrarian School Carlos Spegazzini. The participants were farmers already receiving technical support from these institutions.

Figure 2. Soil Management to Enhance Climate Change Adaptation, Mitigation, and Resilience



Source: Vargas, 2013

29. Measuring the PDO #2 indicator was challenging given the limited implementation period of the field activities. As such, the results provided only a good basis to determine a trend toward 'maintaining or improving conditions'. Specifically, the end line measurements were conducted only in nine of the 11 SISs, indicating that two SISs improved, five were maintained, and one showed a slight (3 percent) deterioration, giving the total of nine points (annex 7, table 7.1). These results are in line with literature reporting that certain soil parameters have slow response time to management changes (Cardoso et al. 2013). A qualitative proxy measurement from an intermediate outcome indicator based on selected biophysical, social, or economic attributes resulted in the targeted value of 18 out of a maximum of 24

²¹ The Nature Conservancy (TNC) was contracted to establish a methodology to measure the impact of the promoted practices on the targeted agroecosystems based on a proxy index on core soil quality variables in the 11 SISs following a Food and Agricultural Organization Land Degradation Assessment in Drylands (FAO-LADA) methodology. Four variables were chosen in case of the rainfed systems: soil coverage, soil carbon, bulk density, and available phosphorus, while the irrigation systems included two additional variables: electric conductivity and exchangeable sodium percentage. The calculation implied that each SIS, where the status of the agroecosystem improved, added 2 points; a SIS where it was maintained added 1 point; and a SIS where the agroecosystem deteriorated added 0. The maximum index value would have been 22, and the original target of 10 points was not revised.

²² Annex 6 of the AF document details the activities as envisioned during project preparation.



points (see annex 1), further reinforcing the finding of a trend toward maintaining/improving conditions of agroecosystems. Visual observations during project implementation and the ICR mission indicated that an SIS using paratill²³ to reduce tillage compaction along with cultivation of perennial and annual pastures, improvements in livestock rotations, and the use of IEWS information fared better than the neighboring field that was still using conventional practices during the drier conditions experienced in 2019 (see annex 7, figure 7.2).

30. **The project built local capacity and financed equipment to continue and scale up the monitoring of edaphic conditions in the SWBA for long-term monitoring actions.** The GoA has a National Observatory on Land Degradation and Desertification (*Observatorio Nacional de la Degradación de Tierras y Desertificación*, ONDTyD), coordinated by the MAyDS, that maintains a network of continued biophysical monitoring activities and assessment of land degradation and desertification across Argentina. The project contributed to the ONDTyD through a baseline study for the PDO #2 indicator by The Nature Conservancy (TNC) that developed a proxy index along the protocols applied by the ONDTyD to further support monitoring of soil conditions. According to the MAyDS, some of the SISs will be incorporated in the ONDTyD systems for continued monitoring.

31. **A total of 427 farmers participated in the implementation of the practices promoted by the project and indicated interest in adopting them at project end (the target achieved and extended by 105 percent).** These farmers account for those who participated directly in the pilot SIS and those supported through the three municipal plans on sustainable forage production and two on reforestation. In general, farmers' perception on the performance of any technology particularly in terms of positive economic impacts significantly influences their decision to adopt them (Adesina and Zinnah 1993). During the field visits and interviews along the ICR mission, beneficiary farmers experienced some initial productive improvements and observed emerging positive environmental impacts. Production was achieved with less external inputs (diesel and agrochemicals), reducing the cost of production.²⁴ The project targeted producers already working with the participating technical institutions and interested in new solutions to address increasing productivity constraints due to environmental degradation and increasing climate variability. Agricultural literature on technology adoption indicates that working with early adopters open to innovation increases the likelihood of adoption and establishes a good basis to promote future replication and scale-up (Baumgart-Getz, Prokopy, and Floress 2012; Rogers 2003). The practices were also tailored to respond to local problems and generate context-specific evidence to enhance adoption among nonparticipating farmers (Karugia et al. 2004).

32. Capacity building and access to dedicated technical assistance strengthened technology adoption. It is generally recognized that access to knowledge and training is a key driver of technology adoption (Genius et al. 2014; Sova et al. 2018). During each of the closing workshops held in the participating municipalities, beneficiaries expressed the importance of having the technical institutions teach them how to implement the practices in the field. Working alongside farmers and training nonparticipating farmers and stakeholders was a core element of the pilots. The project delivered more than 118 training

²³ A machine that gently lifts and bends subsoil to remove hardpans, allowing the soil to fracture along its natural planes of weakness and then settle back again. The soil loosening improves water infiltration and drainage, encourages root development, and allows for deeper fertilizer placement. The gentle lifting leaves topsoil and subsoil layers intact, minimizes clods, and leaves valuable residue on the surface. The paratill financed by the project was the first introduced in the SWBA.

²⁴ Based on interviews carried out for the Project Final Evaluation contracted to a consultancy firm called *CEIS Consultora* in line with the AF and World Bank requirements.



days and trained 2,172 people. Six manuals were produced to document the main good practices promoted by the project.²⁵ The project also participated actively in international exchange activities organized by the Argentine Fund for South-South and Triangular Cooperation, generating, among others, bilateral visits to China and Mexico with concrete results of additional funding from China and a cactus pilot for forage purposes brought from Mexico. Further, the focus of the SISs was broader than just demonstrating productive practices to farmers. Some of the SISs generated instruments and tools to support better land use planning and build the capacity of future agricultural specialists/extensionists to sustain dissemination of the promoted practices in the long term. The Argerich tree nursery in Villarino is an example of the development potential embedded in similar demand-based projects with capacity to attract further actors and attend evolving ideas consistent with the development objectives. The project supported the transformation of the tree nursery, dating back to 1909, from a worn-out municipal establishment to a center of reference beyond the local level and a breeding ground for new interinstitutional initiatives.

33. **The project's overall efficacy is rated Substantial** based on the level of achievement of the PDO indicators, key related intermediate results, and associated information. This rating is justified by (a) the uptake of municipalities to establish plans on sustainable forage production with focus on native pastures along with reforestation efforts to continue mainstreaming the promoted practices, (b) strong ownership and high commitment of the participating technical institutions to integrate piloted activities in their own operational programs, (c) unprecedented interinstitutional collaboration reached to continue operating and continuously improve the IEWS services that contribute to similar service development at the national and international level, and (d) a particularly strong ownership of the project activities as demonstrated during implementation by all relevant stakeholders and their continued interest expressed during the closing workshops.

Assessment of Efficiency and Ratings

34. **The project's overall efficiency is rated Substantial due to high economic returns and administrative efficiency.** The project achieved high economic benefits far exceeding the costs of the project. An economic and financial analysis was undertaken for the ICR based on the available data and considering the approach at the PP and AF document. This analysis found that the economic and financial net present value (NPV) of the activity was US\$43 million and the economic internal rate of return (EIRR) was 38 percent. The benefits of the project are likely higher as certain benefits were not quantified such as those of the IEWS, increased community participation, and the municipal plans. The ICR economic results are high in absolute terms and are within a same range with the positive economic benefits assessed ex ante, as indicated in table 2. The ex ante appraisal estimates are slightly higher because benefits from the IEWS were included. Sensitivity analysis suggests that the estimates are sensitive to the assumed adoption rate of these technologies. See annex 4 for further details on the Efficiency Analysis.²⁶

²⁵ Available at: <https://www.argentina.gob.ar/ambiente/tierra/bosques-suelos/manejo-sustentable-suelo/sudoesteba/guias-buenas-practicas>.

²⁶ The GoA proposed that an 'efficiency index' be considered in the discussion of Efficiency. After examining said proposal, included at the end of annex 5, the ICR authors did not adopt it for the following reasons: (a) the embedded information is provided in the column 'actual disbursements' in the table 'Ratings of Project Performance in ISRs' in the ICR Data Sheet; (b) the timing of disbursements and the initial slow disbursement is discussed in the ICR in terms of administrative efficiency; and (c) efficiency is defined differently in the World Bank ICR Guidelines, referring to economic, financial, and administrative efficiency.



Table 2. Results of the Economic Analysis

Economic Indicator	At Appraisal	At ICR
NPV	US\$17.6 million	US\$43.9 million
EIRR at 12% discount rate	53%	38%

35. **There were some administrative shortcomings typical of a complex project involving a small grant.** The complexities in project design are explained in paragraph 53 on Quality at Entry. The Project delivered satisfactorily on results and utilized the full grant, with only a nine-month extension, despite implementation challenges such as: (i) a small grant operation to pilot various complex work fronts, (ii) three differing sets of operational rules and procedures, those of the AF, WB and GoA, and (iii) limited resources for management and support/supervision. Restructuring actions improved the Project’s strategic focus and enhanced its overall operational efficiency. The Implementation Status and Results Reports (ISRs) rated implementation mainly as Moderately Satisfactory (MS) or Satisfactory (S) (six out of seven ratings) and dropped once to Moderately Unsatisfactory (MU) due to the initial delay because of political and administrative issues and slow bureaucratic processes within the MAYDS. This was further compounded by a lack of capacity of the Project Implementation Unit (PIU, later PT). A slow start-up is, however, a common feature of similar projects. Delays were faced in 2017 and 2019 due to seasonality and climatic conditions affecting implementation of certain promoted agricultural practices.

Overall Outcome Rating

36. **Overall project outcome is rated Satisfactory** based on the following summary of the key aspects:

- **High relevance of the PDO** across the project cycle based on its initial and sustained alignment with the relevant World Bank strategies, national climate and environmental policies, and strategies related with the agricultural sector and increasing international commitments.
- **Substantial rating for efficacy**, considering (a) the project needed to report on limited changes in key edaphic parameters derived from the piloted SLM practices and compensate said shortfall by validated field observations of changes in relevant complementary parameters; (b) the high commitment of the participating technical institutions and directly benefitted municipalities and producers to continue supporting the validated SLM practices, sustainable forage production, conservation and recovery of natural pastures, and reforestation efforts after a pause of 60 years in the SWBA; and (c) the positive broader and longer-term sustainability prospects of the IEWS, among other key project results that are replicable and scalable.
- **Substantial rating for efficiency**, based on the project’s economic and financial outcomes and ability to successfully overcome/ride out implementation challenges.



Other Outcomes and Impacts

37. **Gender.** A special focus on gender work was included in the project design due to women's vulnerability to climate change,²⁷ and the project intended to promote gender-sensitive participatory approaches and adaptation strategies. However, as implementation started, few women were engaged in project-related productive activities in the field and the project did not develop a gender plan. The lack of specific gender focus was not considered a barrier to meet the project objectives, while gender focus would have required specialized efforts in which the over demanded PT was not able to invest. The gender-disaggregated indicators show that approximately 10 percent of the beneficiary producers were women, as well as 3 of the 10 public employees targeted for project-related capacity building. Out of the 916 people trained and gender disaggregated (19 percent of the total of the trained people), 329 (36 percent) were female.²⁸

38. **Poverty reduction and shared prosperity resulted positive.** The project was a climate adaptation operation targeting small and medium farmers not classified as poor. While the focus was not on poverty, the project contributed to demonstrate measures viable and adaptable to poor farmers along with the required investment needs and technical assistance support. The water efficiency measures illustrate how the project effectively worked with fragile systems of family farming on vegetable production. The farmers were provided with viable solutions to manage environmental and climate threats while improving production and secure economic benefits. The revolving fund for geomembrane reservoirs (paragraph 24) established during the project's extension period will target less well-off family farmers in the irrigation GIA. Also, the tree nurseries supported by the project in Puan and Villarino were linked to social rehabilitation and employment training with vulnerable people. An example is the establishment of the cooperative Foresta, comprising previously unemployed people who were trained and received equipment and assistance to initiate diverse productive activities under the Argerich tree nursery in Villarino (paragraph 23).

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

39. **The project design was sound from a technical perspective but ambitious in scope for the small grant size.** The project aspired to implement integrated and comprehensive actions without enough consideration of the limited resources and time frame that became even more evident during implementation due to the initial delays in getting the project started. The design included participatory and bottom-up planning processes to promote awareness and build ownership and lasting change in farmer behavior. While the approach proved appropriate to engage in a targeted territory and help solve root causes of the identified problems, the actual process and facilitation required more effort than originally envisioned to create robust and well-articulated initial arrangements and avoid dispersion of the project activities. Working with and depending on natural cycles exposed the implementation

²⁷The PP indicated that studies in Argentina have identified women's vulnerability to climate impacts and a need for their active participation in adaptation strategies.

²⁸Information on the number/gender of the participants trained before 2016 is not available due to lack of respective monitoring during the initial implementation period. The total number of people trained was 4,721, but disaggregated data exist only for 961 participants.



schedule to further risks. The overall project design, however, was adaptable enough to allow addressing these major challenges in a functional manner.

40. **The institutional set-up was complex.** During preparation, the project counted with strong provincial-level support reflected in the institutional and implementation arrangements proposed in the PP. However, political changes between project preparation and initiation made it difficult to operationalize them. The OPDS lost a field office where the project's field personnel were to be hosted and could only provide limited support to working with the targeted municipal governments. The intricate political relationships between the federal and provincial government made it challenging to collaborate with the Ministry of Agroindustry of the Province of Buenos Aires (MAI). The anticipated collaboration with the World Bank PROSAP II (P106684) to contribute to its adaptation measures was not possible because PROSAP II closed in March 2017 before the project's pilot results were available. The project seized some opportunities to engage with the MAI in the context of another World Bank-financed operation (paragraph 44) and IEWS (paragraph 25).

B. KEY FACTORS DURING IMPLEMENTATION

Factors Subject to Government and/or Implementing Entities' Control

41. **Political changes at the central and provincial level had a considerable impact on project management throughout its lifetime.** At the onset, the project suffered from lack of close monitoring and proper strategic guidance from authorities. The general elections in 2015 brought political leadership changes at the national, provincial, and local levels, adding challenges to project coordination. Internal changes within the executing agency at the national level included replacement of authorities in 2014, upgrade to a ministry in 2016, and downgrade back to a Government Secretariat in 2018 (and again to a ministry after the 2019 general elections), which delayed administrative decisions and affected processes. The related impacts were greater initially and became more manageable once the project was consolidated and enjoyed engaged support by the responsible authorities.

