ADAPTATION FUND

REQUEST FOR PROJECT/PROGRAMME FUNDING FROM ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN G6-602
Washington, DC. 20433
U.S.A
Fax: +1 (202) 522-3240/5
Email: secretariat@adaptation-fund.org

ACRONYMS

AOP	Annual Operational Plan	Plan Operativo Anual
AR4	Forth Assessment Report	Cuarto Informe de Evaluación
AGAVISA	Cattle Ranching Association of the Northern Villarino	Asociación de Ganaderos de Villarino Norte
BA	Buenos Aires Province	Provincia de Buenos Aires
CERZO	Renewable Natural Resource Center of Arid Zones	Centro de Recursos Naturales Renovables de las Zonas Áridas
CIC	Scientific Investigations Commission	Comisión de Investigación Científica
CIM	Center for International Migration	Centro para la Migración Internacional
CIMA	Research Center of the Sea and the Atmosphere	Centro de Investigaciones del Mar y la Atmósfera
CISAUA	Center of Research on Soil and Water for Agricultural Use	Centro de Investigación del Suelo y el Agua para uso Agrícola
CONAE	National Space Activities Commission	Comisión Nacional de Asuntos Espaciales
CONICET	National Center of Scientific and Technical Research	Consejo Nacional de Investigaciones Científicas y Técnicas
COP	Conference of the Parties	Conferencia de las Partes
CORFO	Corporation for the Promotion of the Colorado River	Corporación de Fomento del Valle Bonaerense del Río Colorado
CSO	Civil Society Organization	Organización de la Sociedad Civil
EAP	Farming Units	Explotaciones Agropecuarias
ECLAC	Economic Commission for Latin America and the Caribbean	Comisión Económica para América Latina
EEA	Experimental Agricultural Station	Estación Experimental Agropecuaria
EIA	Environmental Impact Analysis	Análisis de Impacto Ambiental
EIRR	Economic Internal Rate of Return	Tasa Económica Interna de Retorno
ENSO	El Niño - Southern Oscillation	El Niño Oscilación del Sur
ESMF	Environmental and Social Management Framework	Marco de Gestión Ambiental y Social
FAUBA	Faculty of Agronomy of the University of Buenos Aires	Facultad de Agronomía de la Universidad de Buenos Aires
FM	Financial Management	Manejo Financiero
FOGABA	Buenos Aires Credit Guarantee Fund	Fondo de Garantías de Buenos Aires
FONCAP	Social Capital Fund	Fondo de Capital Social
GAP	Good Agricultural Practices	Buenas Prácticas Agrícolas
GCCC	Argentine Governmental Committee on Climate Change	Comité Gubernamental Argentino sobre Cambio Climático
GCM	Global Circulation Model	Modelo de Circulación Global
GDP	Gross Domestic Product	Producto Interno Bruto
GEF	Global Environment Facility	Fondo para el Medio Ambiente Mundial – FMAM
GHG	Green House Gases	Gases de Efecto Invernadero
GIA	Geographic Intervention Area	Área Geográfica de Intervención
GIS	Geographic Information System	Sistema Geográfico de Información
GIZ	German International Cooperation	Agencia de Cooperación Técnica Alemana
GRM	Grant Monitoring and Reporting	Monitoreo y Reporte de la Donación
HQ	Head Quarters	Casa Central
ICTs	Information & Communication Technologies	Tecnologías de la Comunicación e Información
IDB	Inter-American Development Bank	Banco Interamericano de Desarrollo

IEWS	Information and Early Warning System	Sistema de Información y Alerta Temprana
INA	National Institute of Water	Instituto Nacional del Agua
INAP	National Public Administration Institute	Instituto Nacional de Administración Pública
INTA	National Institute for Agricultural Technology	Instituto Nacional de Tecnología Agropecuaria
INTI	National Industrial Technology Institute	Instituto Nacional de Tecnología Industrial
IPAP	Provincial Public Administration Institute	Instituto Provincial de Administración Pública
IPPF	Indigenous Peoples Planning Framework	Marco de Planificación Indígena
IRPF	Involuntary Resettlement Policy Framework	Marco de Política de Reasentamiento
ISR	Implementation Status Report	Reporte sobre el Estado de Implementación
KM	Knowledge Management	Gestión del Conocimiento
LADA-FAO	Land Degradation Assessment in Dryland Areas – Food and Agriculture Organization	Evaluación de la Degradación de Tierras en Zonas Áridas – Organización para la Agricultura y la Alimentación
LD	Land Degradation	Degradación de la tierra
LUT	Land Utilization Types	Tipos de Usos del Suelo
MAA	Ministry of Agrarian Affairs	Ministerio de Asuntos Agrarios
MAGyP	Ministry of Agriculture, Livestock and Fisheries	Ministerio de Agricultura, Ganadería y Pesca
MDS	Ministry of Social Development	Ministerio de Desarrollo Social
MEA	Multilateral Environmental Agreements	Acuerdos Ambientales Multilaterales
MERCOSUR	Common Market from the South	Mercado Común del Sur
MIE	Multilateral Implementation Entity	Entidad Multilateral de Implementación
NAP	National Action Plan	Plan de Acción Nacional
NB	Net Benefit	Beneficio Neto
NCCS	National Climate Change Strategy	Estrategia Nacional de Cambio Climático
NDVI	Normalized Difference Vegetation Index	Índice de Diferencia Normalizada de Vegetación
NPV	Net Present Value	Valor Presente Neto
OPDS	Provincial Agency for Sustainable Development	Organismo Provincial para el Desarrollo Sostenible
ORA	Agricultural Risk Office	Oficina de Riesgo Agropecuario
P&M	Policies and Measures	Políticas y Medidas
PAF	Small Family Agriculture	Pequeña Agricultura Familiar
PDSO	Development Plan of the South West of the Buenos Aires Province	Plan de Desarrollo del Sudoeste Bonaerense
PERMER	Renewable Energy in the Rural Market Project	Proyectos de Energías Renovables en Mercados Rurales
PEUZO	Zonal University Education Program	Programa de Educación Zonal Universitaria
PIU	Project Implementation Unit	Unidad Ejecutora de Proyecto
PROSAP	Provincial Agricultural Services Programme	Programa de Servicios Agrícolas Provinciales
RIAN	Network of National Agricultural Information	Red de Información Agrícola Nacional
RIAP	Pampas Agricultural Information Network	Red de Información Agrícola de la Pampas
SAyDS	Secretariat of Environment and Sustainable Development	Secretaría de Ambiente y Desarrollo Sustentable

SENASA	National Food Safety and Quality	Servicio Nacional de Sanidad y Calidad Agroalimentaria
SIS	Specific Intervention Sites	Sitios Específicos de Intervención
SLM	Sustainable Land Management	Manejo Sostenible de la tierra
SNC	Second National Communication	Segunda Comunicación Nacional
SWBA	South West of the Buenos Aires Province	Sudoeste de la Provincia de Buenos Aires
TEU	Territorial Executing Unit	Unidad Ejecutora Territorial
TMU	Technical Management Unit	Unidad de Manejo Técnico
TNC	Third National Communication	Tercera Comunicación Nacional
UBA	University of Buenos Aires	Universidad de Buenos Aires
UNCCD	United Nations Convention to Combat Desertification	Convención de las Naciones Unidas para combatir la Desertificación
UNFCCC	United Nations Framework Convention on Climate Change	Convención Marco de las Naciones Unidas sobre Cambio Climático
UNLP	National University of La Plata	Universidad Nacional de la Plata
UNS	Southern National University	Universidad Nacional del Sur
URO	Regional Operational Unit	Unidad Regional Operativa
UTN	National Technological University	Universidad Tecnológica Nacional
WB	The World Bank	Banco Mundial

PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

PROJECT/PROGRAMME CATEGORY: **REGULAR PROJECT/PROGRAMME**
COUNTRY/IES: **ARGENTINA**
SECTOR/S: AGRICULTURE, ENVIRONMENT
TITLE OF PROJECT/PROGRAMME: **INCREASING CLIMATE RESILIENCE AND ENHANCING SUSTAINABLE LAND MANAGEMENT IN THE SOUTHWEST OF THE BUENOS AIRES PROVINCE**
TYPE OF IMPLEMENTING ENTITY: MIE
IMPLEMENTING ENTITY: **WORLD BANK**
NATIONAL SECRETARIAT OF ENVIRONMENT AND SUSTAINABLE DEVELOPMENT
AMOUNT OF FINANCING REQUESTED: **4,296,817** (IN U.S. DOLLARS EQUIVALENT)

PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

Provide brief information on the problem the proposed project/programme is aiming to solve. Outline relevant climate change scenarios according to best available scientific information. Outline the economic social, development and environmental context in which the project/programme would operate.

Argentina; National Level

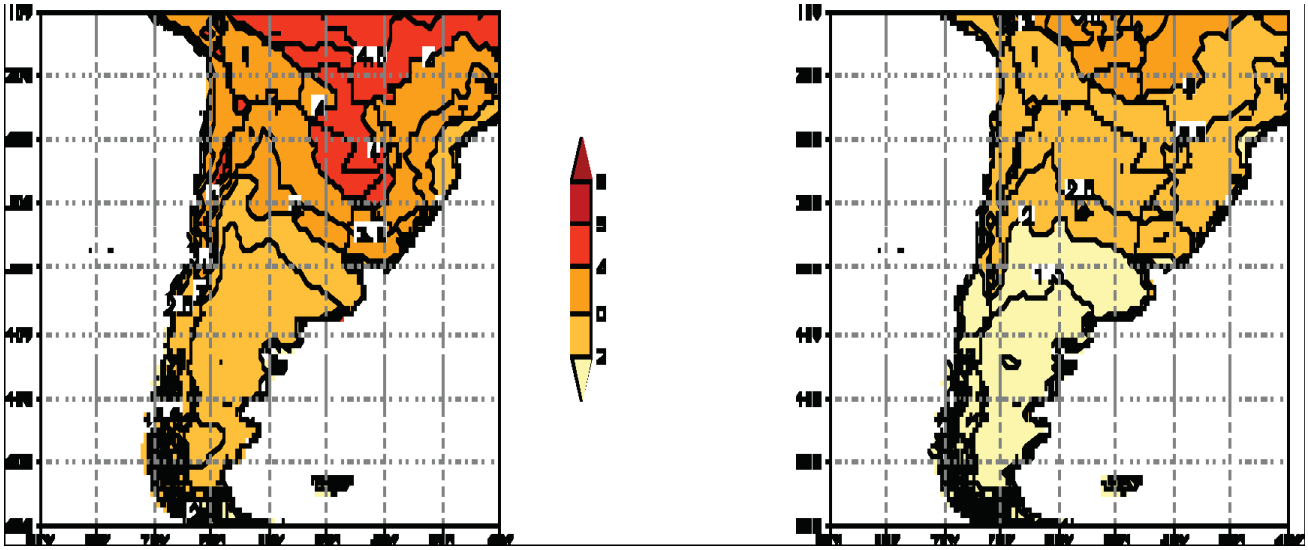
The Argentine Republic's recent macroeconomic performance has been relatively strong; between 2002 and 2010 the Gross Domestic Product (GDP) grew, on average, 7.6% per year in real terms, enabling the country to cut poverty and unemployment rates to levels experienced prior to the 2001 economic crisis. Economic activity started to slow in the last quarter of 2008 due to the impact of the global financial crisis, and further in 2009 due to, among other factors, a severe drought that weighed on agricultural production. The economy rebounded strongly in 2010, fueled by fast growth in internal consumption and external demand as well as by increasing commodity prices. Real GDP grew by 9.2% and is estimated to grow 6% in 2011.

The Second National Communication (SNC) of the Republic of Argentina to the United Nations Framework Convention on Climate Change (UNFCCC) from 2007 provides the latest official climate scenarios available for Argentina. Focused on the period 2080-2090, they project increases in mean and extreme temperatures and changing precipitation patterns. These effects will have diverse impacts on regions, communities and economic sectors, but there are considerable underlying scientific uncertainties related to their magnitude and timing. Although projections for 2080-2090 are uncertain, they can be useful for shorter-term adaptation planning. In the case of temperature, both A2 and B2 scenarios of the

Intergovernmental Panel on Climate Change (IPCC)[1] have a clear warming trend that is more pronounced in the north; more than 4 °C in the A2 scenario. In the case of precipitation, trends are less clear (see Figures 1 and 2).

For projections for 2020-2040, the use of MM5-CIMA has been focused on the Patagonia and the Andes that are the areas where the Global Circulation Models (GCM) do not adequately forecast even the order of magnitude of projected precipitation (see Figure 3).

Figure 1: Projected changes in the annual mean temperature (°C) in 2080/2090 compared with 1980/1990 based on the MMC-CIMA regional model. The graphic at left is from the IPCC A2 scenario, and the graphic at right from the IPCC B2 scenario.



[1] The A2 family of scenarios is characterized by: (i) world of independently operating, self-reliant nations; (ii) continuously increasing population; and (iii) regionally oriented economic development. The more ecologically friendly B2 scenarios are characterized by: (i) continuously increasing population, but at a slower rate than in A2; (ii) emphasis on local rather than global solutions to economic, social and environmental stability; (iii) intermediate levels of economic development; and (iv) less rapid and more fragmented technological change than in A1 and B1.

Figure 2: Idem Figure 1 for precipitation (mm/day)

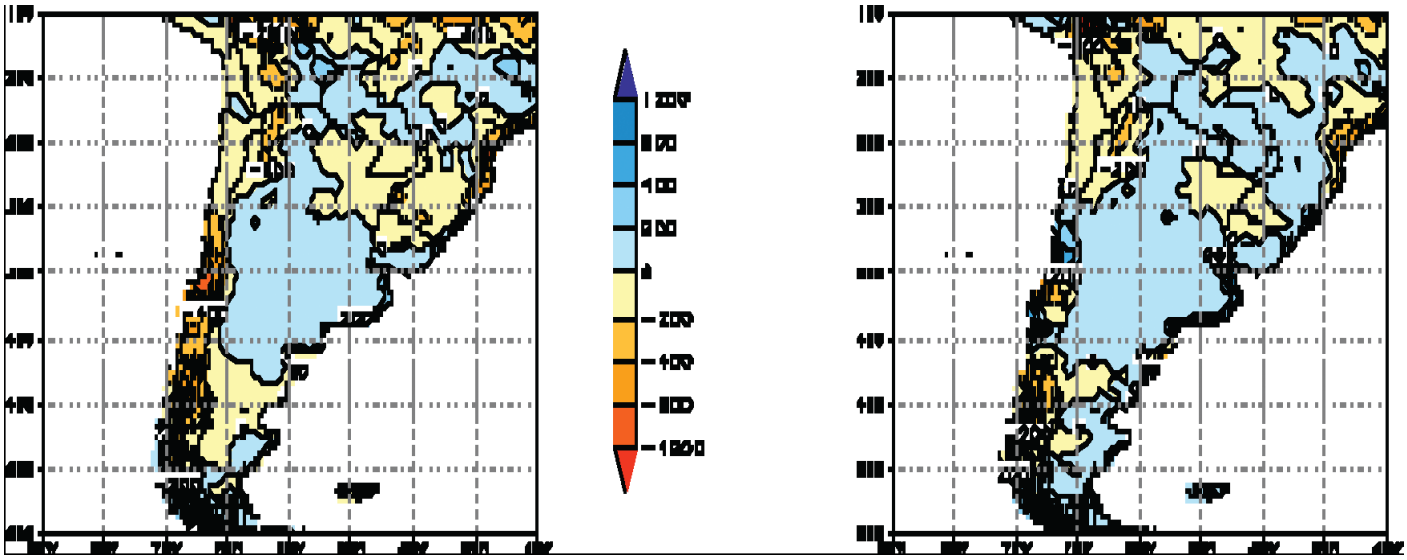
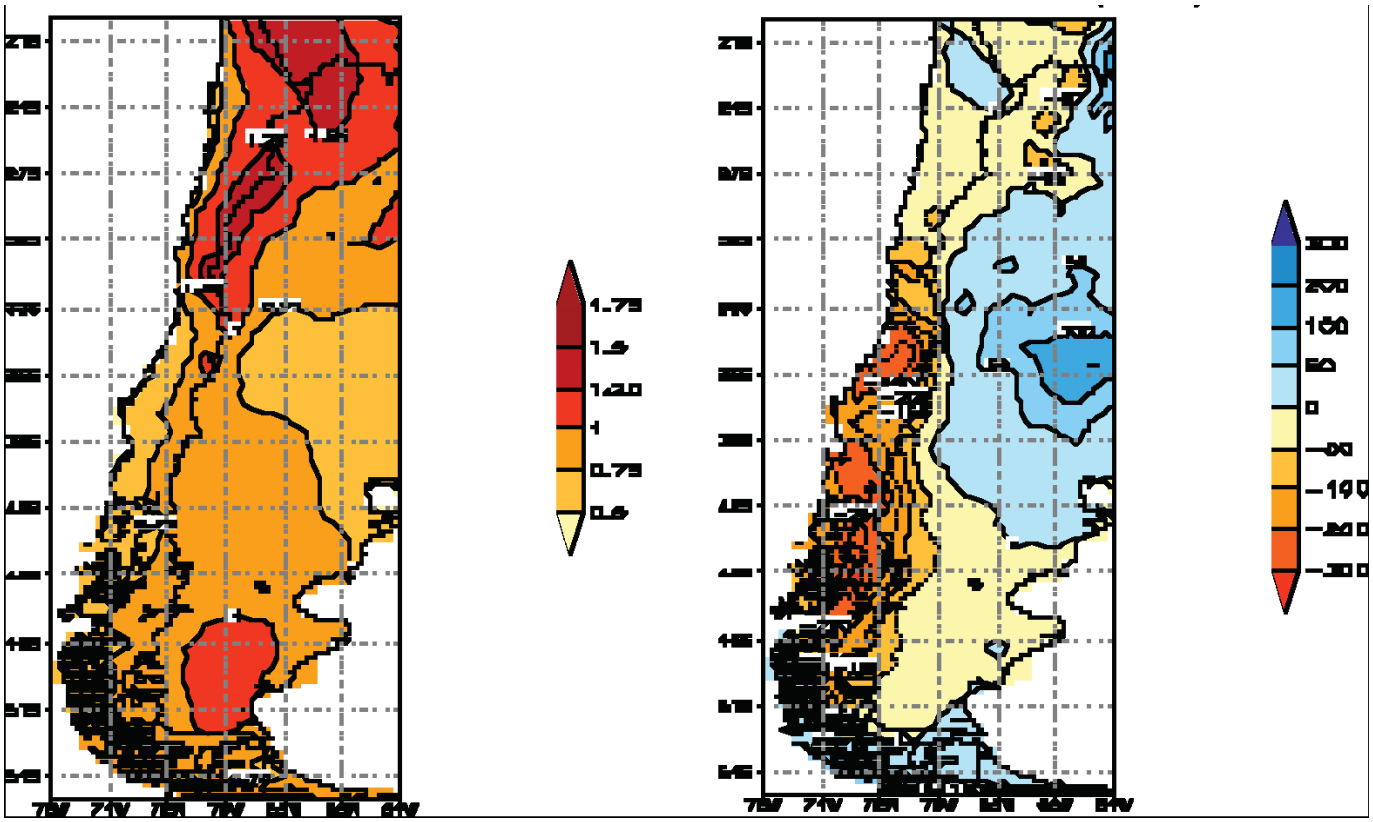


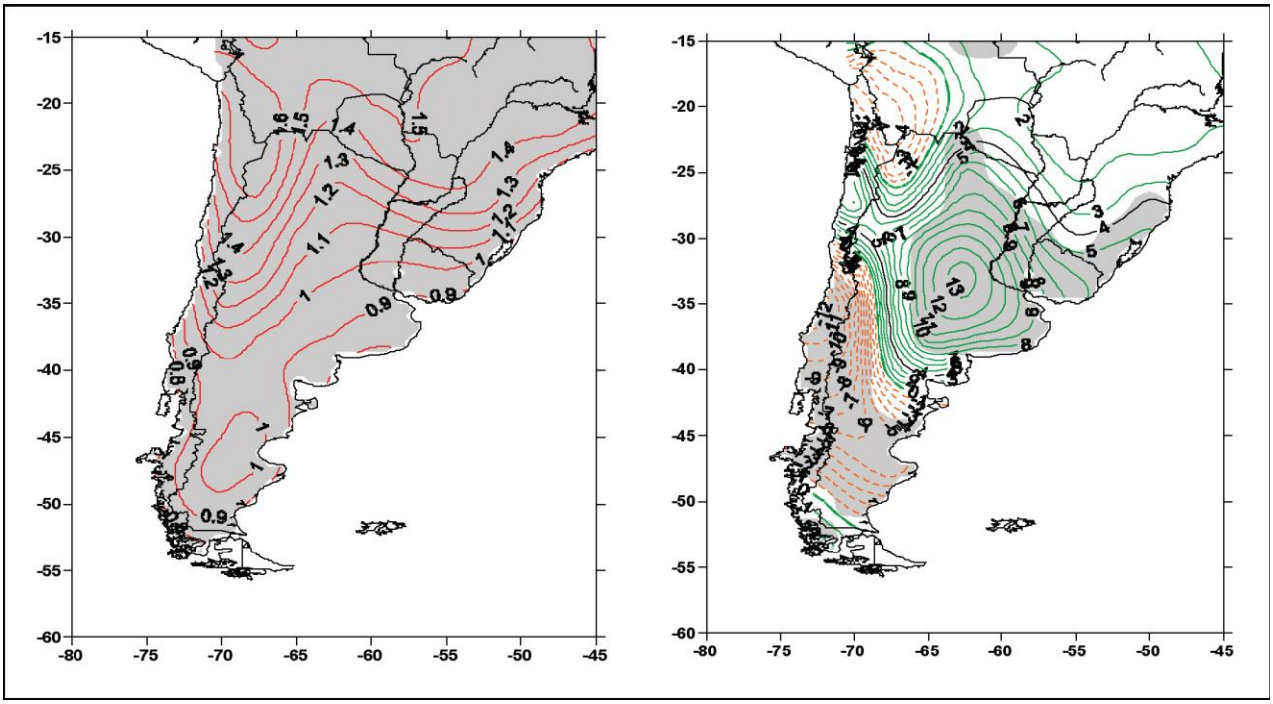
Figure 3: At left, projected changes in the annual mean temperature (°C) in 2020/2030 compared with 1980/1990; at right idem for precipitation from the IPCC A2 scenario based on the MMC-CIMA regional model.



The climate scenarios prepared for the fourth IPCC report (2007) have some improvement in the representation of the climate of Argentina over the previous generation of scenarios from

2001. Therefore, and considering the uncertainty associated with the variability between climate models, an average scenario of the models that best represent the current climate was prepared. The resulting projected changes are for the time horizon 2020-2040 (see figure 4).

Figure 4: Scenarios of annual temperature change (° C) to the left and precipitation (%) on the right for the decade 2020-2040 compared with 1961-1990 using the IPCC A1B scenario. An assembly of nine GCMs was used in the case of temperature, and 14 GCMs in precipitation. The areas shaded with gray imply areas where the correlations between different models present significant changes.



Studies that will be carried out under the Third National Communication (TNC), a project that is expected to get started by end of May, 2012, will be a valuable input for the Project because they will update both observed changes and projections. Similarly, vulnerability studies on the agro-livestock sector will improve available information regarding the impacts of climate change and desertification processes affecting the sector, and provide adaptation policies and measures that can be implemented to strengthen the results of this Project.

Today, the scope and objectives of the Argentine Governmental Committee on Climate Change (GCCC) and its work on a National Climate Change Strategy (NCCS) provide an environment that facilitates the identification of multi-benefit programs and measures that ideally combine synergies of climate mitigation and adaptation. In addition, these apply tools developed for robust decision making under uncertainty.

Argentina's economy relies heavily on natural resources mainly in agriculture, energy, and transportation. In 2008, these activities represented 31% of the GDP. As almost anywhere in the world, going forward implies critical decisions regarding the development path to be

followed. To pursue sustainable development in today's climate-constrained world calls for a focus on climate sensitive sectors.

According to the available climate scenarios developed with the regional MM5-CIMA high resolution model for the 21st century[2], a considerable temperature increase is expected for the whole Argentine territory. The IPCC A2 scenario[3] projects more than 4°C temperature increase in the north of the country, and up to 2°C warming in Patagonia by the second half of the century. These increases, added to the warming already experienced during the 20th Century of approximately 1°C, are expected to have negative effects on several natural systems such as the generalized retreat of glaciers and higher evapo-transpiration in most areas. These effects would in turn impact water availability and consequently increase the risk of water deficits for agricultural production. For the North and central parts of the country, the SNC's forecasts indicate that increases are expected also in terms of maximum temperatures accompanied by a concentration of the rainfall regime. However, the mean rainfall levels are expected to stay approximately at their current levels. All this is expected to result in increased aridity and an intensification of the desertification processes affecting agriculture. Furthermore, since increased droughts are forecast for the winter season, it is expected that cattle ranching would be especially impacted[4].According to the National Action Program to Combat Desertification[5], the Republic of Argentina uses over 80% of its land for agricultural, livestock and forestry activities. Climate, thus, is one of the most important physical assets on which socio-productive activities rely. Climate adaptation is therefore a key development challenge throughout the country. Climate-induced events with the greatest impact on land are: (i) extraordinary storms which cause flooding and wind erosion. This leads to damages which affect infrastructure and diverse property and assets such as: crops, cattle and agricultural soils; and (ii) irregular rainfall which leads to cyclic droughts and floods. According to the SNC[6], variations in rainfall are due to the El Niño/Southern Oscillation (ENSO) phenomenon. The combination of severe weather changes from ENSO and climate change are projected to aggravate the already fragile agricultural system in Argentina. Figure 5 provides a country-wide view on the extension of land degradation as % of dry lands; the white color refers to areas which were not evaluated for the respective LADA-FAO study.

[2] To prepare for the SNC, CIMA researchers validated global climate models used in the Third Report of the IPCC in southern South America, and found that the HadCM3 global model developed by the Hadley Centre in the UK was one of the best models to represent climate (temperature, sea level pressure and precipitation) in southern South America. Consequently, the MM5-CIMA model was nested in the Hadley Centre HadCM3 model scenarios for the period 2080/2090, and using different IPCC scenarios it served the SNC in 2007.