42. **Institutional and fiscal austerity actions hindered project implementation.** Reforms introduced to centralize functions across intrainstitutional structures across the GoA to reduce public expenditures questioned the relevance of the PIUs. The PIU and MAyDS invested considerable time and attention to prevent dismantling of the PIU and, it indeed, continued, named PT. Further austerity measures in 2018 posed significant budget restrictions limiting project allocations in the national budget, no matter derived from an international grant. All participating institutions at the national, provincial, and local level faced budget constraints that limited their resources and ability to mobilize for the SWBA. A careful planification of field activities in close collaboration with the local institutions was needed and proved useful to minimize costs and maximize efforts to achieve the PDO. During the final year of implementation, the macroeconomic situation complicated the overall implementation, and the project was not able to execute the full AF grant despite the expectation as the exchange rates changed and inflation grew quickly and added value to the project budget in U.S. dollars, while the implementation period run out to initiate new procurement processes.



Factors Subject to World Bank Control

43. **The project was the first World Bank operation under the AF.**²⁹ The World Bank had no experience with the AF, and it was necessary to create an implementation framework to address mutually rigorous World Bank operational policies and procedures and the AF requirements while meeting the client's needs. The reality of project implementation was more complex than assumed during preparation, including changing the AF policies that partly contradicted the standard World Bank considerations, such as revising a project's RF at midterm. Also, the PT faced disproportionate reporting requirements under the GoA, World Bank, and AF and needed to gain the skills and experience necessary to run an operation of this complexity. Particularly, the World Bank procurement rules resulted in initial administrative/operational delays. The World Bank team also faced heavy transaction costs but provided close support to the PT to build its fiduciary capacities and engaged proactively with the GoA to overcome occasional execution issues.

44. **Opportunities to scale up demonstrated practices and replicate the IEWS through ongoing World Bank operations.** The greatest project scale-up and replication potential relates to the IEWS and the demonstrated adaptation practices in other semiarid regions in Argentina. In this context, the World Bank GIRSAR Project in the agricultural sector incentivizes and finances adoption of climate-related information systems and climate-smart agriculture technologies and practices at the regional and value chain level. It presents a strategic potential and remarkable opportunity to replicate, scale up, and develop further many of the project results. Further engagement is recommended to explore the related potential both internally and interinstitutionally, as the new GoA administration initiates full execution in March 2020 after the December 2019 general elections.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

M&E Design

45. The M&E design showed some strengths and various shortcomings:

- **M&E aimed to systematize field-level information while building the capacity of key local stakeholders.** The proposed M&E methodology, as detailed in the PP, consisted of a hybrid system designed to track implementation of the main project demonstration activities at the field level through the SIS and the respective results at the central level. It reflected a functional framework to measure field activities based on global practices and adaptation indicators available from the GEF and AF at the time. The M&E strategy at the field level featured a participatory approach to build M&E capacity of technical institutions and municipalities, introduce stakeholder accountability, and actively involve beneficiaries in M&E.

²⁹ An innovative financial instrument of the UNFCCC and its Kyoto Protocol, including equal voice and vote between the donor and recipient countries and allowing recipient countries to pursue direct access. The first AF project in Argentina was through direct access by the ex-Unit for Rural Change under the Ministry of Agroindustry.



- **The PDO was complex and included different levels of results.** The PDO aimed to ‘reduce vulnerability’, which conceptually is a longer-term impact, reflecting outcomes beyond the project cycle. The PDO was poorly articulated, incorporating impacts and outcomes at the same level. The original set of PDO indicators was appropriate and corresponded to the AF core indicators but could have benefited from additional indicators. Unfortunately, revising the PDO was not possible due to the evolving operational rules of the AF that, in early 2017, prohibited changes even to indicators or targets after submission of a project’s first annual progress report.
- **The original RF reflected some of the challenges to capture the intervention logic.** The RF was revised at MTR to clarify the chain of logic, improve indicators, and focus project delivery (paragraph 18).
- **A challenging PDO indicator.** The PDO #2 indicator required contracting of a detailed baseline study. It applied a proxy index on core soil variables based on a scientifically proven methodology, FAO-LADA.³⁰ The local technical institutions voiced concerns on using only biophysical attributes as changes for these variables can take many years (paragraph 30). Measuring the indicator indeed turned out to be problematic as the project did not have enough time between the TNC baseline study completed in 2017 and the follow-up with incomplete measurements by INTA in 2019. Consequently, the project is only able to identify a trend toward maintaining or improving conditions.

M&E Implementation

46. At the SIS level, the participatory approach to M&E proved challenging due to the time, effort, and rigor it required to maintain solid registers from the onset. An effective tool to track field-level activities and support informed decisions at all levels was consolidated only toward the end of project implementation. Annual workshops on results monitoring were organized successfully from 2016 to 2018 with the technical institutions and representatives of the 11 SISs to review, assess, and exchange information on the SIS performance and draw lessons learned. As summarized in paragraph 18, changes were introduced at MTR to strengthen the set of PDO indicators, improve uniformity and consistency in the criteria used to monitor and interpret some of the indicators, and solidify supporting evidence to report specific results.³¹ Thereafter, approval of these changes proved challenging due to the AF operational rules and took longer than expected (paragraph 55).

M&E Utilization

47. **The M&E was integrated in the project’s decision-making processes.** The results of the annual monitoring workshops were used to inform the project planning and remaining implementation decisions. Importantly, the beneficiary municipalities incorporated key M&E aspects in the operational rules of the sustainable forage production plans. INTA will also continue using the TNC methodology to monitor soil

³⁰ Argentina was one of the six pilot countries that validated the FAO-LADA methodology as part of a GEF project implemented by the United Nations Development Programme and executed by the FAO.

³¹ Project’s MTR Evaluation prepared for the AF by the World Bank team.



quality (paragraphs 30 and 31). The TNC methodology is a longer-term monitoring tool for selected biophysical soil properties that can be used at different levels beyond the project scope.

Justification of Overall Rating of Quality of M&E

48. M&E quality is rated Modest, given the significant weaknesses in the M&E design and related operational challenges.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

49. **The project activities were aligned with environmental and social good practices complying with the World Bank safeguards throughout the implementation period.** The project triggered Environmental Assessment (OP/BP 4.01) and was categorized as 'B' in terms of environmental and/or social risks and impacts. As the location of the SIS was not known during project preparation, an Environmental and Social Management Framework (ESMF) was prepared and all the safeguards were triggered for precautionary purposes, except for Projects on International Waterways in Disputed Areas. The ESMF included an Indigenous Peoples Planning Framework and Resettlement Policy Framework, but no related plans were necessary during project implementation. The project investments were screened for potential negative impacts in line with the ESMF and appropriate management measures were put in place. The need for environmental and social risk management was overall limited, and no safeguards-related performance issues were observed nor environmental, social, or occupational health and safety incidents took place during implementation. The promoted SLM practices and water efficiency measures replace farmers' need to rely on agrochemicals to manage pasture lands by cattle ranchers and allow efficient use of permitted agrochemicals among vegetable farmers, respectively. Further, the SWBA is prone to fires, and the IEWS contributed to strengthen interinstitutional efforts in fire management. Regarding natural habitats, two of the SISs³² are in areas classified as Category II ('yellow zone') under the provincial forest law,³³ and their productive activities were subject to a close joint review by the PT and World Bank team. A final project-financed study that covered the two SISs confirmed the conclusion that their productive activities were consistent with the provincial forest law.³⁴ EcoLatina produced a template for sustainable management plans for livestock and/or fruit production in Category II areas, which the OPDS can use to advance operationalizing the forest law implementation. Regarding indigenous peoples, the PT reassessed their potential presence in the project's direct intervention area after the MTR, but the communities present were all urban and without interest in the project-financed activities.

Summary of Fiduciary Compliance

50. **Financial management (FM) presented challenges that were addressed in close collaboration with the World Bank.** The fiduciary arrangements described in the PP did not materialize because of

³² The 'Patagones Rangeland/Monte Biome SIS' and 'San Jose Dryland SIS'.

³³ Sustainable forestry and silvopastoral and tourism exploitation are permitted in these areas, but require a conservation plan or sustainable management plan approved by the OPDS. However, the OPDS has not yet regulated the preparation and submission of such plans.

³⁴ EcoLatina report: *Sistematización de las experiencias demostrativas de producción agropecuaria sustentable de cuatro sitios pilotos llevados a cabo en los partidos de Villarino y Patagones.*



organizational changes within the MAdS,³⁵ and the PT needed to assume the fiduciary responsibilities. The PT hired an FM specialist and a procurement specialist and supporting administrative personnel to cover the tasks, and the World Bank team provided them extensive support throughout implementation. The interim financial reports were generally of good quality with minor observations that the PT addressed promptly. The external audit reports were prepared by the Argentine Supreme Audit Institution (*Auditoría General de la Nación*, AGN). The first audit was submitted on time (2016), but the subsequent audits suffered delays (2017 and 2018). The three audits thus far presented unmodified (clean) opinions and were considered acceptable to the World Bank. The last project audit will cover the project extension until September 2019 and the grace period thereafter that needed an extension until March 31 to complete disbursements with new signatories after the change of the GoA administration in December 2019.

51. **The World Bank’s procurement oversight was wide-ranging and provided substantive support to the PT addressing a broad variety of investments/services required by the SIS.** The procurement proved challenging in terms of technical specificities of the goods/equipment to be acquired and several processes faced difficulties in securing enough qualified offers to meet the World Bank policies. The project executed a total of 77 procurement processes, the largest number corresponding to goods (77 percent) and non-consulting services (14 percent). Despite the absence of international bidding, many procurement processes were time-consuming, including direct contracting of the SMN to develop the drought index and the related online platform that services the IEWS, which served for the desired capacity-building effect and ownership. Despite the PT’s best efforts to reduce excessive bureaucracy, goods were sometimes delivered past the agronomic cultivation periods affecting promoted agricultural activities. The project also intended to integrate local providers to implement the SIS. While this was important to showcase local availability of the necessary goods, many local providers worked informally, needed a lot of support, and many processes got delayed.

52. **Grievance response mechanism.** The project had several mechanisms in place for potentially affected and interested people to contact the PT with grievances, questions, and/or suggestions. The project staff based in the field were available to discuss and meet with different stakeholders upon request, the SIS had signs informing that a project-financed operational plan was under implementation in the site, and a specific email address was available for submission of related feedback. The three beneficiary municipalities also served as a point of contact for interested people, and the Buenos Aires-based PT representatives conducted frequent field visits providing further opportunities for interaction. Most of the contacts received by the project were related to additional requests of support and some were related to issues with procurement processes or tax redemption certificates to suppliers by the National Bank. The PT addressed consultations and grievances satisfactorily and no issue was escalated beyond its scope.

³⁵ A special program unit to manage all internationally financed projects (*Programa de Proyectos con Financiamiento Externo*) was supposed to take care of the project’s fiduciary aspects, but due to change of authorities after project preparation, it never materialized in practice.



C. BANK PERFORMANCE

Quality at Entry

53. Key elements for assessing the project's Quality at Entry include the following:

- **The project had strategic relevance and presented an integrated approach to climate adaptation.** This was particularly important given the novelty of climate adaptation at the time of project preparation and the uncertainties related to climate models. Further, the project brought climate change to the local agenda at the SWBA and promoted a participatory process to pioneer concerted action against climate vulnerability and land degradation processes. In this context, extensive consultations with national and local stakeholders were vital to sufficiently understand the local conditions and needs.
- **The project was ambitious considering the available resources and implementation period but managed to deliver most outputs.** Only two outputs, a regional consultative observatory Regional consultative observatory of public policies on climate change and desertification and a teacher training program for environmental education were dropped from the original project design at the MTR.
- **The participatory approach was a key strength of the project design and resulted in strong ownership by the main stakeholders.** Additionally, although the project was not a pro-poor project, it demonstrated viable solutions for less well-off/highly vulnerable family farmers. Gender focus was included in the project design, but a strong gender focus did not prove strategic for successful project implementation. Women's participation was promoted to the extent it was viable in the local context.
- **The economic analysis at project appraisal was Satisfactory.** The project was deemed economically profitable with an NPV of US\$17,578,259 and an EIRR of 53 percent.
- **The project was designed to generate only positive environmental and social impacts.** Given the demand-driven nature of the demonstration project, the safeguards instruments were prepared conservatively to make sure that the framework approach would be able to address a wide range of situations and potential issues in the field.
- **The MAyDS had relevant fiduciary experience due to its involvement in previous World Bank operations.**³⁶ The FM and procurement arrangements were well documented in the PP. They relied on a planned Program of Projects with External Financing within the MAyDS that did not exist during project preparation. Its capacity was expected to be adequate and no major risks were anticipated. However, before project inception, a change of the GoA administration affected these plans, and the project had to establish a separate PIU to assume the fiduciary responsibilities.

³⁶ 'National Urban Solid Waste Management Project' (P089926) and the GEF grant 'Third National Communication Project' (P116974).



- **Implementation arrangements based on interjurisdictional (national, provincial, and local governments) collaboration proved complex**, given the delicate prevailing political and institutional relationships across the participating levels of administration.
- **Political risks are hard to predict at the appraisal, but given the multilevel implementation arrangements, political risk was underestimated.** The risk associated with the implementing capacity was also underestimated given that the project had to comply with three sets of operating and administrative policies (World Bank/AF/GoA).
- **A better formulation of the PDO would have benefitted the project design and strengthened the RF.** The M&E section discusses the main issues related to project design and its subsequent revisions.