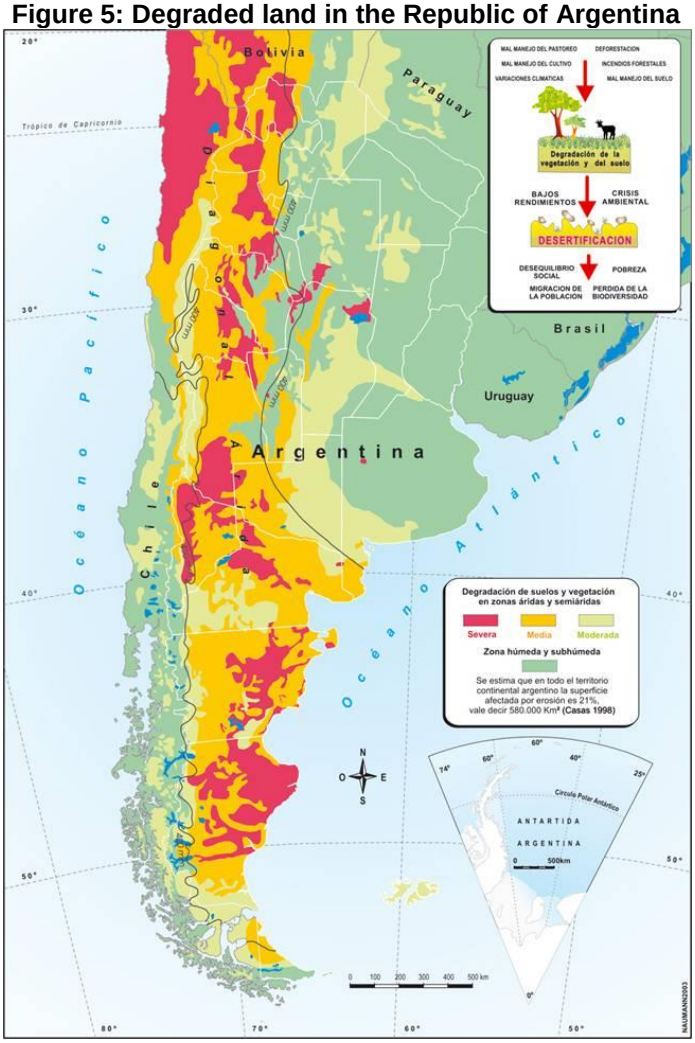
[3] http://www.ipcc.ch/ipccreports/tar/wg1/029.htm: The A2 storyline and scenario family describes a very heterogeneous world based on self-reliance and preservation of local identities. Fertility patterns across regions converge very slowly, which results in continuously increasing population. Economic development is primarily regionally oriented and per capita economic growth and technological change more fragmented and slower than other storylines.

[4] Scenario A1B (2020-2040) described in the Second National Communication on Climate Change in Argentina: http://www.ambiente.gov.ar/?idarticulo=1124

[5] The National Action Program can be found at: http://www.ambiente.gov.ar/?idarticulo=1124

[6]The Second National Communication can be found at: http://www.ambiente.gob.ar/archivos/web/UCC/File/Segunda%20Comunicacion%20Nacional.pdf

Figure 5: Degraded land in the Republic of Argentina

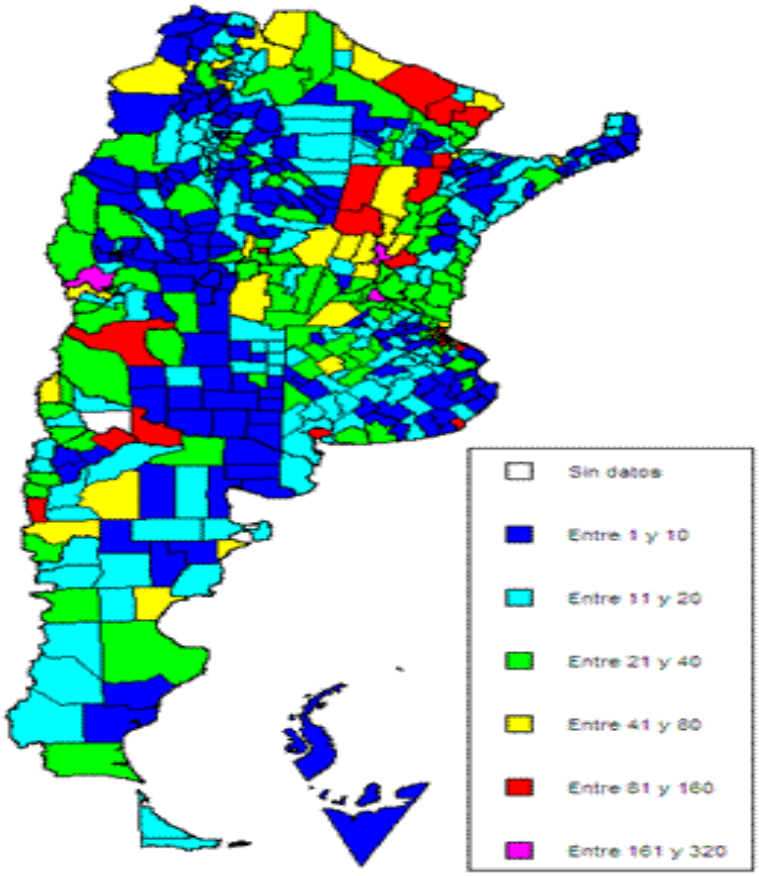


The framework of the National Program for Disaster Risk Prevention and Reduction and Territorial Development[7] suggests that the main threats for the agricultural sector due to the impacts of increasing climate variability and change are triggered by several processes including: on site rains, overflow of watercourses (rivers, streams and canals, both in flatlands and in areas with marked relief); overflow of lagoons, rains combined with winds, surface or sheet-flow runoff in extended plains, snowmelt (in the Patagonia and Cuyo provinces), land degradation, rising water tables, and, occasionally, breakage of dikes and construction of embankments. The associated damages and losses are estimated to be high; equivalent to 1.1% of the Gross Geographic Product.[8]

[7] The program has been implemented since 2010 by the National Ministry of Territorial Planning, Public Investment and Services together with UNDP.
[8] http://www.planif-territorial.gov.ar/html/direcciones/doc/riesgo.pdf

The Desinventar[9] database estimates that in the last 40 years, 68% of the disasters in Argentina have been caused by hydrometeorological threats such as droughts and floods on agricultural lands. Further, floods have accounted for 48% of the hydrometeorological disasters recorded between 1970 and 2009. In terms of land coverage, droughts and floods affect 100% of the country's provinces and 91% of the counties (an administrative unit composed by various municipalities) in the national territory as presented in Figure 6.

Figure 6: Occurrence of number of drought and flood events throughout the Republic of Argentina



Source: DesInventar Argentina, National database, 1970-2009.

It is clear that these changes in climate will have adverse affects on agricultural production in Argentina, and thus the amount of food produced. According to the report "Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation"[10], land

[9] The Desinventar data base is a conceptual and methodological tool for the construction of databases of losses, damages or effects caused by emergencies or disasters in Latin America covering the period 1970-2009 and containing 19,402 records of disasters that comprise the whole of Argentina.

[10] Report was developed by the African Development Bank, Asian Development Bank; Department for International Development, United Kingdom; Directorate-General for Development, European Commission; Federal Ministry for Economic Cooperation and Development, Germany; Ministry of Foreign Affairs -

degradation, changes in food prices and population growth are the greatest concerns in terms of sustaining global food security. The projected changes and increasing variability in temperature, rainfall, and extreme climate events will lead to further droughts, land degradation and desertification in places where they are already severe.

The situation described above provides the context to one of the greatest challenges for climate change adaptation in Argentina, given that land degradation in arid, semi-arid and sub-humid dry zones exposed to desertification processes comprises 75% of the country. 50% of the agricultural and cattle production and 30% of the total population is located in these zones. [11] From this perspective, climate variability and change have serious consequences for food security and social equity at the national level.

Southwest of the Buenos Aires Province; Project Level

With an approximate area of 6,500,000 hectares, the South West of the Buenos Aires Province (SWBA) comprises 12 counties[12] and has around 550,000 inhabitants, representing 4% of the provincial population. It is primarily an agricultural region with an important urban center/port in the city of Bahía Blanca. According to data from the Provincial Statistics Directorate, farming accounts for 28% of the Gross Geographic Product of the region[13]. Further, it contains 15% of the beef cattle of the entire province.

With respect to agriculture, SWBA is essentially a cattle rearing zone with farming on marginal lands highly vulnerable to eolic erosion and droughts, and agricultural risks increase from North to South and from East to West[14]. The predominant production system is mixed agricultural-cattle production where crops usually occupy from 27% to 44% of the agricultural land and pluriannual and green pastures the rest. Cattle's rearing is important in larger farms but conditioned with water restrictions especially in the county of Patagones. Overall in both cases, livestock production is predominantly made up of cattle breeding and rearing with direct grazing on sown and natural pastures; in Patagones cattle breeding occurs also on native bushland. During the last decade, the SWBA has produced 46% of the total harvest of wheat of the Buenos Aires Province with an average cultivated area of 1.33 million hectares.

The SWBA population is highly dependent on small and medium-scale agricultural and cattle ranching activities. The project's target area accounts for approximately 12.3% of all farms in the range of 0-500 hectares in the province. According to the last National Agricultural Census (2002), this stratum of family-run subsistence farming corresponds to 62.5% of the 5,000 farming units[15] (in Spanish *explotaciones agropecuarias*, EAPs) of the zone. Due to

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Development Cooperation, The Netherlands; Organization for Economic Cooperation and Development; United Nations Development Programme; United Nations Environment Programme; The World Bank.

[11] http://www.ambiente.gov.ar/?idarticulo=1124

[12] The Southwest of the Province of Buenos Aires established in Law 13647 includes the counties of Adolfo Alsina, Saavedra, Puán, Tornquist, Coronel Rosales, Coronel Dorrego, Bahía Blanca, Villarino, Patagones, Districts II, III, X, V, VI of Guaminí, Districts XI, V, XV, VI, XIII, VII, VIII, XIV, XII of Coronel Suárez, and Districts X, XI, XII, VIII, IX, VII, IV, V of Coronel Pringles.

[13] Excluding the county of Bahía Blanca with a predominant service economy.

[14] http://www.maa.gba.gov.ar/2010/dir_econo_rural/plan_des_sudoeste.php

[15] Estimated size of an economic unit varies from 1000 to 1300 hectares.

low productivity rates, the return of investment of most of these farming units run below economic feasibility even at the upper end of the farm size range.

The soils in the semi-arid Pampa regions are biophysically fragile. Their naturally low levels of climate resilience have been further eroded by anthropogenic stress factors that have already exposed them to severe desertification processes. These soils are especially vulnerable to increasing climate variability and change. Figure 7 presents evolution of the Normalized Difference Vegetation Index (NDVI) measured at the INTA Bordenave experimental agricultural station within the direct intervention zone of the Project between December 2008 and October 2009. The blue line presents evolution of the percentage of the station's area of influence where the green index values were greater than 0.6. The red columns provide comparison with average monthly rainfall; a correlation between green cover and rainfall is clear.

Figure 7: Green index measured between 12/2008 and 10/2009 within the Project area presents alarming data on lack of green cover that affects agricultural production and implies extremely low levels of recovery.

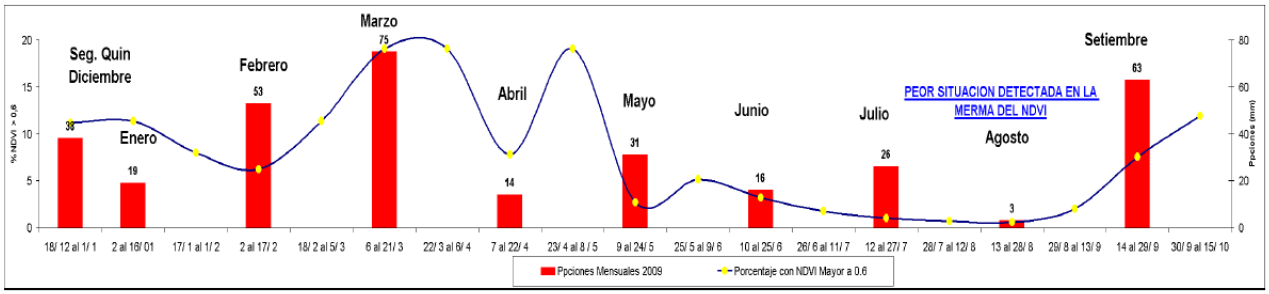


Figura 1: Evolución del porcentaje del área de influencia de la EEA Bordenave con valores de Indice Verde mayores a 0,6 desde el 18 de diciembre de 2008 al 15 de octubre de 2009. Comparación con las precipitaciones medias mensuales.

ENSO-based cycles of climate variability are known to have shaped the socio-economic and demographic development of the SWBA since the late 19th century[16]. Farming techniques have evolved over time to cope with these climatic fluctuations, but there is considerable evidence of short term decision making that does not adequately address the need to elaborate and implement climate resilient techniques. Farmers have had diverse coping strategies in response to current climate conditions, but in most cases those strategies have not enhanced the climate resiliency of the agroecosystems; they have rather made them more vulnerable to increasing climate trends and future changes. These coping strategies to past and current climate conditions will need to be strengthened by adaptation measures.

Over the last century, Argentina has experienced significant agricultural intensification without much attention being given to environmental sustainability and the conservation of agroecosystems, natural resilience and adaptive capacity of the agricultural systems, which have therefore suffered significant damage and loss of their natural climate resilience. In addition, ENSO-based cycles of climate variability in the Project area have further

[16] Glave, Adolfo (2006): *La Influencia climática en el Sudoeste Bonaerense y el Sudeste Pampeano* in: Revista Producción Animal 31, 18-23.

aggravated both the immediate socio-economic and biophysical situations as well as their future prospects.

In the SWBA, the average annual precipitation varies between 840 mm in the East and 380 mm in the West, where the rainfall is usually not enough for livestock and crop production. Typical rainfall patterns were studied and the annual variability of precipitations analyzed from 1970 to 2008[17], and important seasonal differences were found and related maps prepared. The results of the rainfall studies found that overall, varying precipitation is a characteristic of the Project area, and global phenomena contribute to these variations. Table 1 presents measured precipitation at two experimental agricultural stations within the project area from 2005 to 2009.

Table 1: Average precipitation measured at two experimental agricultural stations within the Project area

Year	Precipitation (mm)	
	INTA Ascasubi	**Patagones Experimental Farm**
2005	307	292
2006	515	428
2007	296	287
2008	252	198
October 2009	185	151

Source: INTA Ascasubi

As is common, data on climate projections at a highly disaggregated spatial level are both sparse and (more) uncertain than national and continental level projections. The state-of-the-art information for the project area was gained in dialogue with some of the leading national climate scientists, e.g. IPCC Working Group II Co-Chair and former Director of the Science Department of the Research Center of the Sea and the Atmosphere (CIMA), Dr. Vicente Barros, in terms of the expected biophysical climate change effects in the proposed Project area:

Historical temperature data covering the period of 1960-1991 is available for the Project area at the archives of the National Meteorological Service. The data indicate a wide range in temperature extremes, e.g. 11.8–30°C in winter. Existing climate models indicate that the mean temperature in the project zone for 2020 would be at least 1ºC higher than the present mean, implying a 2ºC temperature increase starting at the beginning of the 20th century.

With regard to precipitation, the current rainfall rates are expected to stay the same over the next decade. Coupled with a temperature increase, however, net soil moisture is expected to decrease in the project area. Consequently, the biophysical assets are projected to face disruptive and even “dangerous” impacts due to warming beyond the commonly cited threshold of 2ºC above the pre-industrial temperature level. Beyond these projections on average changes in precipitation and temperature, climate change poses increasing risks to sporadic extreme weather events with growing ranges and impacts.

[17] Alicia Campo, 2008: *Análisis de las variaciones anuales de precipitación en el suroeste bonaerense, Argentina.*

In the Project area, these climate change effects are expected to occur in addition to existing climate variability and anthropogenic drivers of desertification, aggravating the impacts on the existing agroecosystems. The currently available climate models project that the ENSO phenomena is a climate pattern that will continue to appear in the future. However, there is no certainty on potential changes in the intensity of these phenomena. Hence, adaptation requires building sustainability and thence resilience to a range of potential climate outcomes. The objective of this Project is to assist in this endeavor, understanding climate adaptation as a continued and constantly evolving process rather than a set of specific measures.

These changes in climate variables are projected to lead to severe impacts in terms of depletion of pastures critical to livestock survival. Also, the expected warming will increasingly threaten sustainability of crop production as drier conditions continue, particularly in the winter and beginning of spring. Furthermore, these extreme temperatures have been known to lead to significant negative impacts from thermal stress (frost conditions), but there is not yet literature on this increasingly observed phenomenon.

Given the extreme oscillations between relatively long wet and dry periods, the problems faced are not restricted to a lack of water, but rather to a vicious cycle between the following factors: drought – wind erosion – flooding – water erosion – soil compaction – salinization – desertification.

The worst drought in the last 50 years in the zone was recorded in 2009, adding to what was already a 5-year trend of low rainfall, at 185 mm average. The drought generated serious losses in crops and forage, as well as natural grasslands. The consequences for production of grain and animal forage were disastrous with nil yields and resulting bankruptcies of farmers who had already been living in poor conditions. In terms of anthropogenic stress factors on the environment, closely linked with the climatic cycles described above, there was, on the one hand, a strong degradation and overexploitation of the soil resources due to overgrazing and excessively intense methods of agricultural production during the wet period prior to the drought that lasted until 2005: soil degradation followed the farmers attempting to maintain their yield levels by increasing the animal load per lot.[18]

The periodic droughts in the project area triggered wind erosion processes on over 8,000,000 ha that gave rise to the creation of dunes, dust bowls, and soil blowing. These fragile soils do not recover during the rainy periods but, on the contrary, have appeared to be especially affected by water erosion, accounting up to approximately 4,000,000 ha.[19] This context represents a tendency in the project area and directly affects agricultural production.

Due to these cycles of extreme climate events that the project area has suffered from, the farming culture is leaning heavily on uncertainty related with climate estimations. This has

[18] http://www.inta.gov.ar/ascasubi/info/documentos/rn/eroviento10.pdf
[19] http://www.ambiente.gov.ar/?idarticulo=1124

lead to a short-term approach to productive systems strongly rooted in the farmers' mentality and hampering unsustainable use of natural resources as described earlier under Figure 7.[20]

Figures 8 and 9: Images of wind erosion within the Project area

The above background information on the worsening climate-related problems provides the context for why SWBA was chosen as the Project area. The selection criteria used by the National Secretariat of Environment and Sustainable Development (SAyDS) consisted of four fundamental aspects: (i) significant occurrence of the above-mentioned negative impacts of climate variability and change; (ii) significant weight of these impacts on national sustainable development on a strategically important area of agriculture and livestock production; (iii) existence of a combination of the three major impacts (flooding, drought and desertification); and (iv) major impacts on the population.

Based on the above criteria, the region targeted by the Project (see Map No. 1 in **Annex** 2) includes the counties (*partido* of Guaminí, Adolfo Alsina, Coronel Suárez, Coronel Pringles, Coronel Dorrego, Saavedra, Tornquist, Puán, Coronel Rosales, Bahía Blanca, Villarino, and Patagones.[21] The proposed direct intervention area (see Map No. 2 in **Annex** 2) would involve three counties with a predominance of dry farming located in zones below the 600 mm isohyetal line (dry counties with frequent water deficit): Puán, Villarino, and Patagones. These counties were selected based on the following two criteria: (i) a scattered rural population equal to or greater than 10% of the overall population, and (ii) frequent occurrence of agricultural emergencies. Additionally, part of the pilot adaptation activities will be implemented in the municipality of Bahía Blanca for its importance as the leading administrative centre of the region that hosts important infrastructure, communications, universities, and administrative facilities. The below described Project design is expected to provide innovating, longer-term development proposals to the targeted counties and beyond.

[20] See: López Castro, Natalia (2009): *Cuando la persistencia es una cuestión de familia. Relaciones familiares, traspaso y género en las explotaciones agropecuarias del Sudoeste Bonaerense* in: Mundo Agrario, Vol 10, no. 19.

[21] http://www1.hcdn.gov.ar/proyxml/expediente.asp?fundamentos=si&numexp=6789-D-2008

Figures 10 and 11: Images of degraded pasture lands within the Project area

Figures 12 and 13: Images of past and projected development of the Project area

PROJECT / PROGRAMME OBJECTIVES:

List the main objectives of the project /programme.

The Project objective is to contribute to reduce climate and human induced vulnerability of the agroecosystems in the Southwest of the Buenos Aires Province by increasing adaptive capacity of key local institutions and actors, and piloting climate resilient and sustainable land management practices. Participatory planning processes will be used to identify and pilot concrete adaptation measures focusing on water, crops and livestock management to promote climate resilience.

The Project aims at benefitting farmers and farmer families engaged in small and medium-sized agricultural and cattle production on dry lands within the direct and indirect intervention zones: counties of Puán, Villarino and Patagones, and 9 further SWBA counties, respectively. Additionally, a wide range of actual and potential partner organizations working on related aspects within the area and up to national level will benefit from and contribute to a critical set of capacity building and institutional strengthening measures.

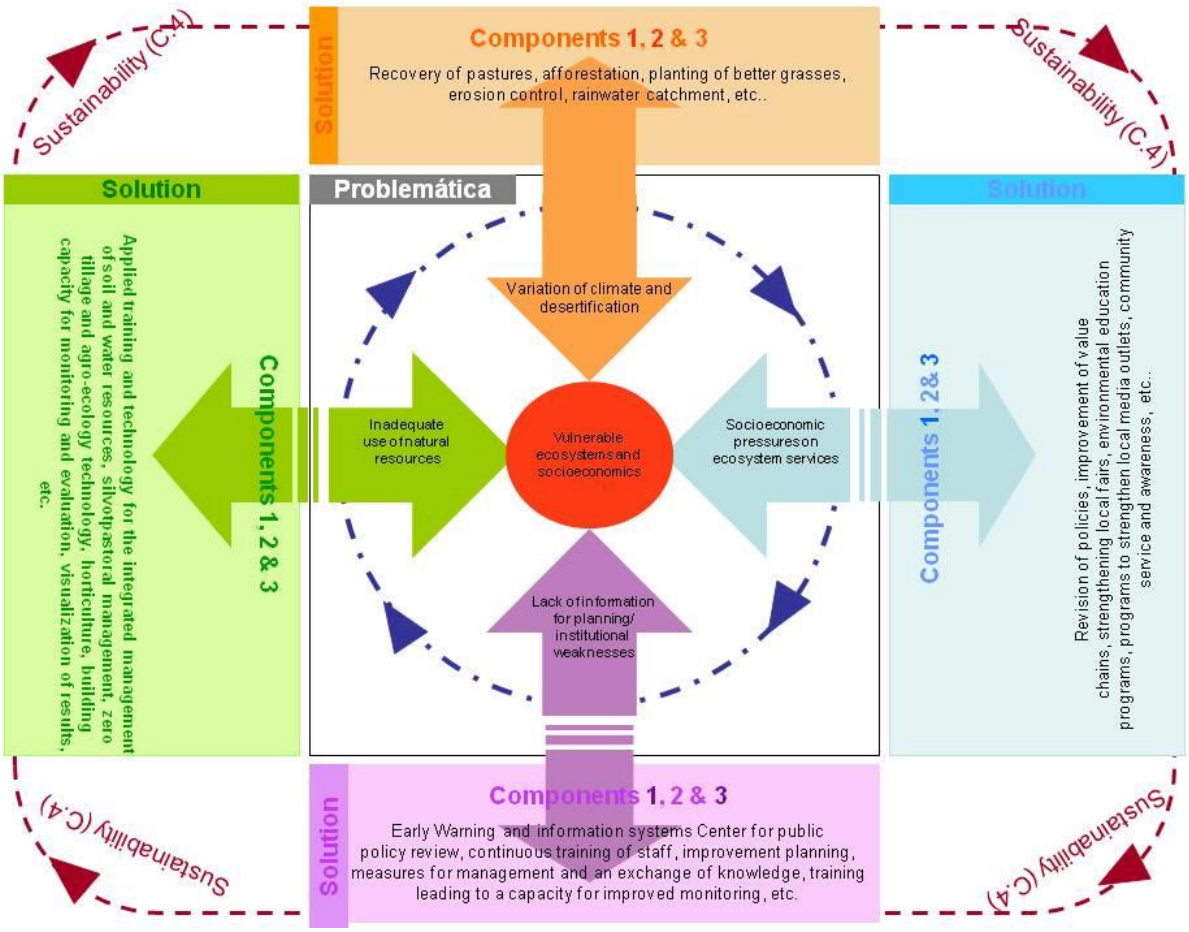
Component 2 will apply a participatory approach to pilot concrete adaptation measures in local agroecosystems empowering especially the family farming sector with farm sizes ranging from 200 to 3,500 hectares[22]. This applies to 5,075 producers and represents 65% of the farms in the SWBA. Further, the Project activities are expected to provide relevant lessons also for bigger producers that own up to 3,500 hectares and beyond. **Annex** 6 describes the Geographic Intervention Areas (GIA) and Specific Intervention Sites (SIS), their selection criteria, as well as the type of direct beneficiaries and related participation criteria.

Figure 14 presents the diverse Project components and shows how the activities intertwine and form a holistic approach to climate adaptation. Building adaptive capacity is understood as a process; a continuum of learning by doing, starting from the most cost-beneficial no-regret measures[23] known, and adjusting and refining actions as knowledge and experience accumulates – and the climate itself keeps varying and changing.

[22] It is assumed that farms with less than 200 hectares are dedicated to other, mainly horticultural activities or are located in irrigation areas.

[23] No-regret adaptation measures refer to such measures that would be justified under all plausible future scenarios, including the absence of manmade climate change.

Figure 14: Project structure that strengthens climate resilience based on a comprehensive range of actions



Baseline situation: Farmers have adopted diverse coping strategies in response to current climate conditions, but in most cases those strategies have not enhanced the climate resiliency of the agroecosystems, but rather made them more vulnerable to increasing climate trends and future changes. Some no-regret adaptation measures are also being implemented or proposed as stand-alone programs, plans and projects at the national, provincial and local level.	**Intermediate scenario:** Increasingly informed no-regret adaptation measures for climate resilient and sustainable management of natural resources implemented and supported by cross-institutional work aimed at creating an adequate political, social and economic framework to ensure adoption, sustainability, continuity, and further development of the adaptation measures. The measures will be chosen through participatory processes that combine institutional and community-level capacity building.	**Target scenario:** Continued promotion of adaptive capacity through climate resilient land management measures that are technically tested and socialized and benefit of political and institutional support. Stakeholders' knowledge on climate change has been improved and they have capacity to better predict climatic trends and adjust their action accordingly. Furthermore, intersectoral cooperation has been strengthened at different administrative levels.

PARTICIPACION & CONSULTATION

Forecasting with precision can be difficult when attempting to identify the specific impacts of projected climatic changes in small geographic areas, such as the three particularly targeted SWBA counties. For this reason, the Project is designed to (i) support no-regret adaptation measures that yield positive returns under a variety of climate scenarios, and (ii) progressively increase stakeholders' ability to access information on changing climatic conditions and to adapt effectively and flexibly to such changing conditions in the future.

The Project has four components that aim at simultaneously strengthening the political and institutional frameworks of Argentina at the national and sub-national level (component 1); increasing preparedness for adoption of an adaptive management approach and technologies to adjust to the effects of climate change (component 2). In addition, stakeholders' ownership of and commitment to the Project objectives will be fostered through capacity building, knowledge-sharing, and communication and outreach activities (elements of components 1,3,4). In this sense, the Project's knowledge management ratio builds upon a cross-cutting approach, making a distinction between data collection and information processing and distribution. The activities which collect data and transform it into useful information for related actions have been added to all relevant components. Consequently, the tools for data gathering applied to a Project component will serve as an input for activities in others. For example, component 1 will establish an Information and Early Warning System (IEWS) and a Regional Consultative Observatory of Public Policies on Climate Change and Desertification (Observatory). The IEWS will feed data into the functioning of the Observatory, and both tools will support the proposed field activities.