Quality of Supervision

54. Key elements for assessing the Bank's Quality at Supervision include the following:

- **The World Bank supervision benefited from having continuity in the team for the duration of the project.** The World Bank team always included a task team leader (TTL) and a co-TTL, and the latter proved key in ensuring continuity during the two changes of the TTL during the project lifetime. The first TTL covered the project preparation together with a co-TTL who stepped aside after preparation but took over as the TTL before the MTR when she moved to Buenos Aires. On the other hand, a country-based co-TTL joined the team during the final stretch of project preparation and helped the transition between both TTL changes. These arrangements secured that there was minimal disruption to project implementation.
- **Implementation and fiduciary support were close and comprehensive and valued by the PT/MAyDS.** The World Bank team encouraged and maintained proactive and sincere communication with the PT/MAyDS, which consulted and reported carefully on issues and progress. Active use of WhatsApp allowed real-time reporting on advances in the field and quick exchange of information in diverse situations. The World Bank reporting on progress and issues through World Bank ISRs and an annual progress report template applied by the AF was detailed and candid but presented delays.
- **The World Bank-led MTR in 2017 examined the project situation in detail and provided strategic direction for the remaining implementation period and expected outcomes.** The MTR found that the PDO remained achievable and relevant at the national, provincial, and local level. The World Bank submitted an MTR report to the AF Secretariat detailing results achieved and identified restructuring needs. The specific outcomes of the MTR are detailed in paragraphs 19–21.
- **Proactivity of the World Bank was key to adapt the project to the changing country situations.** Continuous communication and close monitoring of implementation progress between the teams enabled addressing issues related to the GoA's administrative reforms that affected implementation. It further facilitated assessing alternative solutions to challenges, for example, with procurement, and the World Bank supported the PT/MAyDS



in resolving budget and other administrative issues. When the fiscal austerity measures were introduced GoA-wide in mid-2018, the World Bank team was instrumental in maintaining the necessary PT staffing and supporting the push for implementation progress. In terms of portfolio-wide challenges, the World Bank team elevated the exchange and agreements to a higher level between the MAyDS and World Bank authorities, as needed.

- **The World Bank supported active dissemination of the key project results** at various forums, including various World Bank Brown Bag Lunches with outside invitees and promoted synergies with relevant World Bank operations.
- **Project restructuring proved difficult and slow due to multiple factors.** Changes in the AF operational rules on restructuring required additional exchange between the World Bank and AF Secretariat and took time. The World Bank team strategically split the restructuring into two. The first approved in January 2018 resolved an urgent need for reallocating funds between disbursement categories. The second restructuring addressed revisions to the RF (paragraph 18 and 19) and extension of the closing date. However, it could only be approved in December 2018 because of various reasons, including the belated 2017 audit report by the AGN.

Justification of Overall Rating of Bank Performance

55. **Overall World Bank Performance is rated Satisfactory**, based on some shortcomings at entry that were offset by strong Bank performance in the quality of supervision. The World Bank task team provided quality implementation support and closely collaborated with the PT/MAyDS and the participating institutions to facilitate successful implementation of the small yet complex operation. The World Bank team's support to the PT in establishing a successful interinstitutional collaboration and delivering concrete results, while complying with the three sets of operational rules applicable to the project, was key to achieving the project objectives. The World Bank was proactive and responsive in addressing critical needs of the PT during the drastically changing and challenging situations in the country. Project restructuring took longer than expected but did not affect the results in the field or in institutional terms.

D. RISK TO DEVELOPMENT OUTCOME

56. **Risk to Development Outcome is assessed as Moderate.**

- **There is a risk that project outcomes could lose political visibility, given the change in government in December 2019.** The likelihood of this risk materializing is limited, as climate change is expected to remain a priority issue at the national, provincial, and municipal level.
- **The GoA is transitioning its approach to agricultural emergencies to an ex ante integrated risk management system.** This approach is based on the necessity to (a) improve agriculture risk information systems for better decision making, (b) enable farmers to adopt better risk management technologies and instruments (including off-farm works and infrastructure), and (c) reform the agricultural emergency system to respond better and faster to family farmers. The scope of this project is consistent with (a) and (b).



- **Scaling up the project results to other municipalities in the SWBA remains to be seen.** The limited collaboration between the project and the provincial government may affect the scalability of project activities within the Province of Buenos Aires. The strong involvement and ownership of INTA and the SMN may offset potential continued disinterest on the part of provincial authorities.
- **Increased macroeconomic volatility in the country could affect farmers' decisions.** Farmers recognized the emerging benefits of the project-promoted practices. However, they expressed uncertainty in planning further investments, given increased inflation and exchange rate volatility.
- **Technical and academic institutions are committed to continue project-promoted activities.** These institutions have already integrated this work in their research and operating programs. In this context, additional financing instruments will be needed to support individual or group investments.
- **Linking project-promoted investments to municipal plans was strategic to sustain the activities in the medium term.** The project supported the establishment of the municipal plans on sustainable forage production and reforestation. It also strengthened the relationships between the municipalities and the local technical institutions (INTA and UNS) so that they can continue supporting the implementation of the municipal plans. These interlinks provide a strategic sustainability framework and a degree of scalability for key project activities within and beyond the SWBA.
- **The interinstitutional network generated by the project is key to support continuity of the IEWS and other activities.** The strong ownership and commitment shown to the IEWS and other results by the technical institutions is a key foundation for their continuity and replication/scale-up. The contributing institutions have institutionalized their collaboration with the IEWS. This will ensure that a valuable decision-making tool both for producers and their supporting technical and municipal entities continues to exist. Within the province, the IEWS can be expanded to additional municipalities³⁷ under the current institutional framework and supported by the project-financed infrastructure, and the expansion is already underway.

V. LESSONS LEARNED AND RECOMMENDATIONS

57. **The following are key areas of learning from the first World Bank AF project and small trust fund operations:**

- **Small (pilot) projects with strategic substance for a sector or sectors can serve as valuable tools to continue/facilitate innovative, intersectoral, and institutional collaboration.** Trust fund operations are windows of opportunity for continued collaboration with a government, for example when either the macroeconomic situation does not allow a conventional sector

³⁷ Bahía Blanca, Tornquist, Coronel Pringles, Saavedra, and Coronel Rosales.



engagement, or when working in support of environmental public goods. However, they tend to have specific operating rules that need to be combined with World Bank policies and typically require additional time. Teams at both ends need to adopt a pragmatic approach to overcome challenges and search for strategic partners and higher-level support to leverage results to the envisaged scale.

- **Strategies to replicate and scale up actions that prove successful in pilots should be clearly defined.** The project succeeded in showcasing the viability of an interesting set of climate adaptation measures for agricultural systems in semiarid and arid conditions. These measures have the potential to be replicated nationally and internationally. Linking small pilot type operations to a World Bank investment project is an option to secure replicability. Internal exchange between World Bank staff across sectors should be promoted more strategically to explore the viability of further replication and scale-up across and beyond regional boundaries.
- **Measuring the effectiveness and adequacy of climate adaptation is challenging.** A careful balance of SMART indicators and other adequate methods and tools is required to capture the full range of benefits of climate adaptation in local contexts. The use of indicators relying on biophysical properties should be carefully considered given the longer monitoring periods required. These should also be complemented by social/economic variables to capture the full range of lasting/transformational results.

Lessons from Institutional and Beneficiary buy-in

- **When pursuing intersectoral and institutional collaboration, it is good to show results before proceeding with formalizing the arrangements.** A key lesson learned in the development and establishment of the IEWS in the SWBA is that it is best to first work through informal interinstitutional collaboration arrangements between local and national stakeholders. Once a system has proved viable and useful in practice, formalizing interinstitutional collaboration arrangements for a long-term commitment is much easier.
- **Adequate resources and strong local presence are required for projects that promote rural change.** Territorial projects promoting rural change need to have strong presence in the field to successfully carry out integrated and innovative pilot activities, such as those promoted by the project. Managing local engagement, ownership, and a diverse set of pilot investments and agreements requires committed and socially skillful champions both at the national and local level. In case of the project, strong commitment by the PT, at both the national and local level, was key to promote innovative collaborations (paragraphs 23 and 24).

Lessons from Piloted Measures Based on Participatory Planning and Adaptive Management

- Successful solution of complex problems, such as man-made land degradation and adaptation to climate change in productive systems, requires putting technical capacities and minimum financial incentives in place to demonstrate how production practices and technologies can address these issues while generating additional benefits to farmers.



- **Direct contracting of key technical national institutions is recommended to build capacity under grant operations.** The World Bank procurement rules require careful analysis of any direct contracting but, as proved by the project, it is worth the effort for the development and ownership effect when working with national technical institutions. The project initially approached the SMN to review the technical specifications of the project-financed meteorological stations. Later, it contracted the SMN to develop the drought index and support the development of an online platform to upgrade the IEWS infrastructure. On the other hand, contracting the TNC, a nongovernmental institution, was not successful as the related critical collaboration with INTA proved challenging. In hindsight, development of the baseline study and methodology for longer-term soil monitoring could have been more successful if it had been carried out by INTA.
 - **A participatory approach in project design and implementation pays off and needs to be carefully planned and resourced.** The project invested a lot of effort in coordinating and creating trusting relationships with the participating institutions, municipalities, and beneficiaries. Establishing a common vision and shared objectives across diverse but related actors is needed to effectively plan and align the activities needed to achieve them. Sharing of challenges and successes provides an ideal setting for ideas on harnessing synergy among sectors and programs and broadening collaboration, for example around the Argerich tree nursery in Villarino. Participatory planning needs to be conceptualized, systematized, and properly resourced among key project activities, and should be considered as an objective of similar projects that aim to establishing long-term interinstitutional collaboration and behavioral changes.
 - **Adaptive management responses are needed in countries prone to quick and constant macro-context changes.** Project implementation proved challenging due to the initial implementation and later restructuring delays caused by constant changes in institutional, administrative, and political circumstances. Continued and frank communication between the GoA, World Bank, and PT was crucial to timely identification of the necessary adjustments in project management to respond effectively to the changing situations.
58. Given the demonstrated innovations of the project and considering its short implementation period, the project could be considered for a Project Performance Assessment Review by the Independent Evaluation Group of the World Bank Group. Such a review would enable the assessment of the evolution of the demonstration practices over time, including adoption/replication and scale-up, and capture of biophysical changes in soil quality.



ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Contribution to reduction of climate and man-made vulnerability of the agroecosystems in the Southwest of the Buenos Aires Province

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Productive agroecosystems in the pilot sites maintained or improved to withstand conditions resulting from climate variability and change	Number	0.00 22-Jul-2013	10.00 22-Jul-2013		9.00 30-Sep-2019

Comments (achievements against targets):

Target achieved at 90 percent, while the indicator resulted challenging to measure. See paragraphs 29-31. In the Bank Implementation Status Reports (ISR), the indicator was reported based on interim visual observations in the field. At the MTR, said practice gave birth to the intermediate outcome indicator "Selected biophysical, social or economic attributes in the pilot sites improved to withstand conditions resulting from climate variability" that achieved its target at 100 percent. In all, the final Project result in terms of maintained or improved productive agroecosystems is considered satisfactory despite the reported result of nine out of 10 targeted points. On the downside, the challenges faced with this indicator are reflected in the Modest rating of the Project's M&E Quality.



Objective/Outcome: Increased adaptive capacity of key local institutions and actors

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Targeted institutions that the Project has prompted to attend adaptation needs in their structures, HR composition, work programs etc. to increase their capacity to address climate-related challenges	Number	0.00 22-Jul-2013	10.00 22-Jul-2013		10.00 30-Sep-2019

Comments (achievements against targets):

Target achieved at 100 percent. The 10 reported institutions are the: (i) Municipality of Puan that has kept strengthening its Bordenave Municipal Tree Nursery and established a Municipal Nature Reserve (protected area) and is running a Municipal Plan on Sustainable Forage Production that aims at fixing soil and reducing wind erosion through increased topsoil coverage (“Forage Plan”); (ii) Municipality of Villarino that has created a Municipal Environmental Agency and a Municipal Nature Reserve, is co-implementing a pilot program of green employment with a road-side afforestation plan aimed at reducing wind erosion (“Green Employment Pilot”), and has established and runs a Forage Plan; (iii) Municipality of Patagones that has established and runs a Forage Plan; (iv) National Ministry of Social Development is co-implementing the Green Employment Pilot; (v) National Roads Agency is co-implementing the Green Employment Pilot; (vi) National Institute on Agricultural Technology (INTA: Ascasubi and Bordenave Experimental Stations) signed the Information and Early-Warning System (IEWS) Agreement in February 2018 and keeps contributing to it and is implementing several related projects with own funding; (vii) National Meteorological Service (SMN) provides maintenance to 12 meteorological stations financed by the Project, server space and data processing for running a Drought Index in the Project area, signed the IEWS Agreement in April 2018 and keeps contributing to it; (viii) Center of Renewable Natural Resources in the Semiarid Zone (CERZOS) – National Center of Scientific and Technical Research (CONICET) signed the IEWS Agreement in May 2018 and keeps contributing to it; (ix) National Southern University (UNS) signed the IEWS Agreement in October 2018 and keeps contributing to it; and (x) CORFO, the Development Corporation of the Colorado River in Bonaerense Valley, through an Assembly Act of the Consortium, established a program with a revolving fund to support financing of water efficiency measures by its members and is implementing the program.



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Relevant threat and hazard information generated and disseminated to farmers and other stakeholders on a timely basis	Yes/No	N 22-Jul-2013	Y 22-Jul-2013	Y	Y 30-Sep-2019

Comments (achievements against targets):

Target achieved at 100 percent with a plenty of value added. An Information and Early Warning System on climate change and desertification (IEWS; SIAT in Spanish) was developed in 2016 and improved thereafter jointly with local researchers, extension institutions and with an increasing role by the National Meteorological Service (SMN) to generate and disseminate relevant climatic information on threats and hazards to farmers and stakeholders in the intervention area and to serve as an example for other regions nationally, regionally in Latin America and Caribbean as well as globally. The reports are produced quarterly since December 2016 and provide agro-meteorological information, productive forecasts and risk assessment on fires and wind-erosion, as well as land management and crop and livestock management recommendations. Until January 2020, 13 reports have been produced and disseminated through different channels including websites of SMN, INTA and SAyDS, rural radios and local institutions, particularly INTA through its extensionists and the beneficiary municipalities.