Finally, and from the beginning of the Project implementation, promotion of sustainability, scale up, and further development of the overall Project results will be addressed through a dedicated component (component 4). The components are described in detail in the following sections.

PROJECT / PROGRAMME COMPONENTS AND FINANCING:

Fill in the table presenting the relationships among project/programme components, activities, expected concrete outputs, and the corresponding budgets. If necessary, please refer to the attached instructions for a detailed description of each term. For the case of a programme, individual components are likely to refer to specific sub-sets of stakeholders, regions and/or sectors that can be addressed through a set of well defined interventions / projects.

Component: 1. Reducing Institutional and Community-level Vulnerability		
Subcomponent	Expected Outcomes	Expected Concrete Output
1.1: Creating Institutional Tools for Climate Resilience	1.1.1 Institutional response and prevention capacities developed to reduce local vulnerabilities to climate variability and change.	1.1.1.1 Information and early-warning system for droughts, land degradation and desertification control.
		1.1.1.2 Regional Consultative Observatory of Public Policies on Climate Change and Desertification to mainstream climate change adaptation.
		1.1.1.3 Institutional capacity building program directed at local public officers.
1.2: Promoting Climate-smart Socio-cultural Approaches to Land Management	1.2.1 Reduced vulnerability of livelihoods with a special focus on productive approaches.	1.2.1.1Training program on climate change and different adaptation options for disseminators and opinion leaders (journalists, town councilors, etc.).
		1.2.1.2 Training program for rural school teachers to mainstream environmental factors, climate change and approaches to climate resilience into the curriculum.
		1.2.1.3 A gender-sensitive program to empower farmers and their families and strengthen their social role for sustainable development.
Component TOTAL		**729,399**
Component: 2. Implementing Adaptation Measures in Productive Agroecosystems		
Subcomponent	Expected Outcomes	Expected Concrete Output
---	2.1.1 Concrete adaptation measures piloted with a special focus on the productive agro-ecosystems.	2.1.1.1 Water Resources Management: Installation of microsystems for irrigation and rainwater harvesting.
		2.1.1.2 Crop Management: Implementation of crop rotation systems, diversification, time alteration of sowing, and organic agriculture in demonstration sites.
		2.1.1.3 Livestock and Pasture Management: Implementation of adaptation measures such as forage banks, silvopastorile systems, rangeland recovery and sustainable plot management.
		2.1.1.4 Participatory development of Good Agricultural Practices (GAPs) aimed at enhancing management plans for production and adoption of a voluntary code of climate resilient GAP. Based on results of further stakeholder consultations, identification of alternative livelihood options and ways to facilitate their adoption.
Component TOTAL		**2,400,000**
Component: 3. Applying Participatory Approach to Knowledge Management and local capacity - development for adaptation to climate change		
Subcomponent	Expected Outcomes	Expected Concrete Output
---	3.1.1 Enhanced local capacity for adaptation and response, developed in a	3.1.1.1 Combined consultation, coordination, training, and knowledge sharing at the local level in the three counties of direct Project intervention to develop and validate intervention proposals and work plans.

	participatory manner.	3.1.1.2 Capacity building for indicator development and measurement plans, systems of continuous improvement, training for local application groups, and mutual knowledge sharing in terms of the proposed activities between and beyond the counties.
		3.1.1.3 Participatory development of progress information through development of periodic reports to make information available to all stakeholders.
		3.1.1.4 Training and knowledge management with stakeholders through joint demonstrative field visits.
Component TOTAL		**281,698**
Component: 4. Developing a Sustainability Strategy		
Subcomponent	Expected Outcomes	Expected Concrete Output
---	4.1.1 Technical, institutional and material capacity developed to sustain the results obtained and contribute to their up scaling.	4.1.1.1 A representative Working Committee for the Project's intervention area comprised by the regional Observatory with institutional capacity to maintain the IEWS and committed to provide information to the national and provincial Project focal points (OPDS and SAyDS) for a period of 5 consecutive years after Project completion.
		4.1.1.2 A compilation and publication of standard-formatted set of evaluation and tracking tools (specific reports on key issues).
		4.1.1.3 A compilation and review of domestic and international sources of finance to secure continuity of the key Project activities.
		4.1.1.4 Final local level dissemination on progress evaluation with involved stakeholders and publication of lessons learned.
		4.1.1.5 Implementation of a program for dissemination and exchange of experiences both nationally and internationally.
Component TOTAL		**206,503**
Total :		**3,617,600**

Project Execution Costs		342,600
- General Coordinator	110,400	
- Territorial Exc. Coordinator	81,600	
- Financial Assistant	81,600	
- Administrative Assistant (part time)	28,000	
- M&E Activities	22,000	
- PIU Operations (communications, services, transport, etc.)	8,000	
- In the field Operations (idem PIU)	5,000	
- Equipment for local office	4,000	
- Office supply (paper, toner, copies, etc.)	2.000	
7. Total Project/Programme Cost		3,960,200
8. Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable)		336,617
Amount of Financing Requested		**4,296,817**

PROJECTED CALENDAR:

Indicate the dates of the following milestones for the proposed project/programme

MILESTONES	EXPECTED DATES
Start of Project/Programme Implementation	March 2013
Mid-term Review (if planned)	February 2015
Project/Programme *Closing*	February 2017
Terminal Evaluation	August 2017

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

Project Components

As presented in Figure 14 above, the Project strategy is based on promoting an enabling environment for climate adaptation as a continued, inter-sectoral and inter-institutional learning process. The bulk of the requested funding will be reserved for implementation of production-based adaptation measures in dry land agroecosystems by introducing techniques for climate resilient and sustainable management of natural resources (component 2). These technical interventions will be supported by cross-institutional work aimed at creating an adequate political, social, and economic framework to ensure adoption, sustainability, continuity, and further development of the adaptation efforts. The complementary pillars (components 1, 2 and 3) aim at bolstering and fine-tuning adaptation measures identified and chosen through institutional and community-level capacity building. Stakeholder ownership will be promoted through a bottom-up approach and use of participatory engagement procedures.

Respect to its main component (component 2), the Project design presents fundamentally a framework for implementing potential adaptation measures as per results of participatory work together with the Project beneficiaries on planning, capacity building, knowledge sharing, and dissemination. The participatory approach to Project implementation will entail a wide range of group work methodologies in the field, including technical meetings, organizational encounters, social events, field visits, and study tours. Beneficiary and stakeholder participation will be operationalized taking advantage of the local social networks that currently exist in the intervention area. A “cascade approach” will be followed to facilitate direct contact between the Project Implementation Unit (PIU) and the main local opinion leaders and replication agents. The PIU will lead the planning and organization of the beneficiary and stakeholder engagement responding and adjusting to local demand and availability and maximizing efficiency and effectiveness.

Component 1: Reducing Institutional and Community-level Vulnerability (US$ 760,000)

This component aims at improving response and planning capacity of local institutions and communities by promoting people's engagement in data collection and analysis from inter-institutional to household level. The rational of this component is twofold: (i) collection and processing of *data* to provide useful *information* to stakeholders, and (ii) analyzing and debating this information to develop adequate decision-making processes at institutional as well as household level.

The Project will collect data and transform it into information through establishment of an *Information and Early-Warning System on Climate Change and Desertification* (IEWS). Further, a *Regional Consultative Observatory of Public Policies on Climate Change and Desertification* (Observatory) will be created through institutional and sector-specific networking among related stakeholders to conduct the created information into relevant decision-making processes. This network will benefit from participation and commitment of the regional universities, municipalities, the Provincial Agency for Sustainable Development (OPDS), and other field-based stakeholders, all under the initial coordination and guidance of the Project. In addition, innovative and participatory capacity building and governance tools will be developed through specific programs targeting institutions, agricultural producers and their families.

Intermediate outcome: Institutional and community level response and prevention capacities developed to reduce land degradation and desertification and local vulnerabilities of the agricultural sector to climate variability and change. Specifically, the sectors involved in adaptation of the agro ecosystems in the SWBA will be assisted in setting up a Regional Consultative Observatory on Climate Change and Desertification (the Observatory)[24]. Its main functions will be to monitor the land degradation processes induced by growing impacts of increased climate variability and change. In addition, it will serve as a Consultative Council for public decision-making on related policy options, as well as a hub center for promotion of research activities.

The proposed Observatory is expected to be successful based on its focus on institutional mainstreaming processes and ensuring its continuation beyond the Project implementation phase. The following elements support this expectation:

1) The Observatory will involve existing, well-established institutions with their own staff and operational budgets;
2) Project funding is required only to cover the incremental costs of its initial convening actions such as facilitating institutional networking, organizing face-to-face meetings of stakeholders/members, and preparing of specific technical outputs. Project funding will cover establishing the critical constituency, as well as setting up the mechanisms to start filling the knowledge gap related to climate change and land degradation and consequent strategic discussions on regional planning.

3) After the Project termination, the continuation of the Observatory is not expected to require additional inputs. After creating the enabling institutional environment and strengthening them through concrete measures included in the Sustainability Strategy (component 4), the participating institutions will be committed and prepared to continue cooperation related with monitoring of climate change and land degradation within the target region where it is a critical development threat.

The Observatory will be trained and enabled to establish, run and use the IEWS, work with maps on climate risks and vulnerabilities, generate incentives through sustainable land management programs, and develop gender-sensitive adaptation strategies and a program for public awareness. Once created, the Observatory will adopt a roadmap with four stages that consist of:

(1) **Surveys and analysis of public policies: All relevant public policies implemented in the** Project target area will be identified and assessed. This would involve, *inter alia*, development of a database, identification of overlapping roles and responsibilities, beneficiaries, and production rates, detection of gaps, additional analysis of possible synergies that can be developed between on-going policies, and proposed recommendations to enhance implementation and enforcement of policies relating to land degradation and climate change in the region.

(2) **Impact evaluation of public policies**, including definition of a set of variables to assess impacts of related territorial, environmental, social and economic policies, production of statistical series of relevant variables, and development of a database and a set of impact monitoring indicators.

(3) **Identification and analysis of policy-related risks and recommendations to mitigate and/or manage them**.

(4) **Set up and facilitate a forum to define participation mechanisms for users and stakeholders** to contribute to improving policies and their implementation. **Annex 5** includes a detailed description of the scope, objectives and roadmap for the creation of this Observatory. As a precedent, the Government of the Buenos Aires Province has a specific team that evaluates impacts of public policies within the Ministry of Economy.

The IEWS will produce useful information for the Project beneficiaries and stakeholders, as well as inputs for the Observatory. It will increase the prevention and response capacity of the affected farmers and stakeholder groups, such as municipal governments, farmer cooperatives and provincial institutions. This system will have a multi-institutional structure involving local technical institutions and universities to allow active participation, access and sharing of data (i.e. INTA, National Weather Service, the provincial entities with capacity and relevant competences, as well as private entities).

This outcome will benefit all 12 SWBA counties, which include approximately 550 thousand inhabitants. Regarding to reduce vulnerability of communities, a strengthening program will be developed to support farmers and their families in taking stock of the current and

projected situation for farming in their area. This program will address differing needs, priorities and preferences of men and women in order to provide meaningful options for participation in a gender-sensitive manner. Incentives will be created for active participation in confronting man-made and climate change induced factors of vulnerability, thus improving stakeholders' knowledge and response capacity and increasing their sense of belonging, accountability and citizenship.

Sub-component 1.1: Creating Institutional Tools for Climate Resilience. This activity will contribute to an on-going effort to create an IEWS for climate change and desertification at the provincial level in cooperation with the relevant technical institutions. **Annex 4** in this document provides technical details related to the overall architecture of the IEWS. Institutional capacity building will be an essential part of this component to secure continued development of the system. In addition, capacity building will entail creating the Observatory as an overall coordinating platform for the revision of public policies and technical standards.

Outputs:

a) Institutional capacity building program directed at local public officers: The program will seek to strengthen the local capacities of the public system to enforce and improve the regulatory procedures, management of socio-environmental conflicts, promote enhanced perspectives of the role of the public sector at the service of citizens, and participatory management systems, among other things. During the first six-months of the Project implementation, three two-day consultations will be organized in each of the direct intervention municipalities (Villarino, Puán and Patagones). Their objective will be to develop a training plan for civil servants on key issues to be identified. Likewise, a training methodology will be specified with respect to participants' role and the required technological support. Once the training plan has been generated, a further consultation will be organized in the following months to define the subjects to be included under the identified topics. The training program will assist in consolidating the capacity of local-level public officers to understand their role as social change agents within the communities and in a transparent democratic environment that offers opportunities to participate in the change process.

b) Information and Early-Warning System (IEWS) on Climate Change and Desertification developed and run through inter-institutional cooperation: An IEWS is a necessary component for adaptation to climate change related with droughts, land degradation, and desertification control as impacts of climate variability. The IEWS will focus on the region's dry zones and generate necessary data for reduction of vulnerability (information-management) as well as risk-prevention (alerts). It will consist of the installation of metering stations and establishment of technical teams in each of the 12 counties involved, expansion of meteorological stations, and development of harmonizing criteria and indicators, as well as appropriate procedures for analysis, warning, dissemination of information and decision-making. Creating of an organized IEWS will make it possible to require and order timely and space-specific information to be able to produce complete, systematic, multidisciplinary and inter-institutional reporting dynamics made available to affected stakeholders. The currently generated information and data will be leveraged by promoting generation of new and more complete information. All climate data will be properly disseminated to allow access to

climate information systems, with a special emphasis on reaching the most vulnerable farmers, as well as providing training in order to turn this information management into actions in the field.

c) Regional Consultative Observatory of Public Policies on Climate Change and Desertification in operation: The purpose of creating the Observatory is to promote knowledge networks and support regional and local governments to mainstream adaptation into their development planning and public policy-making processes. Further, the Observatory will derive lessons from the applied adaptation measures and turn them into knowledge derived from its network structure. It will promote a set of technically sound and politically agreed practical guidelines to provide incentives for climate resilient and sustainable production within the local agroecosystems beyond the pilot measures to be implemented. Details about the Observatory scope are included in **Annex 5**. The potential of institutional coordination for the Observatory and the Project itself is presented in **Annex 7.** The Observatory is expected to have great potential to provide long-term management processes that actively identify and apply the most pertinent adaptive actions. The Project will offer a coordination and articulation framework through the facilitation of meetings and specific activities. As part of the Sustainability Strategy, a legal specialist will be contracted to explore and propose a menu of institutional arrangements to ensure continuation of the Observatory based on a legally binding framework.

d) Generation of new Climate Change Models for the region. This activity will be carried out by the participating academic institutions that meet the technical standards such as the Center for Atmospheric and Ocean Research, School of Exact and Natural Sciences of the University of Buenos Aires (CIMA) and the National Southern University (UNS).