Surveys carried out by the Project showed that the satisfaction level with the IEWS is high (87-96 percent valued it as good or very good). 95 percent of the respondents indicated they have considered the recommendations in their decision making. Furthermore, the network of the IEWS meteorological stations provides real-time information online. The monitored area currently counts with 14 meteorological stations, 12 of them financed by the Project, and the availability of real-time data has improved in a 300 km radius. The higher resolution information has improved through measurement on the vegetation applying the Normalized Difference Vegetation Index (NDVI) and an innovative drought index. This information has been incorporated into a platform financed by the Project and hosted by the SMN that now provides updates on drought information every five days based on various indexes (NDVI, drought and fires). Finally, the IEWS team participates in the National Drought Protocol led by the National Secretariat of Agroindustry as part of its agricultural risk management program. Specifically, the IEWS provides local field data observations that helps to validate the information generated at the national level.

Objective/Outcome: Piloted climate resilient and sustainable land management practices



Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Farmers adopting improved agricultural technology	Number	0.00 22-Jul-2013	408.00 19-Dec-2018		427.00 30-Sep-2019
Farmers adopting improved agricultural technology - Female	Number	0.00 22-Jul-2013	39.00 19-Dec-2018		43.00 30-Sep-2019
Farmers adopting improved agricultural technology - male	Number	0.00 22-Jul-2013	369.00 19-Dec-2018		384.00 30-Sep-2019

Comments (achievements against targets):

Target achieved and exceeded at 105 percent. See paragraph 32. "Improved agricultural technology adoption" is understood in terms of the "adoption" involving a process that comprises four stages: 1) Commitment: verified through the application letter of each SIS; 2) Implementation: verified in the field by means of physical investments, associated with the Project activities; 3) Management and evaluation: verified through interviews with farmers and field visits; and 4) Adoption: verified through interviews with farmers and field visits. Within the scope of the Project implementation period, it needs to be noted that monitoring the number of people who reach the referred stages was feasible only in terms of the two first stages of the process. The Project implementation period was too short to verify reaching of the final adoption stage, but the interviews and analysis conducted to prepare the present ICR confirmed a positive trend toward potential adoption of the promoted technologies.

A.2 Intermediate Results Indicators

Component: Component 1: Reducing Institutional and Community-level Vulnerability

Indicator Name	Unit of	Baseline	Original Target	Formally Revised	Actual Achieved at
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	Measure			Target	Completion
Share of beneficiaries satisfied with climate-related information and recommendations generated by the IEWS (disaggregated by gender)	Percentage	0.00	50.00	75.00	94.00
		22-Jul-2013	22-Jul-2013	19-Dec-2018	30-Sep-2019

Comments (achievements against targets):

Target achieved and exceeded at 125 percent. The first satisfaction survey of the IEWS users was conducted in August and September 2018, where 87 percent of the respondents valued the quarterly reports as very good (36 percent) or good (51 percent), and 95 percent manifested they have considered IEWS recommendations when taking decisions on their productive activities. A second survey was conducted in July and August 2019, where 94 percent of the respondents valued the quarterly reports as very good (57 percent) or good (37 percent), and 94 percent manifested they have considered IEWS recommendations when taking decisions on their productive activities.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Targeted local public employees trained (disaggregated by gender)	Percentage	0.00	60.00		83.00
		22-Jul-2013	22-Jul-2013		30-Sep-2019

Comments (achievements against targets):

Target achieved and exceeded at 138 percent. The result reflects 10 trained public employees. The percent is measured of the total of the relevant public employees in the Municipalities of Puan, Villarino and Patagones, where the Project worked directly and as defined by the EP/SAyDS following the organic municipal structures in place since December 2015. The applicable total of 12 employees corresponds to the three Mayors and three Secretaries of Production, the Head of the Municipal Tree Nursery in Puan and Villarino, the Production Assistant and Director of Environment in Villarino, and the Director and Assistant of Production in Patagones. At the Project closure, nine of the targeted public employees are men and three women. No gender



target has been set for this indicator, but the result is monitored by gender. The final gender result is that three of the 10 trained public employees are female (30 percent of the trained officials), 100 percent of the targeted female public employees. The following public employees were trained: three Majors, three Secretaries of Production (two women), two Heads of the Municipal Tree Nursery, a Production Director in Patagones (a woman), and a Director of Environment in Villarino.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Client days of training provided (number)	Number	0.00	64.00		118.00
		22-Jul-2013	22-Jul-2013		30-Sep-2019

Comments (achievements against targets):

Target achieved and exceeded at 184 percent. The result reflects the cumulative training days delivered on various Project-related topics by the PT or in close collaboration/with financial support by the Project e.g. on participatory project planning, incorporation of climate considerations in productive activities and early-warning systems.

The total of training days consists of six organized in 2015, 14 by June 2016, 45 between July 2016 and December 2017, 38 until December 3, 2018, and 15 between December 10, 2018 till May 30, 2019. Some Project beneficiaries were also able to participate in five days of training provided in Montevideo through international collaboration in November 2017. Further, 12 institutional representatives from national, provincial and local governments participated in a Green Employment Course provided by the International Labor Organization (ILO) in October and November 2018 (12 days). The indicator does not have a specific gender target, but training was to be monitored by gender. However, full information on the number and gender of the participants is not available due to lack of respective monitoring during the initial implementation period. The total of participants in the reported training days between July 2016 and May 2018 is 2,245. The total of female participants in said group is 473 (21 percent).

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
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Cultural and socio-productive activities carried out in the Project zone jointly with the municipal governments (fairs, exhibitions, etc.)	Number	0.00	28.00		13.00
		22-Jul-2013	22-Jul-2013		30-Sep-2019

Comments (achievements against targets):

Target partially achieved at 46 percent. The main reasons for the lower than expected result of the indicator were that (i) only a couple of relevant events take place annually in the SWBA where the Project was able to join to showcase its activities; (ii) the Project implementation suffered an important initial delay before it gained speed starting in early 2016, and the Project lost various opportunities to participate in relevant events in the SWBA; and (iii) the PT and the participating local entities hardly counted with enough human and other resources to split the Project focus to organize cultural and socio-productive activities of their own, given the key Project objectives required continuously their bulk of attention and time.

Examples of the 13 reported activities are the Project launch workshops in June and September 2015, including a provision of 150 olive saplings to participating farmers in Medanos; annual drawing competitions in local schools on Project-related topics in 2016, 2017 and 2019; local festivals as the National Garlic Festival in Villarino; a workshop related to the National Forest Law and protection of native forests for municipal officers in Patagones; and a fair of the Livestock Association of Villarino.

Component: Component 2: Implementing Adaptation Measures in Productive Agroecosystems

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Adaptation/sustainable land management (SLM) technologies identified/verified through local participatory consultations under the Project framework that are	Number	0.00 22-Jul-2013	12.00 22-Jul-2013		14.00 30-Sep-2019



demonstrated within the GIAs				
<p>Comments (achievements against targets): Target achieved and exceeded at 117 percent. The Project identified a total of 41 adaptation/sustainable land management technologies. The final result reflects 14 of them that are being implemented in the field: 1) Loosening of topsoil and deepening of soil profile by using paratill; 2) planting of perennial pastures to strengthen cattle raising; 3) inclusion of annual legumes in cattle raising management; 4) drip irrigation; 5) planning and implementation of crop rotation; 6) biologic pest management by means of strip cropping; 7) soil mapping; 8) land management zoning and mapping; 9) intercropping of legumes and perennial pastures for fodder; 10) consociated intercropping; 11) production of substrates through composting; 12) breeding of native plants; 13) simulation and evaluation of effects of drought; and 14) remediation of saline soil.</p>				

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Selected biophysical, social or economic attributes in the pilot sites improved to withstand conditions resulting from climate variability (Index 0-22)	Number	0.00	18.00		18.00
		22-Jul-2013	19-Dec-2018		30-Sep-2019

Comments (achievements against targets):
 Target achieved at 100 percent. The indicator measures partial advances towards more climate resilient agroecosystems, including improvements in quality of productive resources like irrigation water and soil profile, increased productivity, and resource efficiency, among others. For each SIS, the index result can be 0, 1 or 2, where 0 corresponds when none of the two preselected attributes for the SIS are improved, 1 when one improves, and 2 when both preselected attributes improve.

The list of the two biophysical, social or economic attributes selected for measurement across the 11 SIS in the three Geographic Intervention Areas (GIAs) and their index value until September 2019 is presented as follows:

Semi-arid GIA



- 1) Naposta-UNS: students with skills developed for management of sustainable production (number of participants in the field courses who report having gained new knowledge for practical application in the matter) and producers that adopted diversification practices promoted by the Project (number). Results: 1 and 0.
- 2) Naposta-CERZOS-CONICET: diversity of natural pastures (number of natural pastures per batch) and aerial biomass (kg of dry matter/batch). Results: 1 and 1.
- 3) Agroecological Unit Bordenave-San German: diversity of legume species with attributes for production (number of species per ha/batch) and diversity of arthropods (number of species per ha/batch). Results: 1 and 1.
- 4) Bordenave-San German Dryland: soil fertility (mg, P and N in kg of soil) and producers with a VERIS study needed to adapt their management plans to specific environmental constraints (number). Results: 0 and 1.
- 5) Levalle Dryland: quality of the forage dry matter (mg, P and N in kg of dry matter) and soil fertility (mg, P and N in kg of soil). Results: 1 and 0.

Irrigation GIA

- 6) Pradere Irrigation: efficiency of water management (liter of irrigation water/ha) and quality of irrigation water (saline concentration mg/l). Results: 1 and 1.
- 7) Ascasubi Irrigation: efficiency of water management (liter of irrigation water/ha) and availability of irrigation water (days with water available for irrigation per week/year). Results: 1 and 1.

Arid GIA

- 8) San Jose Dryland: forage productivity (kg/ha/year and roll/ha/year) and depth of the productive soil profile (depth measured by penetrometer). Results: 1 and 1.
- 9) Patagones Rangelands Monte Biome: Pasture surface under conservation and/or recovery (ha) and production of dry matter (kg/ha/year). Results: 1 and 0.
- 10) Apiarian Patagones: producers/students of the school with capacity developed to carry out plans of productive diversification (number of participants in the field courses who report being better equipped to apply the achieved knowledge in productive diversification) and local socio-productive structure strengthened with improved infrastructure (socio-productive agreement put into practice for the efficient use of the installed infrastructure). Results: 1 and 1.
- 11) Agrarian School Carlos Spegazzini: producers/students of the school with capacity developed to carry out plans of productive diversification (number of participants in the field courses who report being better equipped to apply the achieved knowledge in productive diversification) and producers that adopted practices promoted by the Project (number). Results: 1 and 1.



Component: Component 3: Applying a Participatory Approach to Knowledge Management and Monitoring and Evaluation

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of related articles/programs in the local media	Number	0.00	22.00		473.00
		22-Jul-2013	22-Jul-2013		30-Sep-2019

Comments (achievements against targets):

Target achieved and exceeded at 2150 percent. See paragraph 27.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
KM events with broad stakeholder representation	Number	0.00	8.00	8.00	9.00
		22-Jul-2013	19-Dec-2018	19-Dec-2018	30-Sep-2019

Comments (achievements against targets):

Target achieved and exceeded at 113 percent. As per the PT, the knowledge management events included broad stakeholder participation (local governments and technical institutions, national and provincial ministries/entities, farmers, educational institutions, international organizations and local media). Beyond two workshops organized in September 2015 on the Project indicators and formulation of the SIS proposals with focus on objectives, results and indicators, three annual workshops were organized to evaluate progress of Project activities until December 2016, 2017 and 2018. These workshops focused on monitoring the advances in the SIS and with the municipal plans, including reporting on the respective indicators. The workshops also served for exchange of experience and lessons learnt, including on the IEWS. Two more KM workshops were organized jointly with the Bank in form of a “brown back lunch, BBL” to disseminate good practices; the first on the Project’s overall results and lessons learnt until June 2018, and the second on the pilot to promote green jobs in March 2019. A further KM workshop was organized with SMN on the drought index and management in July 2019; it will be reflected in the results in the ICR. Overall, the PT has invested a plenty of work in communication and KM activities and the Project achieved strong



visibility in local media. Additionally, the PT was invited and participated in different workshops where related results, lessons learnt and initiatives were presented and discussed, including the National Action Program on Fight against the Desertification and Mitigation of the Effects of Drought, among others.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Institutions in charge of the Specific Intervention Sites that carry out the respective activities of monitoring and evaluation	Percentage	0.00 22-Jul-2013	70.00 22-Jul-2013		80.00 30-Sep-2019

Comments (achievements against targets):

Target achieved and exceeded at 114 percent. All the participating entities responsible of the SIS implementation at the local level (INTA Ascasubi, INTA Bordenave, CERZOS, Carlos Spegazzini Agrarian School and UNS) and the directly benefited farmers were trained on the Project indicators and monitoring and evaluation (M&E) techniques applied across the Project activities. However, systematic reporting on the results remained a challenge until the extension period, when the participating entities, except for the Carlos Spegazzini Agrarian School, carried out M&E activities as integral part of their final activities. In the 2017 and particularly the 2018 annual monitoring workshop, the SIS were required to present the results of their indicators. In February-March 2019, the same were revised against the baseline information, and the results of the indicators were updated in May 2019.

Component: Component 4: Developing a Sustainability Strategy

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Assumed institutional	Number	0.00	7.00		17.00



commitments for the continuity and sustainability of the Project results per sector and activity		22-Jul-2013	22-Jul-2013		30-Sep-2019
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Comments (achievements against targets):

Target achieved and exceeded at 243 percent. The result reflects the following 17 institutional commitments: SMN, INTA, CERZOS-CONICET, and UNS participating in the IEWS (4); a municipal ordinance on a Municipal Plan on Sustainable Forage Production signed and operational in the Municipalities of Puan, Villarino and Patagones (3); the national Ministry of Social Development, National Roads Agency and Municipality of Villarino participating in the pilot program on green employment on road side forestation (3); a Municipal Nature Reserve (protected area) established in the Municipalities of Puan and Villarino (2); and Municipal Environmental Agency created and functioning in the Municipality of Villarino (1); Carlos Spegazzini Agrarian School has established a honey extraction plant with bee keepers and municipal support in Patagones (1); a collaboration agreement established between the Foresta cooperative and a major supermarket cooperative called Cooperativa Obrera (1); an agreement between the INTA Prohuerta program and the National Ministry of Health and Social Development for financing a part of the water reservoirs under a new CORFO program for efficient water use that is under consolidation (1); and the Assembly Act of CORFO with a compromise to establish a new program to support financing of water efficiency measures by its members that started implementation in 2019 (1).

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Guiding material on possible policies to adapt to climate change produced and disseminated among decision makers	Yes/No	N 22-Jul-2013	Y 22-Jul-2013	Y	Y 31-May-2019

Comments (achievements against targets):

Target achieved at 100 percent. Beyond abundant communication materials (leaflets, posters, articles and videos), the Project developed six good practice guides/manuals on the principal adaptation measures it implemented: sustainable agricultural production, natural grassland management and restoration,



agroecology as a measure of adaptation to climate change, construction of excavated water reservoirs for pressurized irrigation, implantation and management of cultivated perennial pastures, and bee production. They are disclosed at the MAyDS website: <https://www.argentina.gob.ar/ambiente/tierra/bosques-suelos/manejo-sustentable-suelo/sudoesteba/guias-buenas-practicas>.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
New or adjusted policies approved to address climate change risks	Number	0.00 22-Jul-2013	4.00 22-Jul-2013		9.00 30-Sep-2019

Comments (achievements against targets):

Target achieved and exceeded at 225 percent. The nine political initiatives by the three targeted Municipalities (Puan, Villarino and Patagones) refer to the establishment and functioning of: two protected areas (Puan and Villarino); an Environmental Agency (Villarino); a strengthened municipal tree nursery (Puan); a pilot program of green employment with a road-side afforestation plan aimed at reducing wind erosion based on a strengthened municipal tree nursery (Villarino); three Municipal Plans on Sustainable Forage Production; and a honey extraction plant established by the Carlos Spegazzini Agrarian School with bee keepers and support by the Municipality of Patagones.



B. ORGANIZATION OF THE ASSESSMENT OF THE PDO

Objective/Outcome 1 (PDO) was to contribute to reducing climate vulnerability of the agroecosystems in the Southwest of the Recipient’s Buenos Aires Province.	
Outcome Indicators	<ol style="list-style-type: none"> 1. PDO #1 - Targeted institutions that the Project has prompted to attend adaptation needs in their structures, HR composition, work programs etc. to increase their capacity to address climate-related challenges (Number) - Target of 10 institutions achieved at 100 percent. 2. PDO #3 - Relevant threat and hazard information generated and disseminated to farmers and other stakeholders on a timely basis (Yes/No) - Target ‘Yes’ achieved at 100 percent with remarkable value added.
Intermediate Results	<ol style="list-style-type: none"> 1. Share of beneficiaries satisfied with information on climate change generated by the IEWS (disaggregated by gender) - Target of 75 percent of IEWS beneficiaries satisfied achieved and exceeded at 125 percent in 2019. 2. Assumed institutional commitments for the continuity and sustainability of the Project results per sector and activity (Number) - Target achieved and exceeded at 243 percent, reflecting the 17 institutional commitments. 3. New or adjusted policies approved to address climate change risks (Number) - Target of 4 achieved and exceeded at 225 percent.
Key Outputs by Component	<p>Component 1</p> <ol style="list-style-type: none"> 1. Targeted local public employees trained (disaggregated by gender) (Percentage, Custom) - Target achieved and exceeded at 138 percent. 2. Client days of training provided (Number) - Target achieved and exceeded at 184 percent. 3. Cultural and socio-productive activities carried out in the Project zone jointly with the municipal governments (fairs, exhibitions, etc.) (Number) - Target partially achieved at 46 percent. <p>Component 3</p> <ol style="list-style-type: none"> 4. Number of related articles/programs in the local media (Number) - Target achieved and exceeded at 2,150 percent. 5. KM events with broad stakeholder representation (Number) - Target achieved and exceeded at 113 percent. 6. Institutions in charge of the Specific Intervention Sites that carry out the respective activities of monitoring and evaluation (Percentage) - Target achieved and exceeded at 114. <p>Component 4</p> <ol style="list-style-type: none"> 7. Guiding material on possible policies to adapt to climate change produced and disseminated among decision makers (Yes/No) - Target ‘Yes’ achieved at 100 percent.



Objective/Outcome 2 was to contribute to reducing man-made vulnerability of the agroecosystems in the Southwest of the Recipient’s Buenos Aires Province.	
Outcome Indicators	<ol style="list-style-type: none">8. PDO #2 - Productive agroecosystems in the pilot sites maintained or improved to withstand conditions resulting from climate variability and change AF (Index) - Target achieved at 90 percent with additional considerations.9. PDO #4 - Farmers adopting improved agricultural technology (Number, disaggregated by gender) - Target achieved and exceeded at 105 percent, women (10 percent).
Intermediate Results	PDO 4 was an intermediate result upgraded to PDO at MT.
Key Outputs by Component	Component 2 <ol style="list-style-type: none">10. Adaptation/sustainable land management (SLM) technologies identified/verified through local participatory consultations under the Project framework that are demonstrated within the GIAs (Number) - Target achieved and exceeded at 117 percent.11. Selected biophysical, social or economic attributes in the pilot sites improved to withstand conditions resulting from climate variability (Index 0–22) (Number) - Target achieved at 100 percent.



ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Alejandro Alcala	Legal Counsel
Ana Elisa Bucher	Peer Reviewer
Charles Di Leva	Chief Counsel
Emilia Battaglini	Sector Manager (Acting)
Erick Fernandes	Peer Reviewer
Karin Kemper	Sector Manager
Lilian Pedersen	Social Development Specialist
Marcelo Hector Acerbi	Task Team Leader(s)
Michael Peter Steen Jacobsen	Peer Reviewer
Pablo Francisco Herrera	Environmental Specialist
Priti Kumar	Peer Reviewer
Richard Hosier	Peer Reviewer
Tuuli Johanna Bernardini	Task Team Leader(s)
Supervision/ICR	
Agostina Signorini	Team Member
Ana Elisa Bucher	Team Member
Anders Jensen	Sr. Monitoring and Evaluation Specialist
Anna Gueorguieva	Team Member - ICR Contributor: Economic Analysis
Daniel Chalupowicz	Financial Management Specialist
Daniela Fernanda Gayraud Aguayo	Team Member
Erika Ruth Felix	Team Member - ICR Main Author
Julio Sanjines Gonzales	Procurement Specialist(s)
Lilian Pedersen	Social Development Specialist
Marcelo Hector Acerbi	Task Team Leader(s)
Maria Elizabeth Grandio	Procurement Specialist(s)
Martin Ariel Sabbatella	Procurement Specialist(s)
Pablo Francisco Herrera	Environmental Specialist
Paula Agostina Di Crocco	Financial Management Specialist
Ruth Tiffer-Sotomayor	Task Team Leader(s)
Santiago Scialabba	Social Specialist
Tuuli Johanna Bernardini	Task Team Leader(s)/ICR Task Team Leader(s)



B. STAFF TIME AND COST		
Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US\$ (including travel and consultant costs)
Preparation		
FY11	-	1,065
FY12	11.15	34,521
FY13	7.69	21,221
FY14	4.90	10,269
Total	23.74	67,076
Supervision/ICR		
FY14	5.20	13,494
FY15	6.86	50,801
FY16	1.82	8,193
FY17	11.35	39,595
FY18	3.90	13,532
FY19	4.68	25,079
FY20	4.83	43,305
Total	38.64	193,999



ANNEX 3. PROJECT COST BY COMPONENT

Table 3. Project Original and Actual Cost by Component

Components	Amount at Approval (US\$, millions)	Actual at Project Closing (US\$, millions)	Percentage of Approval
Component 1: Reducing Institutional and Community-level Vulnerability	1.10	0.66	60
Component 2: Implementing Adaptation Measures in Productive Agroecosystems	2.37	2.57	108
Component 3: Applying a Participatory Approach to Knowledge Management and Monitoring and Evaluation	0.22	0.23	105
Component 4: Developing a Sustainability Strategy	0.27	0.42	156
Total	3.96	3.88	98

Note: Beyond the amounts allocated between the four components, the original project design included an unallocated amount of US\$0.11 million and an amount of US\$0.20 million reserved for project execution. In table 3, the total of the two amounts was allocated evenly between the four components at approval and at project closing.



ANNEX 4. EFFICIENCY ANALYSIS

1. An economic and financial analysis was undertaken during project preparation and again at the completion stage based on the available data and considering the approach at the appraisal stage. The analysis covered the activities under Component 2: Implementing Adaptation Measures in Productive Agroecosystems.

Efficiency Analysis at Appraisal

2. At appraisal, a cost-benefit analysis was conducted to estimate the economic benefits of implementing integrated crop and pasture management. The analysis covered some of the on-farm measures planned under Component 2 and implementation of the IEWS. Each of these measures presented positive economic returns either separately or integrated across the project components. The NPV of the project, integrating Component 2 and IEWS measures, was estimated at US\$17,578,259, and the EIRR at 53 percent. This analysis was carried out incorporating available information on climate variability that determines yield variability as well as crops and pasture rotation in the baseline scenario, without adoption of climate-smart agricultural practices. Aimed at looking beyond prevailing conditions, a climate-based sensitivity analysis was carried out. Given the available climate scenarios, water shortages were expected in the region due to temperature increase. The sensitivity analysis was made considering three different versions of a drought scenario: moderate, severe, and extreme. Under all these scenarios, the project exceeded the limits of the minimal profitability requirement, because the EIRR remains above the discount rate.

3. Component 2 analysis estimated the expected returns to the new adaptation measures introduced under the component. These estimations were made for each intervention zone and typical production systems, comparing business-as-usual returns and with-project returns. The estimates are presented in table 4.1. The NPV of integrated crop and pasture management under Component 2 is US\$6,135,718, and the internal rate of return is 71 percent. The PD analysis also estimates the benefits of land restoration activities and improved water management activities.

Table 4.1. PD Estimates for Returns to Integrated Crop and Pasture Management Activities under Component 2 Activities by Production Zone

Production Zone	Expected Increase in Net Benefit (Average US\$/ha)
Rainfed Villarino	25.3
Rainfed Patagones	22.5
Rio Colorado Valley	140.4

4. For the IEWS, a case study on wheat production was used, based on wheat’s emblematic role in the region. The estimated negative economic impacts of moderate, severe, and extreme drought events on wheat production in the SWBA were estimated. Additionally, the potential to reduce these losses in each scenario was estimated after the setup of the IEWS and establishment of enough capacity to use it effectively. Impacts of the IEWS on the economic losses in wheat production under different scenarios of drought events are estimated in the 12 SWBA municipalities. An average of about 1,191,589 ha of wheat are sown every year with an average yield of 1.8 tons per hectare.



Economic and Financial Analysis of Component 2

5. **Costs.** The costs included in the analysis were all costs of the project in all components, according to table 4.2.

Table 4.2. Original and Final Project Budget by Component

Project Components	Original PP Cost (US\$, millions)	Final
Component 1: Reducing Institutional and Community-level Vulnerability	1.027	0.768
1.1. Participation		
1.2. Early-Warning System on Climate Change and Desertification (IEWS)		
1.3. Capacity building		
Component 2: Implementing Adaptation Measures in Productive Agroecosystems	2.291	2.374
Component 3: Applying a Participatory Approach to Knowledge Management and Monitoring and Evaluation	0.140	0.264
Component 4: Developing a Sustainability Strategy	0.195	0.185
4.1. Three Municipal Plans on Sustainable Forage Production		
Unallocated	0.110	0.000
Execution costs	0.198	0.368
Total grant proceeds	3,960.200	3,959.000

6. **Benefits.** The project benefits calculated were those accruing to farmers under Component 2. Case studies of three SIS farm models were carried out for the San Jose, Patagones, and Ascasubi SISs. Using data of the business-as-usual profits compared to the observed profits, the marginal benefit of the project could be calculated for these models. These farm models were then applied to each SIS as reflected in the table 4.3. Because only the financial benefits to the farmers are estimated, the estimated financial benefits of the project are equal to the economic benefits, since there are no non-financial benefits estimated in this analysis.

Table 4.3. Economic Farm Model Applied in Each SIS

SIS	Activities	Economic Farm Model Applied
(1) Naposta-UNS	Development of a service unit for sustainable land use and management; experimental site	The project estimated farm model from field data collection based on the EcoLatina Report.
(2) Naposta-CERZOS-CONICET	Improvement and functional dynamics of natural grasslands of the SWBA; experimental site	Very experimental and does not reflect any other case studies
(3) Agroecological Unit Bordenave-San German	Generation of processes and techniques to restore ecosystem attributes that increase adaptive capacity in the SWBA; experimental site	Closest is San Jose; then approximate adoption based on number of trained farmers.
(4) Bordenave-San German Dryland	Implementation of soil management techniques through land zoning and soil mapping in agricultural and mixed systems in the	Very experimental and does not reflect any other case studies



SIS	Activities	Economic Farm Model Applied
	Municipality of Puan	
(5) Levalle Dryland	Implementation of soil management strategies through fertilization with nitrogen fixation in pastures and afforestation in fields	San Jose model; model adoption based on number of people trained; September 24 update: 20 farmers participated
(f) San Jose Dryland	Reduce vulnerability to wind erosion by improving soil structure to achieve better pasture implantations in fields	The project estimated farm model from field data collection based on the EcoLatina Report.
(7) Patagones Rangelands; Monte Biome	Strengthening of biodiversity and ecosystem services in pastures in rangelands/monte biome systems	The project estimated farm model from field data collection based on the EcoLatina Report.
(8) Apiarian Patagones	Beekeeping as an instrument for enhancing and valorization of ecosystem services in the Southern Patagonia	Same as 9
(9) Agrarian School Carlos Spegazzini	Model for diversification and sustainability of traditional agricultural systems through incorporation of olive groves	Beekeeping and olive production. Only the hectares of trees are known.
(10) Pradere Irrigation	Integral soil management, afforestation, and apiarian production in irrigated fields of small farmers	The project estimated farm model from field data collection based on the EcoLatina Report.
(11) Ascasubi Irrigation	Improvement of irrigation efficiency, recovery of saline soils, afforestation, and crop management in irrigated fields of small farmers	The project estimated farm model from field data collection based on the EcoLatina Report.