Activities:

a) Institutional strengthening and training based on the design of public policies to reduce vulnerability to climate change and desertification; b) strengthening the local capacities of the public system for the enforcement of regulatory procedures, management of socio-environmental conflicts, perspective of the role of the state at the service of citizens, participatory management system; c) training for technicians and farmers on the tools required to manage a monitoring and early warning network; d) engaging participation of dissemination agents and decision-makers who are users of the system; e) integration of the platform into the Observatory through working meetings; f) defining of analysis criteria and systems; g) defining requirements for sundry materials (equipment, etc.); h) training, human resource development, and liaising with other government structures; i) defining of the structure to operate the Observatory; j) developing climate change models for the Project area; l) developing a weekly bulleting and radio spots and quarterly reports to share information of short and medium term weather forecast and long term climate projections; m) establishing a network structure for data management (bylaws/rules); and n) organizing and preparing meetings, trips, materials, etc. for the operation of the Observatory.

The following institutions have been envisaged to participate in this component: Municipalities-IPAP-INAP; INTA (Ascasubi); UNS-Municipal Governments-OPDS-Farmer

Associations-NGOs-INTA (Ascasubi/Bordenave)-CERZO, and National Observatory of Land Degradation and Desertification (SAyDS-CONICET).

Sub-component 1.2: Promoting Climate-smart Socio-cultural Approaches to Land Management will aim at reducing negative patterns of interaction between socio-productive systems and the natural environment through introduction and eventual adoption of change in community relations with the natural environment.

At present, according to a series of sociological studies on social fragmentation of rural communities in the proposed area of intervention, there is a general perception among the inhabitants of the community of neglect on the part of public policies among rural communities. There is also a sense of lack of responsibility related to using natural resources in a sustainable fashion, as depicted under the Project level background and context description. Hence, in the counties within the Project intervention zone, currently the main barriers to adopt climate adaptation measures include: social fragmentation, low levels of awareness and understanding of the factors involved in the degradation of resources, as well as a growing disconnection with traditional subsistence farming activities. These socio-cultural processes are directly linked with the dynamics of climate change, hence leading inhabitants to favor a short-term vision of the economic accumulation cycles and consequent adverse approach to production changes and adoption of sustainable technologies.

This sub-component on reduction of social vulnerability is fundamental for the effectiveness of the other Project components, as it addresses the issues at the root of the problem, including social processes that are interlinked with climate change issues like flooding and drought, and the responses to these climate change issues both politically and economically. It aims at transforming socio-cultural barriers into windows of opportunities through an adaptive process of change. It will include working with local teacher training institutions, opinion leaders, farmers' families, and communities as a whole. As a result of training programs for key social disseminators such as journalists and town councilors, the aim is to induce a motivational change to promote success of the proposed adaptation measures. Respective activities will be defined in detail in close consultation with the Project stakeholders.

Outputs:

a) Training program for key local stakeholders, including specifically opinion leaders; b) teacher training program for environmental education specifically designed for the zone through teacher training institutes that offer training under the program framework and related activities/initiatives carried out at different levels of the local school system; and c) gender-sensitive program on appreciation of the local culture and products, the role of farmers and their family in society through socio-productive activities carried out in the Project zone jointly with the municipal governments (fairs, exhibitions, etc). The scope of the proposed training programs is included in **Annex 9** and **Annex 10**.

Activities:

a) Thematic and professional training for popular environmental communication; b) technology strengthening (of the local media's technical infrastructure); c) strengthening the cooperation approach of media with a focus on social action; d) developing materials required to conduct training courses; e) developing and delivering a training program for rural teachers; f) cooperation and coordination with the Ministry of Education; g) linkage with training agency or institution; h) organizing activities with students and the community, e.g. through project-organized competitions (stories, photos, logos/slogans/posters); i) developing a gender-sensitive program to strengthen the social role of farmers and their families for sustainable development and conservation of natural resources, work culture and environmental preservation; j) developing programs and identifying the target audience of participants; and k) strengthening the feeling of attachment and identification with the environment: local product fairs, cultural exhibitions, awareness-raising actions including attractive media such as theater and films. SAyDS programs such as *Somos Ambiente* ("We are environment") will take part in these activities.

The following institutions have been envisaged to participate in this component: Cooperatives of communication media at the local level, UTN-FAUBA-Ministry of Education of the Province of Buenos Aires-Municipal Governments-local civil society organizations-UNS.

Finally, component 1 targets the following main barriers identified to cross-sectoral coordination:

Institutional capacity and deficiencies
In Argentina, the state governments are directly responsible for the protection of natural resources in their jurisdictions. SAyDS, the national environmental authority, is in charge of promoting policy formulation and federal coordination at the national level. Each province has agencies that are in charge of different facets of NRM such as overseeing environmental impact assessments, emitting permits accordingly, rehabilitating degraded areas, etc. Many agencies have overlapping mandates that easily result in negative competition between substance-wise similar agencies within and between administrative levels.

Decision-making occurs often without sufficient knowledge of the interrelations between proposed interventions and complex ecosystem functions or consequences that land degradation and climate change may have on ecosystem integrity. Planning is carried out from a sectoral perspective rather than a more integrated approach that would be needed.

Information gaps and deficiencies in decision making tools
Overall, there is insufficient climate change (CC) and adaptation related information available to support local decision-making. Although some agencies (INTA, UNS, and Agricultural Risk Office, etc.) carry out isolated activities, there is yet no specific, coordinated system at the sub-regional level to assess desertification dynamics in the light of CC. The absence of a comprehensive monitoring system seriously limits application of adaptive management based on early detection of CC impacts. This limits decision-making both at local and regional levels.

Low levels of cooperation and consensus amongst stakeholders
The widely different perspectives of productive, political and technical spheres have meant that there is no shared vision of the region's future or, consequently, the optimal strategies to achieve it. This is partly due to traditional differences of focus and values between these spheres, but also to the absence of functional mechanisms through which information exchange and consensus building can take place to facilitate stakeholder participation in policy formulation and implementation.

Capacity constraints of farmers
Most of the small and medium-scale farmers do not have sufficient knowledge of new technologies to improve their management and land-use practices in the context of desertification and adaptation to CC.

Creation of the Observatory and the planned capacity building activities are expected to address the lack of coordination by creating and sustaining a coordination platform. The participatory nature of the Observatory is expected to increase related interest and engagement by ensuring that each stakeholder will be able to draw specific benefits of their participation.

Component 2: Implementing Adaptation Measures in Productive Agroecosystems (US$ 2,400,000) will be constructed and put in practice in conjunction with local farmer families and pertinent technical institutions. The main interventions, to be selected and appraised during the Project's implementation, will cover small-scale pilot interventions selected from a menu of options related to management of livestock and grazing lands, crops and water resources. These measures have been initially assessed by the INTA Ascasubi. This technical perspective and spatial correlation with subregions is included in **Annex 6.** Discussions and necessary analysis will be conducted during the participatory process of defining the actual adaptation pilots in terms of each specific SIS. However, it is to be noted that most of the measures included in the proposed menu of adaptation activities have already been successfully applied in the Project area or similar locations elsewhere. The INTA has already prepared preliminary assessments for the proposed activities.

Critical information on the main challenges faced by the sector, which in turn was an important input to the development of the Project environmental and climate change criteria, was gathered during the preparation mission. Working closely with local sector specialists from the SAyDS, OPDS, UNS and INTA, the following technical priorities were agreed: (i) developing agriculture in soils with a minimum suitability, adjusting the cultivation method employed, (ii) increasing the area with permanent pastures in their various alternatives, (iii) stimulating alternatives which contribute nitrogen to the soil such as vetch and alfalfa, (iv) not discarding permanent no-tillage agriculture, but always analyzing its use for each case in particular without generalizing, especially taking into account the edaphic-climatic characteristics of the zone/field. The actions to be developed focus on rapidly stabilizing areas with serious symptoms of erosion.

Outputs: A program of interventions in Geographical Intervention Areas (GIAs), predefined on a participatory basis according to biophysical, economic and social criteria, offering a

menu of options related to the management of water resources, crops, cattle and grazing lands. This would include a road map to build these interventions under a participatory scheme with targeted technical assistance on capacity building and execution support.

Activities: Development and installation of the Sustainable Land Management (SLM) practices selected for the Project's area of influence, such as: irrigation microsystems, management practices or alternative crops, etc. Other activities could include programs to improve access to markets and options to facilitate occupational changes.

The following institutions have been envisaged to participate in this component: INTA-UNS-Municipal Governments.

Adaptation Measures

In order to suit pilot adaptation measures optimally to the biophysical conditions of the productive environment and expectations of the farmers, a variety of adaptation measures will be further discussed and analyzed as part of the action plans for each SIS during Project implementation. This will include a strong training component supported by the cross cutting capacity building components. According to results of the foreseen stakeholder consultations and based on their technical and socio-economic soundness, the bottom-up approach of this Project provides flexibility for different adaptation measures and approaches. In all cases, necessary inputs and their shared management at the community level will be identified together with local stakeholders.

As mentioned before, final definition of and decisions upon the piloted adaptation measures remains open, but the Project approach focuses on no-regret measures. The innovative Project features relate to the holistic, inter-institutional, and participatory approach within the region and beyond.

The principal adaptation measures included in the Project proposal

Annex 6 provides details on the activities included in the following menu of options, their general description, technical feasibility, estimated cost, and relevant participation process.

Rainwater harvesting and improved irrigation technology

The Project area comprises mainly rainfall-dependent agricultural and livestock systems. Rainwater harvesting [25] in response to climate extremes and climate change induced droughts enhances resilience of the agroecosystems and the communities that depend on them.

In a very straight-forward manner, rainwater harvesting promotes adaptation to poor rainfall patterns and improve sustainable and efficient water use. The executing agency has earlier

[25] The INTA and the National Southern University will carry out water balance calculations. No calculations have been made thus far as both the specific intervention sites (SIS) as the actual adaptation measures will be decided upon through a participatory process at the beginning of Project implementation.

experience on testing rainwater harvesting in the Santiago del Estero Province, another dry-land area of Argentina, where the German bilateral aid supported a “Sustainable Development of Arid and Semiarid Areas of Argentina” project in 2003. Through the project, 125 families and their livestock benefitted in a small area through a combination of rainwater harvesting and aeolic and photovoltaic water pumping technologies, and similar benefits are foreseen in the projected area.

Rainwater harvesting stems from traditional adaptation strategies and is considered particularly useful to address vulnerability challenges with adaptation to environmental stresses at the local scale. The farmer families in the Project area confront changes derived from both local and global variables. Building their resilience to absorb increasing climate-induced shocks will be done through application of a learning-by-doing approach, where sound knowledge on the historical adaptive processes are integrated with emerging lessons from the state-of-the-art adaptation pilots and research.

Experience with micro or drip irrigation show promising results as efficient technologies to combat desertification and enhance people’s livelihoods in dry lands as a mean of climate change adaptation. Micro-irrigation leads to higher water use efficiency. When piloting combinations of these technologies and introduction of adjusted species within the framework of the proposed adaptation project, grasslands are expected to be recovered, crop yields enhanced, and family incomes and the quality of nutrition elevated.

Enhanced crop management

In the Project area, increasing need for climate resilient development derives from the severe negative impacts that climate variability and change are posing on the agricultural system. The local population is highly dependent on agriculture, and the project proposes to enhance climate adaptation in productive agricultural systems through adjustments of seeding periods in response to changes in weather trends, introduction of more climate resistant species, especially to droughts, as well as diversification of cultivars and other products as a mean to enhance the capacity of the farmers to adapt to climate change.

Rangeland and forage management

With respect to livestock management both on cultivated pastures in previously cleared lands as well as on natural grasslands, field observations show urgent need for change in management of stocking rates and grazing. It is essential that stocking and grazing management contemplates adjustments based on current and projected grass availability and carrying capacity. Livestock systems that cause continuous overload on the terrain are a characteristic of the project area, and this makes a switch to more conservative and adaptive livestock systems essential to enhance necessary load adjustment and flexibility.

In terms of grazing management, a change is needed from continuous grazing to rotational grazing in order to provide defoliated pastures time to recover. This will contribute to a limited exposure of natural resources to different stressors, as changes in rain patterns and evapotranspiration. Grazing breaks are essential for building climate resilience through

specific forage species to maintain vitality and enable their full production potential, reproductive capacity and competitive ability.