7. **The estimated farm models.** At project completion, three farm models were estimated. Several representative farms were surveyed in each production zone, as specified in table 4.4. Their net benefits, with and without project, were estimated in a study implemented by EcoLatina. The main results are presented in table 4.4.

Table 4.4. Estimation of Farm Models for Each Production Zone, Number of Farms Surveyed, and Average Farm Size

Production Zone	SIS Objective	Number of farms Surveyed	Farm Size (average ha)
San Jose Dryland	Reduce vulnerability to wind erosion by improving soil structure to achieve better pasture implantations in fields	8	750
Patagones Rangelands; Monte Biome	Strengthening of biodiversity and ecosystem services in pastures in rangelands/monte biome systems	5	2,500
Ascasubi Irrigation	Improvement of irrigation efficiency, recovery of saline soils, afforestation, and crop management in irrigated fields of small farmers	5	35

8. Eight farms were surveyed in the San Jose zone. The average estimates per farm are presented in table 4.5. Differences with PD-level estimates of benefits are large with the PD ex ante predictions far exceeding the survey results at the ICR stage.



Table 4.5. Survey Results per Farm, Net Benefits of the Project Activities in US\$ by Zone

Zone	US\$ in 2019	US\$ in 2020	US\$ in 2021	US\$ in 2022	US\$ in 2023
San Jose	-7,631.32125	2,086.750	3,591.250	7,888.000	11,177.500
Patagones	-3,298.2312	1,020.000	1,995.800	2,971.600	3,947.400
Ascasubi Irrigation	-830.416	791.724	791.724	791.724	791.724

9. The project achieved high economic efficiency, generating flows of economic benefits to society far exceeding the costs of the project. Using these costs and benefits, the economic and financial NPV of the activity is US\$43 million and the EIRR is 36 percent, indicating a high economic efficiency.

Table 4.6. NPV and EIRR

NPV 6%	US\$43,072,551.42
EIRR	36%

10. The economic and financial NPV and EIRR of only Component 2 for introducing new adaptation technologies are US\$43.9 million and 38 percent, respectively:

Table 4.7. NPV and EIRR of Component 2

NPV 6%	US\$43,937,715.19
EIRR	38%

11. The benefits of the project are likely higher as certain benefits were not quantified such as benefits of IEWS, increased community participation, and municipal plans. The empirically estimated benefits include the improved farmer profits under Component 2.

12. A sensitivity analysis was performed considering that no further adoption takes place by the trained farmers. The economic results indicate a drop of NPV and EIRR to US\$20.7 million and 29 percent, respectively, indicating that high returns to the activities are still maintained (see paragraph 25 in the main section).

13. Overall the results indicate a High economic efficiency with some administrative shortcomings, as detailed in paragraph 36 of the main section.



ANNEX 5. RECIPIENT COMMENTS

1. The PT within the MAyDS and responsible staff at the Ministry of Economy reviewed the draft ICR. The PT was satisfied with the draft and had no comments to share. Below, a translated summary of the project's final report by the PT is presented, yet the PT/MAyDS would have preferred a Spanish summary of their original version. The proposed inclusion of an 'efficiency index' by the Ministry of Economy in the discussion of Efficiency (footnote 25) is presented at the end of this annex.

2. The World Bank team acknowledges the long-term commitment to and efforts by the PT/MAyDS and the local participating institutions for successful achievement of the project objectives.

General Overview

3. The development of the agricultural sector in Argentina, like everywhere else, is increasingly conditioned by the impacts of climate change. This implies great challenges and opportunities in terms of finding more sustainable forms of production to reduce CO₂ emissions as well as to incorporate technologies that allow the sector to adapt and be better prepared to face these challenges and thus continue to maintain the livelihoods sustained by the agricultural production systems. The SWBA covers approximately 25 percent of the total area of the province, an area equivalent to the surface of Belgium. The SWBA is part of the semiarid, arid, and dry sub-humid regions of the country. A large part of the region's economy is based on agricultural activities. The area faces serious biophysical, climatic, and anthropogenic degradation processes, mainly through the loss of organic matter, compaction, wind, and water erosion that reduces productivity. The soils in the semiarid regions, especially those used for agriculture, are most at risk for degradation. These soils present unique characteristics that make them very susceptible to the impacts of climate variability and change, which ultimately result in serious soil erosion processes, including desertification.

4. This project was designed and implemented to support reduction of the vulnerability of the agricultural and livestock systems in the SWBA to the processes of desertification and climate variability and change, through adaptation measures in line with SLM. The targeted beneficiaries of the project were small and medium farmers/livestock ranchers and their families in the arid and semiarid areas of the SWBA. The specific geographical area of intervention were the municipalities of Villarino, Patagones, and Puan.

5. The project was a grant provided by the AF, executed by the MAyDS and implemented with the World Bank as the responsible multilateral implementing entity.

Results

6. The project promoted and enabled piloting of climate change adaptation actions through a continuous, intersectoral, and interinstitutional learning process. It promoted production-based adaptation measures in dryland agroecosystems by introducing techniques that promote sustainable and participatory management of natural resources while also strengthening capacity to climate change adaptation. The project supported cross-institutional collaboration to (a) create an adequate political, social, and economic framework to ensure the adoption, sustainability, continuity, and future



development of adaptation efforts and (b) strengthen and adjust the selected adaptation measures through institutional and community-level capacity building.

- **Disbursements and beneficiaries.** The project was fully implemented, with 98.21 percent of the resources being disbursed. It directly benefited a total of 1,632 people, of which 427 were producers (384 men and 43 women). The producers were small or medium agricultural and livestock producers located in the arid lands in the municipalities of Puan, Villarino, and Patagones in the SWBA.
- **Outcomes.** The PDOs were successfully achieved and even exceeded expectations in some cases, as indicated in table 5.1

Table 5.1. Project Outcomes

PDO Indicators	Target	Final Result ^a
PDO #1: Targeted institutions that the Project has prompted to attend adaptation needs in their structures, HR composition, work programs etc. to increase their capacity to address climate-related challenges	10	10 (100%)
PDO #2: Productive agroecosystems in the pilot sites maintained or improved to withstand conditions resulting from climate variability and change (Index)	10	9 (90%) ^b
PDO #3: Relevant threat and hazard information generated and disseminated to farmers and other stakeholders on a timely basis (Yes/No)	Yes	Yes (100%)
PDO #4: Farmers adopting improved agricultural technology (Number)	408	427 (105%)

Note: (a) The values in parentheses show the percentage with which the proposed objective was achieved.

(b) Measuring of this index indicator resulted challenging, and the final results remained lacking from the three SISs that were not supported by INTA.

Results by Component

7. **Component 1** improved the response and planning capacity of communities as well as local, regional, and national institutions to address climatic and man-made vulnerabilities of the targeted agroecosystems. It accomplished this through (a) collection and processing of data to generate key information to stakeholders and (b) analysis and discussion of this information to develop adequate decision-making processes at the institutional and farm level. The key outputs of Component 1 include the IEWS that collects, processes, and analyzes climatic data to inform on climatic risks and provide specific recommendations at the farm level. Key IEWS outputs during the project implementation period were 12 trimestral reports produced, 3,569 visitors and 7,354 visits in one of its websites, 12 new meteorological stations installed by the project in the area of intervention and linked to the red of meteorological stations administered by the SMN, and online drought index developed. These activities were complemented by promotion of sociocultural activities to reduce negative interactions. The results of Component 1, as measured by its indicators, are as shown in table 5.2.

Table 5.2. Results of Component 1

Intermediate Results	Target	Final Result
1.1: Share of beneficiaries satisfied with climate-related information and recommendations generated by the IEWS	75%	94% (125%)
1.1.1: Targeted local public employees trained	60%	83% (138%)



1.1.2: IEWS developed and functioning	Yes	Yes
1.2: % of consulted people that indicate a change in customs related to the project	60%	83%
1.2.1: Client days of training provided	64	118 (184%)

8. **Component 2** implemented adaptation measures in productive agroecosystems. The SLM practices in a context of severe climate change were developed and implemented to enhance adaptation and mitigation. The main interventions related to livestock and grazing land, crops, and water resources management. They were selected and evaluated during project implementation in close collaboration with local producer families and relevant technical institutions. The Component 2 outputs include (a) identification of 41 climate adaptation and SLM measures and (b) selection and implementation of 14 of these measures in 11 SISs. The direct beneficiaries of these measures were 427 (384 male and 43 female) producers. The project contributed US\$2.2 million worth of necessary equipment, tools, and capacity building to support the participating institutions and producers in the intervention area to implement the selected adaptation and SLM measures.

9. The summary of the SIS and the specific practices implemented are summarized in table 5.3. Each of these SISs prepared a final report detailing the activities carried out and the results obtained.

Table 5.3. Summary of the SISs and Practices Implemented

SIS	Practice	Technology	Rationale	Beneficiaries
(1) Agroecological Unit Bordenave-San German	Generation of processes and techniques to restore ecosystem attributes that increase adaptive capacity in the SWBA	Strip Cultivation	Crop rotation, strip cultivation, and agroforestry to increase biodiversity that improves conditions and enhances response to climate variability.	Direct - 30 producers Indirect - 120 producers in Southern Puan
(2) Bordenave-San German Dryland	Implementation of soil management techniques through land zoning and soil mapping in agricultural and mixed systems in the Municipality of Puan	Fertilization in crop management zones	Nitrogen fertilization generates an enrichment of the soil according to its needs. This nitrogen is incorporated into the pastures, improving its quality as forage and reducing the demand for chemical fertilization in the entire field.	Direct - 80 producers Indirect - 120 producers in Southern Puan
		Land zoning map	Producers access extension services that support their decision-making processes.	
(3) Naposta-CERZOS-CONICET	Improvement of functional dynamics of natural	Simulation and evaluation of drought impacts	Extreme drought promotes competition among species favoring the more drought-resistant ones. Evaluate	50 livestock producers



SIS	Practice	Technology	Rationale	Beneficiaries
	grasslands of the SWBA; experimental site		aboveground biomass per lot in a situation with extreme drought according to the growing species. Natural grasslands are expected to be more resistant with the presence of more native species than cultivated grasslands.	
(4) Naposta-UNS	Development of a service unit for sustainable land use and management; experimental site	Planning of SLM practices	The Department of Agronomy in the UNS is the main entity preparing future agronomists in the region. The incorporation of training in agriculture per zone, sustainability, and resilience is of vital importance to prepare future extensionists and build capacity to promote these practices.	Direct - 240 future extensionists and 200 producers Indirect - 1,000 producers in the SWBA
(5) Levalle Dryland	Implementation of grazing land management to improve grassland recovery	Intercropping of legumes and grasses with perennial forage crops	The intercropping of legumes and grasses enriches the soil through nitrogen fixation processes. This nitrogen is incorporated in the soil and part of it in the pastures, improving forage quality.	Direct - 23 producers Indirect - 200 producers
(6) Ascasubi Irrigation	Improvement of irrigation efficiency	Trickle (drip) irrigation	Drip irrigation increases the efficiency of water use in irrigation. Combined with reservoirs, it improves on-farm regular water availability, improving the quality and quantity of production per unit of irrigated area. Limitation in the quantity, quality, and frequency of water for irrigation (from 1 day/week and, in drought conditions, 1 day every 10 to 15 days). Having water availability with frequency and efficiently is key for adequate planning, production diversification,	Direct - 30 producers Indirect - 250 producers



SIS	Practice	Technology	Rationale	Beneficiaries
(7) Pradere Irrigation			and increased productivity.	
		Trickle (drip) irrigation	Same as above.	Direct - 30 producers
		Rainwater harvest in reservoirs	Reservoirs in this irrigation area are supplied by CORFO. It is expected that a combination of rainwater harvesting with improved water distribution reduces the concentration of salinity.	Indirect - 120 producers and 60 apiculture producers
(8) Patagones Rangelands; Monte Biome	Rangeland management through rotation of lots and regeneration of natural grasslands	Rotation of grazing pastures and regenerative closures	Rotation of grazing pastures with regeneration closures enables a more intensive and concentrated practice in specific lots, minimizing the requirements in the area. It contemplates a more rational management of lots to overcome overexploitation, avoiding bare soils and recovering natural grasslands. Improves the climate adaptation capacity of soil.	Direct - four producers of a rural change group Indirect - 114 producers and 154 service providers in the SWBA
(9) San Jose Dryland	Tillage management to reduce soil densification and improve soil structure to achieve better perennial pasture implantations	Deepening of the soil profile by using paratill	The use of paratill breaks the plough floor, increasing the depth of the productive horizon in the soil. This increases water retention capacity and allows grasses to establish deep rooting systems, thereby increasing biomass productivity.	Direct - 20 producers Indirect - 120 producers
(10) Agrarian School Carlos Spegazzini	Model for diversification and sustainability of traditional agricultural systems through incorporation of olive groves	Demonstration of an olive oil plantation in the SWBA	Participation of students in field activities to become acquainted with practices that promote greater resilience to climate change. This production model permits a diversification to reduce pressure from wheat production and improves water retention in soil.	Direct - 188 students-producers and initially 10 small-scale producers and their families
(11) Apiarian Patagones	Beekeeping as an instrument	Installation of demo apiaries	Training of beekeepers in the demonstration apiaries	Direct - 18 organized



SIS	Practice	Technology	Rationale	Beneficiaries
	for diversification of traditional production systems through enhancing and valorization of ecosystem services in the Southern Patagonia	Analysis of the value chain	regarding hive management, sanitary conditions, and other knowledge to guarantee a healthy bee colony with increased honey production capacity and major flower diversity. Extraction and processing of honey increases value added that motives diversification of rural productive activities through beekeeping as a viable economic option and improves producers' capacity to increase their climate resilience.	producers and 97 family members Indirect - 16 beekeepers in the region and 64 family members and 178 service providers

Revolving Funds for Municipal Plans for Sustainable Forage Production, Conservation of Natural Pastures, and Reforestation

10. Municipal revolving funds for sustainable soil management were established to perpetuate the forage resource in each of the three municipalities supported by the project. The funds were endorsed and promoted by municipal decrees. The main results of implementing these revolving funds supported by the project are as follows:

- 1,200 ha of perennial pastures with *agropyron* and *Vicia villosa Roth* in Villarino, Patagones, and Púan.
- Registration of 50 producers who have placed about 500 additional hectares of natural pasture in conservation.
- Collection of pasture seeds for an INTA seed bank, training in sustainable pasture management, and analyzing of soil samples for soil mapping stipulated as conditions for participation in the revolving funds.
- In Villarino, the municipal decree additionally promotes fire prevention measures and intercropping with an understory of native forest species for participation.