Pasture lands where the top most 20-30 cm of soil (the so called soil horizon) has already been eroded forms a separate case of concern in terms of the most adequate management practices. Here, one of the alternatives to be discussed among the project stakeholders is introduction of climate resilient and hardy species that tolerate a wider range of temperature variation, expected as an impact of climate change in the regions, and the dominant soil conditions. With respect to forage management, the initial aim is to reduce vulnerability through forage stocking and sharing at community level to assure stable inputs for livestock production.

Silvopastorile livestock production

Silvopastorile systems provide a sustainable means to plan for optimal grazing systems through differing combinations of forestry, pasture, and livestock management depending on the particular features of specific ecosystems. Human intervention in the already altered ecosystem produces changes aimed at meeting desired objectives. Therefore, it is important to implement means of ecosystem management that can provide more flexible, effective, and cost-beneficial opportunities for managing multipurpose systems that serve a number of goals pertinent to promotion of environmental, social, and economic sustainability in face of the projected climate change

Silvopastorile systems integrate tree production with livestock management that provides a synergy advantage with positive impacts on the environment, economy, and society. The aim is to improve productivity in the short, medium and long term based on a biologically diverse ecosystem that produces multiple products within the framework of sustainable land use. Hereby, the climate dimension relies on ecosystem-based adaptation, where a more diverse and healthy ecosystem provides for enhanced resilience in terms of climatic variations and related stress factors, including the reduction of local temperature leading to increased animal productivity, further contributing to the rotational grazing measure. Additionally, silvopastorile systems provide synergies with carbon capture and climate change mitigation.

Sustainable land management and erosion control

Most of the abovementioned actions can be envisioned as means of adaptation to climate change and variability impacts already described by using different measures of sustainable land management. Erosion control is of major importance in terms of recovering resilience of the agroecosystems in the SWBA. This is because soil loss through wind and water erosion is the strongest barrier for improved provision of ecosystem goods and services and related livelihoods. Examples of pertinent erosion control measures are, among others, wind-breakers and dune management. These measures match with the Project approach related with implementing ecosystem-based adaptation measures in order to promote the recuperation of the resources in which production is based.

Project implementation strategy in the field

Working through Geographic Intervention Areas, known as GIAs (in Spanish, *Áreas Geográficas de Intervención*), has been adopted as the Project implementation strategy in order to characterize and identify the sites where direct Project interventions under component 2 will be specifically carried out. These areas, which have been preliminarily identified during Project preparation, will be agreed upon by stakeholders in a participatory manner, and will be selected with the objective of implementing SLM practices for future replication at sites with similar characteristics. Participants will thus be able to prioritize areas where an immediate intervention is required. These areas will not cover the whole of the Project's area of influence, but will host the places that will be subject to direct intervention. The Project's total area of influence will be covered by the Observatory and the IEWS, instruments conceived to act as umbrellas for the subsequent GIAs and SISs. The next sections describe the rationale and technical aspects related to this approach.

Criteria for GIAs Selection

The criteria to select GIAs are the following:

- The soil and climate characteristics should serve as the basis for GIA determination. This first criterion has been discussed and agreed with key stakeholders in each of the counties while pre-selecting the proposed GIAs.
- Areas with varying degrees of desertification and vulnerability to climate change and variability; areas that will serve as samples for evaluation and monitoring.
- Areas should be representative of larger areas and provide outcomes that can be extrapolated.
- As far as possible, their boundaries should coincide with administrative and/or geographic units (basins, sub-basins).
- The community and/or group of farmers should show interest in an intervention; there must be a commitment on the part of the local communities.The interventions will take place both in areas with SLM and in areas with various degrees of degradation (critical areas), in order to have a range of replication possibilities for the Project's area of influence.
- The selection should include areas that will have anticipated results that will entail environmental and socio-economic implication aspects in order to establish *comparison criteria.*
- GIA delimitation and identification will be carried out as a function of the following stratification:
- Stratification per type of farmer, focusing on the most vulnerable small agricultural producers.
- Relative share of farmers in the total Project area.
- Average area of the small farmer productive units in that zone.
- Existence of baseline information and SLM practices suggesting technical, economical and socio-environmental feasibility.
- Existence of institutional presence and support with continuity and permanent presence.
- Existence of a farmer's association or an equivalent organization.

Specific Intervention Sites (SIS) within the GIAs. SISs are the specific intervention and evaluation areas where the actions undertaken will deliver direct outcomes. The indirect results that these interventions may generate are much broader, and could even generate positive externalities outside the Project's area of direct influence. There are 3 types of SISs:

- *Highly Degraded Areas:* Land is degraded to such a degree that only medium/long term rehabilitation alternatives can be proposed to alleviate degradation.
- *Areas with Moderate Degradation:* Degree of degradation does not yet present a high impact on the environment. Mitigation practices can be applied and two intervention alternatives may be distinguished (i) changing the land use, and (ii) changing the management, while maintaining the land use.
- *Conserved Areas or Locations who are defined as having Sustainable Management:* Resource management is sustainable. However, some aspects can be enhanced to increase the likelihood of a demonstration and/or dissemination actions.

Each GIA should have at least 2 SISs: (i) one representing a risk situation due to severe land degradation, and the other (ii) in favorable condition, meaning there has been conservation-oriented land use development. Addressing these two distinct conditions will allow for useful future evaluation. Furthermore, the distinct conditions will help to determine the causes as well as the biophysical and socioeconomic impacts of land degradation at the local scale, which will serve as a baseline for the development of specific public policies. Areas with intermediate situations, including different degrees of degradation or alternative resource management will be also considered.

The Land Use Systems (LUS) in the GIAs will be identified in each specific area. Different land uses and the management practices developed will be analyzed, as well as the impacts generated on them (e.g. low, moderate, or severe land degradation due to an indiscriminate use of the soil, or its improvement through the application of good practices). There will be several different LUS within a GIA, so that the analysis can include those which are more representative of the respective area. There may be some variability within each LUS, known as types of use (LUT), such as: types of soil, surface, etc., which will be characterized by a specific management practice.

From the analysis conducted in each of the SISs, it will be possible to make useful comparisons across the Project area, making it possible to have:

- Comparisons of SISs where different types of land degradation (LD) exists, and is more visible in some areas than in others (e.g., by controlling wire fences).
- Comparisons of SISs with different conservation practices (SLM), and with different impacts in various LUS.
- Conserved areas (natural and/or selected closures) compared with areas under some form of use which means a presence of a mild degree of LD.
- Comparisons between cultured agricultural lands and relatively “untouched” adjacent lands, divided by barriers such as lines of trees or fences.

Action plans in SIS. During Project preparation, key areas were identified where implementation of adaptation measures could be representative in terms of the technical selection criteria described above. These GIAs are within the districts of Puan, Carmen de Patagones, and Villarino. The relevant institutions of the area will coordinate the activities to be undertaken in each of the pre identified SISs.

Once starting the Project implementation, a series of consultation and coordination will be conducted to establish operational mechanisms, including roles and responsibilities that each party will bear on the execution of adaptation measures in each SIS. As mentioned, the activities taking place within each SIS are prominently linked to the promotion of diversification and intensification of production, the promotion of rural cooperatives, and support to adapt general technology.

Each of the operational field teams at SIS level will conduct a survey of information on the status and evolution of the production systems that will be linked to knowledge management activities under component 3. For each SIS, teams will identify 4 to 6 real production systems to gather information, starting with a complete diagnosis of the situation and including levels of degradation, economic and productive activities, farmer's strategy and his family. The field teams will monitor the system evolution over time and feed relevant information to the IEWS.

The operational mode in each SIS will function through implementation of voluntary agreements between the SAyDS with the participating entities in charge of the implementation of technical field interventions (e.g. INTA). In the case of participating farmers, voluntary participation agreements will be signed for the farmers to adopt the Project implementation framework. The operational team will prioritize the SISs where relevant data could be obtained for the purposes of the Project, and where it can ensure the continuity of the activities in the long term. The options to remediate degradation, such as management systems that best adapt to climate change, will be discussed and defined in a participatory manner with producers and other technical and institutional partners, including SAyDS, OPDS, INTA, UNS, MAA, Producers' Associations, Municipalities, and producers involved.

Component 3: Applying Participatory Approach to Knowledge Management and Local Capacity Development for Adaptation to Climate Change (US$ 210,000) will engage directly targeted farmers and partner organizations in Project monitoring, adaptive management and dissemination of lessons learned. It aims at creating public awareness and ownership of the Project. People will be trained and provided proper tools to participate in development and tailoring of local and even farm/household-specific adaptation strategies. As applicable/relevant, all activities will contemplate a gender-sensitive approach to adaptation.

Capacity will be built especially for development of knowledge systems that promote continuous improvement and adaptive management as Project and its partner organizations produce more climate and other necessary environmental and social data, and pertinent knowledge and experience grows. A specific methodology will be developed to address the following topics: (i) climate change and implications for agriculture and identification of potential response options; (ii) prioritization of response options; and (iii) development of

action plans[26]. Further, training will be offered to local groups for carrying out KM tasks, and mutual knowledge sharing between and beyond the three key counties will be promoted. A specific communication and KM strategy will be prepared to identify specific means to involve different stakeholder groups and find effective ways for knowledge sharing. Joint demonstrative field visits will be organized to promote hands-on dialogue. At the Project end, good practices and lessons learnt will be disseminated at different administrative levels, including relevant international forums. The basis for the communication strategy is presented in **Annex 8.**

Outcome: Enhanced local knowledge and capacity for adaptation and response, developed in a participatory manner.

Outputs: Combined consultation, coordination, training, and knowledge sharing at the local level in the three counties of direct Project intervention to develop and validate intervention proposals and work plans.

Capacity building will be delivered on areas such as formulation of indicators and measurement plans, systems of continuous improvement, and mutual knowledge sharing in terms of the proposed activities between and beyond the participating counties. Participatory monitoring will produce periodic reports that make information available to all stakeholders. Knowledge management will be promoted amongst stakeholders e.g. through joint demonstrative field visits.

Activities: Consultation and face-to-face and on-line training, consultancies for development of content, joint field visits, participatory planning and publishing and dissemination of good practices.

Component 4: Developing a Sustainability Strategy (US$ 247,100) includes the generation of necessary institutional and community level agreements for the measures to be sustained beyond the Project's closure. It is necessary to create a policy framework taking into account both regulatory and material needs that contribute to the continuation of key activities by relevant stakeholders, and a commitment to a visible/provable dissemination strategy. Continued financing for successful initiatives will be sought through institutional arrangements that enable linking measures with the Development Plan of the Southwest of Buenos Aires Province (PDSO), adopted pursuant to provincial law 13,647 in 2007. The Plan provides resources for annual provincial budgets[27] that are directed at the differential treatment of marginal counties in terms of production, for example in Adolfo Alsina, Saavedra, Púan, Tornquist, Coronel Rosales, Coronel Dorrego, Bahía Blanca, Villarino, Patagones, Guaminí, Coronel Suárez and Coronel Pringles.

[26] One example of this type of process-based methodology has been developed and piloted in Mexico, Peru and Uruguay. A 2009 World Bank publication called Building Response Strategies to Climate Change in Agricultural Systems in Latin America provides a successful example of participatory approach to local adaptation strategies.

[27] The Development Plan of the Southwest of the Buenos Aires Province had funding for 40 million Argentine pesos (approximately US$ 10 million) for 2011. It operates under the Ministry of Agricultural Affairs of the Province of Buenos Aires through a committee that includes several institutions and sectoral business associations. http://www.maa.gba.gov.ar/2010/dir_econo_rural/plan_des_sudoeste.php

The PDSO Steering Committee includes several stakeholders that are relevant for the Project development, and thus their participation is contemplated in the Observatory under component 1. Likewise, linkage with other national-level plans will be promoted, e.g. the Provincial Agricultural Services Program. Furthermore, local authorities will be provided with the necessary tools for continuing funding of key activities. This activity will be mainly focused on the continuation of the IEWS and its adoption by the Observatory. Institutional arrangements targeting sustainability of the Observatory will be promoted, expecting that it will be sustained by its constituting institutions as well as the relevant government programs. This component will facilitate development of arrangements for local accountability and supervision by the federal and provincial executing counterparts for an additional 5-year period after the Project's closing date.

Thereby, a compilation and review of potential sources of financing will be conducted, and a fundraising strategy involving private and public sectors will be developed. Finally, a participatory program to disseminate good practices will be applied to trigger multiplication processes through time.

Outcome: The expected outcome is to improve local, provincial and national level technical and institutional capacity to sustain, scale up and replicate the Project outcomes.

Output: The planned output is the creation of a policy framework taking into account regulatory requirements and resources needed to continue the Project's main activities and a commitment to disseminate the experience and lessons learned.

Activities: a) high level consultations and coordination on policy management to promote institutional commitments, especially targeted to the continuation of the Observatory; b) linking the Observatory and the PDSO; c) hiring a consultancy on key topics to raise institutional awareness; d) generating a compendium of financing sources, e) dissemination and promotion from the local to international level, for example participation through side-events at UNFCCC and UNCCD COPs or other international events, including developing of dissemination materials.

Participating Institutions envisaged for this component include: Municipal Governments-OPDS-PROSAP-MINAGRI-MAA-MDS-INTA, and the Provincial Plan for the Development of the Southwest.

B. Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and groups within communities, including gender groups.