11. The key results of the project were systematized by the University of 'Tres de Febrero'. The report summarizes detailed information on the specific actions contemplated under the municipal plans, the experience gained in the Municipality of Villarino related to initiating creation of green jobs, and the development of the IEWS in collaboration among the SMN, INTA, UNS, CERZOS, and MAYDS.

12. Revolving fund for geomembrane reservoirs for water storage and management for irrigation within the framework of the CORFO and its Hydraulic Council, supported by INTA. This initiative aims to



scale up the practices and technologies implemented in the irrigation SIS. The project helped promote exchanges between the participating producers and technicians of different institutions. It contributed financially to purchase the two first and demonstrative geomembrane reservoirs as well as service the necessary machinery to carry out the works, including a sealer and a depth pitting machine.

13. Component 2 generated six guides for sustainable management of natural resources, covering sustainable agricultural production, natural grassland management and restoration, agroecology as a measure of adaptation to climate change, construction of excavated water reservoirs for pressurized irrigation, implantation and management of cultivated perennial pastures, and beekeeping. The implemented practices demonstrated that the productive systems in the SWBA are far from their productive ceilings because of serious soil quality and management limitations. Soil degradation processes are very evident. Measuring of soil quality revealed the lack of phosphorus and nitrogen that the project provided for participating farmers. Intercropping with *agropyron* and *Vicia spp* provided the best results among legumes, whereas intercropping *weeping lovegrass spp* both with *vicia spp* and *sweet clover* showed good results.

Table 5.4. Results of Component 2

Intermediate Results Indicators	Target	Final Result
2: Selected biophysical, social, or economic attributes in the pilot sites improved to withstand conditions resulting from climate variability	18	18 (100%)
2.1.1: Adaptation/sustainable land management (SLM) technologies identified/verified through local participatory consultations under the Project framework that are demonstrated within the GIAs	12	14 (117%)

14. Component 3 applied a participatory approach to knowledge management and the development of local capacities to adapt to climate change. The participating institutions supported the producers in monitoring, adaptive management, and dissemination of lessons learned of the project activities to raise public awareness and create ownership of the project. A total of 118 workshops were held, in which 2,172 people participated. The workshops helped build capacity on SLM practices, incorporation of climate variables in decision-making processes, and the use of the IEWS. Awareness raising and capacity building were also promoted through training provided by the project and 473 media communications were generated and registered along the implementation period. Some 75 people from different institutions participated in the final project workshop in Buenos Aires in September 2019, including staff from the MAyDS and its technical teams, representatives of the General Direction of Environment of the Ministry of Foreign Affairs, the ILO, the Chief of Cabinet of Ministers; the beneficiary municipalities, the INTA, the SMN, the National Ministry of Agriculture, Livestock, and Fisheries (MAGyP), and producers from the project's area of intervention. Noteworthy in the introductory panel was, for example, that the Director of the ILO Country Office spoke in favor of strengthening the synergies between several projects in the ILO portfolio aimed at promoting creation of decent/green jobs within the framework of a recently signed Memorandum of Understanding between the ILO and the UNCCD.

Table 5.5. Results of Component 3

Intermediate Results Indicators	Target	Final Result
3: Number of related articles/programs in the local media	82	473 (577%)
3.1: KM events with broad stakeholder representation	Yes	Yes



3.2: Institutions in charge of the Specific Intervention Sites that carry out the respective activities of monitoring and evaluation	70%	80% (114%)
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15. **Component 4** worked toward a sustainability strategy to promote sustainability of the project activities and results beyond project closure through collaboration agreements at the institutional and community level. The elaboration and approval of a related project ‘Incorporation of Biodiversity Conservation and Sustainable Land Management into Development Planning: Operationalizing Environmental Land Management in Argentina’ (ARG/19/G24), financed by GEF, contributed to continuity of various work fronts under the project. The coordination between the IEWS and a Drought Protocol implemented by the National Directorate of Agricultural Emergencies and Disasters and Directorate of Agricultural Risk and Insurance of the Sub-Secretariat of Political Coordination of the MAGyP offers another opportunity to sustain and strengthen key project activities both at the institutional and community level. Lastly, a working group has been set up between the MAyDS, MAGyP, and Ministry of Social Development to design and elaborate a National Drought Plan under the National Action Programme to Combat Desertification and Mitigate the Effects of Drought of the UNCCD.

16. The pilot initiative to promote green jobs supported the implementation of the first reforestation plan in the Municipality of Villarino in the last 60 years. Approximately 50 members of a new cooperative, called Foresta, planted approximately 3,000 trees on national roadsides to promote rangeland restoration from wind erosion and reproduced and planted around 2,000 native trees in three demonstrative modules.

17. The project prepared the following documents:

- Six Good Practice Guides available at <https://www.argentina.gob.ar/manejo-sustentable-del-suelo/guias-de-buenas-practicas-para-el-sudoeste-bonaerense>
- Final report on the development and implementation of the drought index for the project's area of influence
- Final report on systematization of the design and implementation process of the IEWS, the municipal plans for sustainable forage production, conservation of natural pastures and Reforestation, and promotion of green jobs
- Final report on systematization of the demonstrative experiences of sustainable agricultural production of three pilot sites carried out in the Municipalities of Patagones and Villarino, and Province of Buenos Aires
- Final evaluation of the project carried out by *CEIS Consultora*

Recommendations and Lesson Learned

18. Proactive participation of local stakeholders (institutions, producers, and communities) is key to the success of locally driven projects. A local perspective on natural resource management combined with participation of local scientific and technological institutions is crucial. Promoting a locally driven process grounded on the development vision of the local and national governments enhances collaboration



between different levels and types of actors (private and public) to reach agreements on goals, objectives, contributions, roles, responsibilities, and short- and medium-term commitments, all key elements for sustainability of actions. A participatory approach promotes transparency and trust among stakeholders and facilitates decision making on and implementation of planned activities.

19. The implementation of the pilot experiences was based on a collaborative model with clear roles and functions among all participants. Key success factors include having locally based project staff, knowledgeable of the local context, and engaging with producers who had experience with and thus trust the participating technical institutions. Participants trusted in the knowledge imparted by the project and committed to carry out the planned activities, this trust being of critical help to overcome challenges encountered during project implementation, especially related to the rigorous procurement rules that the project needed to follow.

20. In relation to the latter, preparation of a Procurement Plan for goods and services together with mapping of local suppliers is recommended. These actions will help identify the availability of local bidders and/or the need to consider inviting bidders from outside a project area to avoid potential procurement-related delays. Nevertheless, the stakeholders interviewed were overall satisfied with the timing and quality of the investments made. The fact that the technical specifications were provided by the local technical experts that led the implementation of the SIS was critical to ensure that appropriate goods and services were procured. The strong participation of local actors in the procurement processes increased the project management capacities at the local level and reduced learning curves and delays in future execution of similar activities, given that there was a trained team at the local level to replicate the project activities.

21. Although the indicators for project M&E were defined jointly by the technical teams at the national and local level, the generation of monitoring information and achievement of indicators was not used in an optimal manner to improve project management. The collection and systematization of the project results during project implementation presented weaknesses and gaps. In general, limited attention was paid to development of and follow-up of process indicators that could have supported project implementation in greater depth.

22. Regarding the implementation of SLM practices, they were carried out in the premises of producers that had previously engaged with the participating technical institutions. These producers were willing to offer their ranches as demonstration sites, an essential factor for sustainability of the demonstrated activities in longer term. This aspect was not explicitly planned during project preparation and is recommended as important eligibility criteria of future beneficiaries.

23. In terms of scalability, training and dissemination of results are important, but greater effort is still required to link different levels of government at both the provincial and national levels. The engagement will enable discussing and presenting project results more broadly and promoting replication of the SLM practices to be piloted across the country. The establishment of key programs as the revolving fund for geomembrane reservoirs by CORFO and the municipal plans for sustainable forage production, conservation of natural pastures, and reforestation by the Municipalities of Villarino, Patagones, and Puan are an indication of the commitment of local stakeholders to continue supporting these activities in the SWBA.



24. Beyond the concrete results achieved through resources invested in equipment, training, and human resources, the project leaves behind functioning teams that will provide continuity to the project-supported actions. This is proven by the technical, institutional, and material capacities at the national, provincial, and local levels, as evidenced by the 17 institutional agreements that were consolidated during project implementation. The development and steady improvement of the IEWS and its continuity after project closure is a clear example of the installed capacities in each of the areas covered by the project, links with new projects under development, and continued participation of the local technical institutional in different related thematic working groups up to the international level.

25. The project achievements are the result of a strong collaboration between various institutions that participated in the project. Their work generated tools and knowledge to enhance climate change adaptation and mitigation through productive activities and helped revert land degradation processes. Overall, the inter and intrainstitutional cooperation between technicians, cooperatives, local producers, and communities contributed significantly to the achievement of the project objectives. The strongest product is the IEWS operating at a local and regional scale with national-level support structure by the SMN. The IEWS implementation surpassed the expected results mainly because of the significant scope and outreach of its reports as well as the strong commitment demonstrated by the participating institutions and the IEWS users. This success can be replicated in other regions of the country.

Efficiency Analysis at Closing

26. In the framework of the final evaluation of the project, it is important to analyse issues of efficiency in the implementation of the respective disbursement flows. From this viewpoint, an efficiency index represents the quotient between the percentage disbursed and the percentage of time elapsed until the evaluation period in which the ISRs were carried out. Therefore, the time elapsed is from the date the Grant Agreement was signed to the end of the grace period; the date where it is possible to solicit the last disbursement. These data are shown in table 5.6 and are plotted in figures 5.1 and 5.2, without considering the minor cancellation of funds.

Table 5.6. ISR assessments (Development Objective and Implementation Progress ratings) and cumulative disbursements as of the date of the ISRs are shown, as well as efficiency ratios as of December 30, 2018 and March 31, 2020.

Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US\$M)	Efficiency Index at Original Closing Date (12/30/2018)	Efficiency Index at final deadline to request disbursements (03/31/2020)
04-01-14	MS	MS	0	0.00	0
16-08-14	MS	MS	0	0.00	0
31-08-15	MS	MS	0.5	0.42	0.52
13-06-16	MU	MU	0.5	0.27	0.34
10-02-17	MS	MS	1.2	0.48	0.61
17-05-18	S	S	2.8	0.81	1.03
19-12-18	S	S	3.5	0.88	1.12
29-09-19	S	S	3.9	0.85	1.07

27. Figures 5.1 and 5.2 consider efficiency evaluation variables and ratings arising from the ISRs.

Figure 5.1. Efficiency index obtained as of March 31, 2020 versus ISR dates. Red bars indicate stages that were rated as Moderately Satisfactory (MS). Blue bars indicate stages that were rated as Satisfactory (S). The green bar corresponds to the only stage rated as Moderately Unsatisfactory (MU).

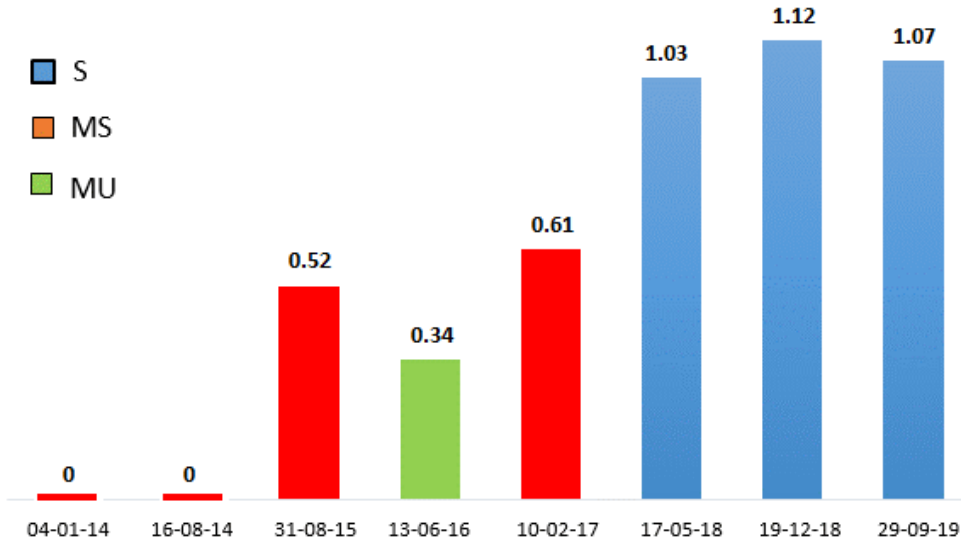
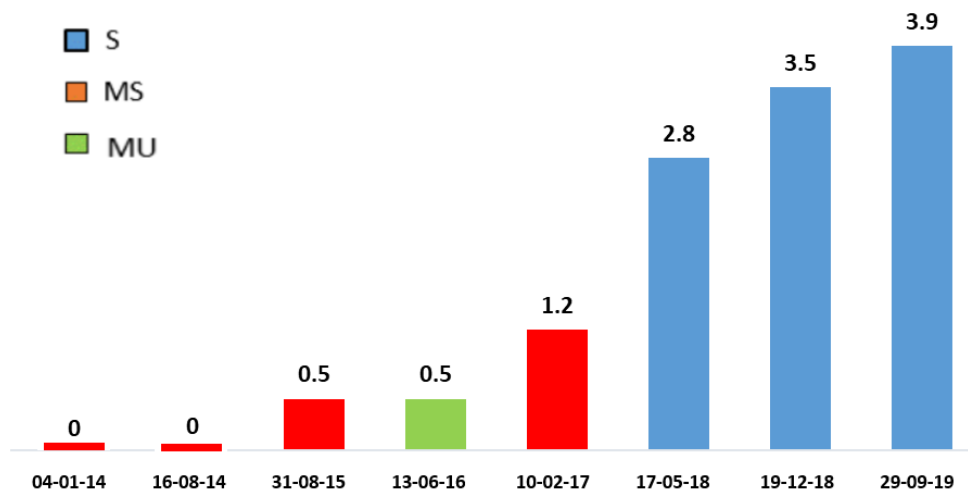


Figure 5.2. Evolution of the amounts disbursed (US\$M) calculated on the dates when the implementation status was evaluated, and results reported through the ISRs. Red bars indicate stages that were rated as Moderately Satisfactory (MS). Blue bars indicate milestones that were rated as Satisfactory (S). The green bar corresponds to the only stage rated as Moderately Unsatisfactory (MU).





28. As a summary, it is important to observe how the efficiency index of 1.07 in figure 5.1 reacted at September 29, 2019, without considering the minor cancellation of funds at the cut-off date of March 31, 2020: at project closing, the percentage disbursed was faster than the percentage of time elapsed until the final evaluation period covered in the last ISR.



ANNEX 6. SUPPORTING DOCUMENTS

Documents Used for Preparing the ICR

World Bank Documents:

All disclosed documents related to the project can be found at the World Bank external website at <https://projects.worldbank.org/en/projects-operations/document-detail/P125804> and all internal documents in the World Bank Operations Portal.

- Project Appraisal Document (79643-AR)
- Grant Agreement
- Adaptation Fund Project Proposal
- Implementation Supervision Reports (ISRs)
- MTR: Report of the Midterm Review submitted to the Adaptation Fund
- Two Restructuring Papers
- Supervision Aide Memoires
- Technical Supervision Reports
- Semester Progress Reports
- Annual progress reports submitted to the Adaptation Fund
- Procurement Post-Reviews
- Financial Management Supervision Reports
- Audit Reports
- Country Partnership Frameworks (CPF) and Systematic Country Diagnostic (P164150), September 12, 2018

Project-Produced Reports:

- **TNC baseline study for the PDO #2 indicator:** *“SSF-CF 73. Establecimiento de una Línea de Base y Sistematización de Indicadores para Mejorar el Manejo Sustentable de las tierras en el Sudoeste de la Provincia de Buenos Aires (BIRF TF 015041) y para el desarrollo de un Modelo de Inversión que regenere capital natural para el Sudoeste de la Provincia de Buenos Aires.”* August 21, 2017.
- **Final SMN Report on the IEWS and Drouth Index:** *“Monitoreo, predicción y alerta temprana de sequías en el sudoeste de la Provincia de Buenos Aires, Argentina: Reporte Final presentado por el Servicio Meteorológico Nacional a la Secretaría de Gobierno de Ambiente y Desarrollo Sustentable.”* May 1, 2019.



- **CEIS Consultora final project report:** “Evaluación Final y de Resultados, Proyecto Aumentado la Residencia Climática y Mejorando el Manejo Sostenible de la Tierra en el Sudoeste de la Provincia de Buenos Aires.” September 2019. Unpublished.
- **EcoLatina (Consultora en Economía y Empresas) report:** “Sistematización de las Experiencias Demostrativas de Producción Agropecuaria Sustentable de Cuatro Sitos Pilotos llevados a cabo en los Partidos de Patagones y Villarino Provincia de Buenos Aires.” Proyecto Aumentado la Residencia Climática y Mejorando el Manejo Sostenible de la Tierra en el Sudoeste de la Provincia de Buenos Aires.” September 11, 2019. Unpublished.
- **Project’s final report by the Project Team/MAYDS:** “Informe de Gestión / Resultados del Proyecto BIRF TF N° 015041: Aumentando la Resiliencia Climática y Mejorando el Manejo Sustentable de la Tierra en el Sudoeste de la Provincia de Buenos Aires”. March 25, 2020.

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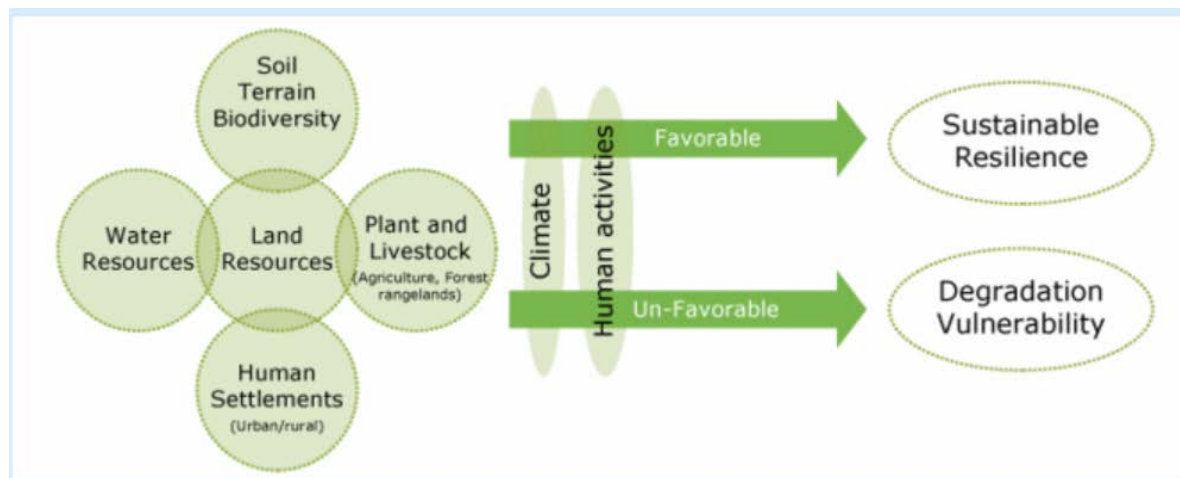
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Ziadat, F., Bunning, S., Corsi, S., and R. Vargas. 2018. *Sustainable Soil and Land Management for Climate Smart Agriculture* (the Vargas 2013 graph is in this document).



ANNEX 7. ADDITIONAL PROJECT OUTCOME INFORMATION

Figure 7.1. Unfavorable Climatic Conditions Coupled with Mismanagement of Natural Resources Leading to Degradation and Vulnerability



Source: FAO 2017.

Table 7.1. Summary of PDO #2 Indicator Baseline versus End Line Applying Proxy from Algorithm of Soil Quality Attributes by TNC

No.	SIS	Baseline (%)	End Line (%)	Observation
1	Naposta UNS-Cerzos Amb 1,2, and 3	78	78	Maintained
2	Naposta UNS-Cerzos Amb 4 and 5	95	95	Maintained
3	Agroecological Bordenave	45	78	Improved
4	Bordenave San German Dryland	65	78	Improved
5	San Jose Dryland	43	40	Maintained with minor change
6	Apiarian Patagones	Without sampling		
7	Patagones Rangelands	60	45	Decreased
8	Lavalle Dryland	53	53	Maintained
9	Pradere Irrigation	75	75	Maintained
10	Ascasubi Irrigation	30	30	Maintained
11	Spagazzini Agrarian Schools	Without sampling		
12	Vivero Villarino Barlovento	35	No data	Insufficient data
13	Vivero Villarino Sotavento	25	No data	Insufficient data
14	Vivero Villarino without windbreak	78	No data	Insufficient data

Source: Based on results reported by the TNC for the project baseline. Data from the end line sampling conducted by INTA and other responsible institutes in 2019 were used to quantify the proxy using the algorithm calculation by the TNC.



Box 7.1. Explanation on Baseline Methodology PDO #2 Indicator

The TNC proxy for the 11 SISs takes into consideration soil cover, organic carbon, bulk density, and available phosphorous, and for the 2 irrigated SIS, two additional variables, electrical conductivity and exchangeable sodium percentage, are taken into account. During the baseline study, referenced values for these variables were established in each SIS across the three GIAs and used to established thresholds to measure improvements. The following tables summarize the variables/description and max and min expected values and the value of the index for each variable. *Source:* TNC baseline study for the PDO #2 indicator.

Reference Values for Rainfed SIS

Variable/Indicador	Description	Max.	Min.	Status	Impact	Value	Index (Impact x Value)
Soil Cover %	Greater or equal to 75	100	75	High	0.5	1	0.5
Soil Cover %	Greater or equal to 50, less than 75	74	50	Medium High	0.5	0.75	0.375
Soil Cover %	Greater or equal to 30, less than 50	49	30	Medium Low	0.5	0.5	0.25
Soil Cover %	Less than 30	29	0	Low	0.5	0.25	0.125
Carbon, Mg/ha	Greater or equal to 60	Greater than 60	60	High	0.3	1	0.3
Carbon, Mg/ha	Greater or equal to 45, less than 60	59	45	Medium high	0.3	0.75	0.225
Carbon, Mg/ha	Greater or equal to 30, less than 45	44	30	Medium low	0.3	0.5	0.15
Carbon, Mg/ha	Less than 30	29	0	Low	0.3	0.25	0.075
Bulk Density, gr/cm3	Less than 1,3	Less than 1	1.29	Low	0.1	1	0.1
Bulk Density, gr/cm3	Greater or equal to 1,3, less than 1,4	1.39	1.3	Medium Low	0.1	0.75	0.075
Bulk Density, gr/cm3	Greater or equal to 1,4, less than 1,5	1.49	1.4	Medium High	0.1	0.5	0.05
Bulk Density, gr/cm3	Greater or equal to 1,5	Greater than 1,5	1.5	High	0.1	0.25	0.025
Available Phosphorous, ppm	Greater or equal to 20	Greater than 20	20	High	0.1	1	0.1
Available Phosphorous, ppm	Greater or equal to 15, less than 20	19	15	Medium high	0.1	0.75	0.075
Available Phosphorous, ppm	Greater or equal to 10, less than 15	14	10	Medium low	0.1	0.5	0.05
Available Phosphorous, ppm	Less than 10	9	Less than 9	Low	0.1	0.25	0.025

Reference Values for Irrigated SIS

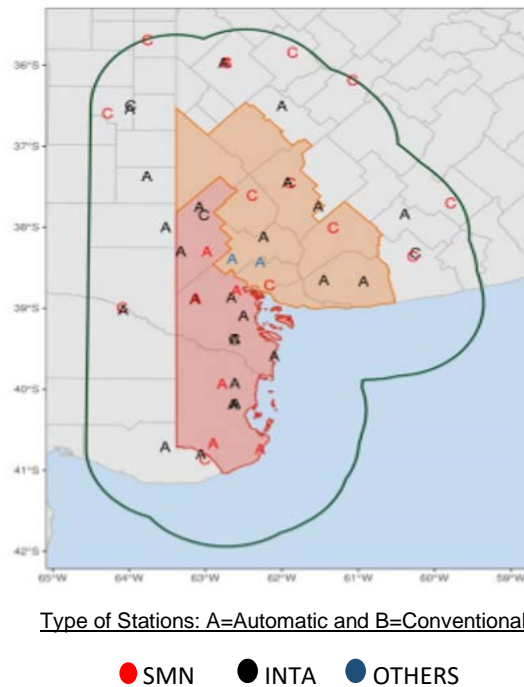
Variable/Indicador	Description	Max.	Min.	Status	Impact	Value	Index (Impact x Value)
Soil Cover %	Greater or equal to 75	100	75	High	0.15	1	0.15
Soil Cover %	Greater or equal to 50, less than 75	74	50	Medium High	0.15	0.75	0.1125
Soil Cover %	Greater or equal to 30, less than 50	49	30	Medium Low	0.15	0.5	0.075
Soil Cover %	Less than 30	29	0	Low	0.15	0.25	0.0375
Carbon, Mg/ha	Greater or equal to 60	Greater than 60	60	High	0.15	1	0.15
Carbon, Mg/ha	Greater or equal to 45, less than 60	59	45	Medium High	0.15	0.75	0.1125
Carbon, Mg/ha	Greater or equal to 30, less than 45	44	30	Medium Low	0.15	0.5	0.075
Carbon, Mg/ha	Less than 30	29	0	Low	0.15	0.25	0.0375
Apparent Density, gr/cm3	Less than 1,3	Less than 1	1.29	Low	0.05	1	0.05
Apparent Density, gr/cm3	Greater or equal to 1,3, less than 1,4	1.39	1.3	Medium Low	0.05	0.75	0.0375
Apparent Density, gr/cm3	Greater or equal to 1,4, less than 1,5	1.49	1.4	Medium High	0.05	0.5	0.025
Apparent Density, gr/cm3	Greater or equal to 1,5	Greater than 1.5	1.5	Low	0.05	0.25	0.0125
Available Phosphorous, ppm	Greater or equal to 20	Greater than 20	20	High	0.05	1	0.05
Available Phosphorous, ppm	Greater or equal to 15, less than 20	19	15	Medium High	0.05	0.75	0.0375
Available Phosphorous, ppm	Greater or equal to 10, less than 15	14	10	Medium Low	0.05	0.5	0.025
Available Phosphorous, ppm	Less than 10	9	Less than 9	Low	0.05	0.25	0.0125
Electrical Conductivity, ds.m-1	Less than 2	1.9	Less than 1	Low	0.3	1	0.3
Electrical Conductivity, ds.m-1	Greater or equal to 2, less than 3	2.9	2	Medium Low	0.3	0.75	0.225
Electrical Conductivity, ds.m-1	Greater or equal to 3, less than 4	3.9	3	Medium High	0.3	0.5	0.15
Electrical Conductivity, ds.m-1	Greater or equal to 4	Greater than 4	4	High	0.3	0.25	0.075
Exchangeable Sodium Saturation	Less than 13	12.9	Less than 10	Low	0.3	1	0.3
Exchangeable Sodium Saturation	Greater or equal to 13, less than 14	13.9	13	Medium Low	0.3	0.75	0.225
Exchangeable Sodium Saturation	Greater or equal to 14, less than 15	14.9	14	Medium High	0.3	0.5	0.15
Exchangeable Sodium Saturation	Greater or equal to 15	Greater than 15	15	High	0.3	0.25	0.075



Figure 7.2. Visual Observations of Fields Visits during the 2019 ICR Mission by Erika Felix, World Bank



Figure 7.3. Map of the Meteorological Stations in a 100 km Buffer Zone of the Project’s Direct Area of Intervention in the SWBA at Project Closure



Source: Final SMN Report on the IEWS and Drouth Index