The Project target beneficiaries are the most representative farmers of the SWBA in terms of type of activity, number of farmers and area involved, i.e. the small and medium-sized mixed agricultural-cattle production farms on dry-land. In the direct Project intervention area, over 80% of the farms are family owned, of which a majority belong to the stratum of small

farmers with less than 500 hectares (Villarino: 61.2%, Patagones 43.1%, Puán 64.5%)[28]. This stratum is especially vulnerable to the impacts of climate change; after each extreme weather event (drought/flood), their future production cycles and family resources are potentially compromised[29]. During the last decade, this has gone so far that the SWBA has depended on public policies supporting primary production, as well as on regulations which have attempted to protect it from climate contingencies. This is especially the case of the provincial Law 10,390 on agricultural emergencies which provides exemptions, extensions and public aid to affected farmers. Thus, during 1991–2010 the region has been declared in drought emergency uninterruptedly, with serious consequences for the farmers and their families, as well as for the local infrastructure and public services/finances.

Methods used by the National Institute for Industrial Technology (INTI) in 2009 to assess levels of poverty in rural areas illustrate that counties in the SWBA, and especially those in dry areas and with particularly scattered rural population, widely exceed the provincial average of poverty, reaching poverty rates of 20–37%. Thus, the Project area is placed second in the province's poverty ranking immediately behind the Buenos Aires conurbation which, in turn, is one of the sites with the highest poverty indicators in the country.[30]

Congruently, population data published by the Directorate of Provincial Statistics signals the growing problem of disappearing villages and urban centers in dry land counties with previous large rural populations. Population growth in most of the counties between 2001 and 2010 has thus been extremely low, and in the cases of Adolfo Alsina, Guaminí, Coronel Dorrego and Puán, there was a net population drop of around 4.5%. Most who migrate from these areas are potentially active population (available to work), leaving behind a population that is highly dependent on family and/or government transfers. In addition, there are clear indications that a substantial reduction in the number of farms is taking place in the Project area, of the order of 5% annually[31]. The decreasing number of farms within the Project area derives from a vicious circle of land degradation and decapitalization of productive assets that leads to farm abandonment and rural migration (see Table 2).

[28] Data from the National Agricultural Census http://www.indec.gov.ar/default_cna2002.
[29] http://www.inta.gov.ar/ascasubi/info/documentos/rn/eroviento10.pdf
[30] Mezza, Nadina; Ocaranza, Alejandro (2009): *Mapa de Pobreza e Indigencia de la Provincia de Buenos Aires*. Instituto Nacional de Tecnología Industrial.
[31] Vulnerability study developed on the basis of the national census: *La teoría social del riesgo. Una primera aproximación a la vulnerabilidad social de los productores agropecuarios del Sudoeste bonaerense ante eventos climáticos adversos.* María Isabel Andrade; Paola Laporta. Centro de Investigaciones Geográficas, Facultad de Humanidades y Ciencias de la Educación, Universidad Nacional de La Plata.

Table 2: Concentration of agricultural activities and abandonment of farms within the Project area

County	Census	No of farms	Ha	Tendency in change in number of farms	Tendency in change in ha
Patagones	CNA 1988	1,073	1,243,315	-	+
	CNA 2002	925	1,271,443		
Puan	CNA 1988	1,156	528,145	-	+
	CNA 2002	882	545,753		
Villarino	CNA 1988	1,347	911,066	-	-
	CNA 2002	938	879,258		
Adolfo Alsina		1,021	476,780	-	-
		805	450,109		
Guamini		658	348,305	-	+
		604	392,613		
Cnel. Dorrego		824	502,302	-	+
		547	544,227		
Tornquist		623	430,354	-	-
		492	400,387		

Source: See footnote 31.

The context described above shows the critical situation that the Project area is facing at the socio-economic and productive level. In this line, the Project aims at providing the affected rural population with an information and early warning system, better systems for water capture and irrigation, technical inputs and materials to adapt their production to increasing climate variability and change, training for an adequate planning of their activities and restoring recuperation capacity of ecosystem services. Additionally, material and conceptual means will be provided to diversify family subsistence agriculture and food security. Overall, it is expected that measures taken in terms of strengthening sustainable production means and facilitating potential occupational changes through concrete pilots, and improvement of value chains (production, distribution and access to alternative markets) will facilitate beneficiaries' climate resilience with a menu of options. Furthermore, the affected population will benefit from better institutions and information, as well as greater predictability in terms of development of their livelihoods.

After the 2001 economic crisis, women played a critical role in preventing massive auctions of fields whose mortgage payments had turned unaffordable for most of the local farmers. Within the Project area, women have had a strong influence in decision-making processes. However, recent regional gender research on rural geography does not paint a similar picture of rural women within the Project area. Many rural or peri-urban women (e.g. Bolivian immigrants) work long days on reproductive and productive tasks, but they are not

acknowledged for it.[32] Thus, special attention will be given to gender-sensitive approaches to Project management and adaptation through tailored consultations with women groups. Please see further details in the Gender Strategy for Project Implementation presented in **Annex 13**.

C. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme.

As described above, changes in climate and human-induced land degradation have increased vulnerability of the SWBA communities. The impacts have already had considerable consequences, including: loss of means of livelihood of thousands of small subsistence farmers and their families, abandonment of small and medium-scale farms and rural villages, deterioration of the rural infrastructure, and pressure on the productive ecosystems. The aforementioned factors further contribute to decreasing climate resilience and adaptive capacity. Salinization, erosion, deforestation and desertification due to the overexploitation of natural resources lead to decreasing productivity of the soil. In addition, population uprooting, dependency on governmental alleviation measures, loss of work culture, deterioration of social life in the rural environment, loss of production knowledge, and deterioration of the human capital erode the socio-cultural basis of the SWBA.

Against this backdrop, the cost of inaction is constantly incremental in time. Currently, this is perceptible considering a series of public programs such as the Agricultural Emergency Law, which exposes high fiscal costs to the public administration. The law involves a program of revolving funds to sustain activities covering over 2,000 farmers (approx. US$ 15 million in 2010),[33] as well as important amounts dedicated to the zone in form of public transfers allocated to the farming sector[34]. Besides, the Development Plan of the SWBA (PDSO, Provincial Law 10390) seeks to promote sustainable development of the agricultural production in the intervention zone. It derives funding from annual provincial budgets (40 million pesos for 2011, equivalent to US$ 10 million)[35]. The related revolving funds focus on financing production factors for agriculture and cattle ranching such as seeds for sowing. The proposed Project intends to get involved in this mechanism with complementary in-kind measures to promote sustainable technologies aimed at filling persistent technology gaps that impact irrigation systems, forage banks and management of grazing plots.

Taking these factors into account, the intervention through the proposed and potentially emerging additional and/or alternative measures is highly beneficial in terms of opportunity costs; compared with the public expenditures on mere alleviation measures, the hereby

[32] Lic. Belén Nieto, María; Lic. Ferrera, Lida María (2010): *Trabajo, Identidad y Género en el Cinturón Hortícola de Bahía Blanca (Argentina). ¿Problemas de Desarrollo Rural?* A paper presented at the VIII Latin American Conference on Rural Sociology, Porto de Galinhas, 2010.
[33] Report from the Office of the President:
http://www.casarosada.gov.ar/index.php?option=com_content&task=view&id=7301&Itemid=66
[34] Reports from the General Accounting Office of the Province of Buenos Aires:
http://www.cgp.gba.gov.ar/Presupuestaria/XlsViewer.aspx?DocName=MunicipiosData/Data/06-2008/Archivos/Subsidios.htm&DocTitle=Subsidios y Transferencias
[35] http://www.lanueva.com/edicion_impresa/nota/3/12/2010/ac3047.html

proposed investment is moderate. Through the proposed project, the following concrete benefits will directly contribute to the reduction of current vulnerabilities:

- Capacity for greater responsiveness by state institutions and production sectors through an adequate information system (early warning) and the development of institutional capacity.
- Increased planning capacity for responsive public policies through coordination mechanisms across the relevant institutions and civil society.
- Greater adaptive capacity of the local communities based on mechanisms that contribute to increased interaction, exchange of experiences and creation of ownership across the key stakeholders.
- Increased resilience of productive ecosystems through mechanisms which help local farmers contribute to the sustainable management of natural resources in productive ecosystems.
- Increased capacity to productive planning through capacity transfer for monitoring, transparent management and participation in decision-making processes.
- Increased awareness of climate change and potential adaptation actions to face it among national and local policy-makers, producers, civil society and other stakeholders.

This Project proposal is based on the assumption that success of concrete adaptation measures during and after project implementation depends on both political and normative mainstreaming and participatory ownership. Therefore, the complementary intervention pillars form a critical part of the Project's cost-effectiveness. Participation, consultation, creation of capacities and institutional strengthening are expected to provide an enabling environment necessary for successful implementation of concrete adaptation measures. Furthermore, explicit capacity and institution building are two foundational activities to scale up and replicate Project outcomes in a potentially vast region where indirect impacts are expected.

During Project preparation, an Economic Evaluation of implementation of adaptation measures within the Project area was conducted. Based on the available information, a cost-benefit analysis was carried out for some of the on-farm measures planned under component 2, as well as for the implementation of the IEWS. Each of these measures present positive economic returns either separately or integrated across the Project components. The Net Present Value (NPV) of the Project, integrating all the assessed measures, is of US$ **17,578,259**, and the Economic Internal Rate of Return (EIRR) of 53 percent. This analysis was carried out considering the current 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 are expected in the region due to temperature increase. Consequently, the sensitivity analysis was made considering three different versions of a drought scenario (moderate, severe and extreme). Under all of these scenarios the Project exceeds the limits of the minimal profitability requirement, since the EIIR remains above the Discount Rate. The evaluation is presented in detail in **Annex 12** that shows that the Project has solid cost-benefit grounds.

D. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, sector strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

Mitigation of climate change and conservation of natural resources are important pillars of the national Government's current programme, which aims at mainstreaming them into the key economic sectors.[36]

Thus, the institutional frameworks of several national agencies currently include development of sectoral programs which are in line with the project objectives. In particular, the Secretariat of Environment and Sustainable Development (*Secretaría de Ambiente y Desarrollo Sustentable*, SAyDS), the Secretariat of Energy and the Ministry of Agriculture, Livestock and Fishing (MAGyP), are promoting various related national programs such as the Strategic Food Plan, Provincial Agricultural Services Program, and National Action Plan to Combat Desertification (NAP), which are described below.

The SAyDS acts as the lead agency to determine the minimum environmental protection requirements to improve, restore, conserve, develop and conduct sustainable management to the native forests and related environmental services. Through Law 26,331 on the Conservation of Native Forests adopted in 2007, the SAyDS has started a nation-wide system for Payment for Ecosystem Services which contributes, among other things, to increasing resilience of ecosystems to the impacts of climate change. In addition, it will help to reduce GHG emissions through avoided deforestation.

The Directorate for Climate Change was created under the SAyDS to address climate change induced challenges. In addition; the creation of SAyDS meant the establishment of the Governmental Climate Change Committee which was created in 2009[37]. This committee operates through an institutional coordination arrangement that serves as a platform to disseminate information across various areas of the national administration related to sectoral processes and climate change. In addition, the Committee has begun developing a National Climate Change Strategy (NCCS; in Spanish, *Estrategia Nacional en Cambio Climático,* ENCC), with the purpose of coordinating the participation of Government sectors and establishing a national action framework. The strategy comprises policies, measures and actions needed to focus on low carbon economic growth. Furthermore, the Governmental Committee coordinates the activities included in the Third National Communication (TNC) on Climate Change to the UNFCCC, the main purpose of which is to design policies and measures (P&M) for climate change that can be integrated into sectoral development

[36] http://www.casarosada.gov.ar/index.php?option=com_content&task=view&id=24&Itemid=34#j

[37] It is worth mentioning that SAyDS is also the focal point of the United Nations Framework Convention on Climate Change (UNFCCC), which the Argentina has participated in since 1993, having hosted COP4 in 1998 when the Buenos Aires Action Plan was adopted. As a signatory to the Kyoto Protocol since 2001, Argentina has made important progress in terms of mitigation of climate change of the Clean Development Mechanism. This includes the contribution of a methodology for reducing GHGs through reforestation adopted by the UNFCC in 2010.

strategies, including evaluation of their economic, environmental and social impacts. The TNC will provide a science-based tool for decision-making not only for the SAyDS but also for various other areas of the national, provincial and municipal governments.

More concretely, and according to the guidelines set forth by the National Focal Point of the UNFCCC, adaptation to climate change should be a priority area within the strategy of the National Government. One of the pillars of the TNC will be a comprehensive analysis of the challenges posed by the evolution of climate conditions on the farming sector. The Fourth Appraisal Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) anticipated substantial dilemmas faced by agriculture, but did not include an evaluation of particular regional challenges. It is on this point that the TNC aims to inform the UNFCCC and highlight the national, subnational and local issues faced by Argentina: the whole of its productive belt will be affected by increases in soil temperatures and changes in rainfall patterns, including the occurrence of extreme weather events.

As for the United Nations Convention to Combat Desertification (UNCCD), the SAyDS, through its **Directorate of Soil Conservation and Fight against Desertification**[38] was set up as National Focal Point in 1994. Currently, Argentina, as host-country to the COP9 in Buenos Aires in 2009, is chairing the Conference of the Parties (COP). Since 1995, the UNCCD Focal Point has developed a National Action Plan (in Spanish, *Plan de Acción Nacional,* PAN)[39], with the main objective of combating desertification and mitigating the effects of drought in order to contribute to sustainable development of the affected zones. The following actions developed within the framework of the PAN are especially relevant for the project:

- Land Degradation Assessment in Drylands (LADA-FAO), aimed at assessing the scope of dry land degradation: in terms of the outputs of the proposed adaptation project, the related evaluation methodologies will serve creation of the early warning system, social and productive survey methodologies and the Good Practice recommendations for Drylands .[40]
- Linked to the LADA project, an evaluation of economic impacts of climate change in Drylands in Argentina is being conducted jointly with ECLAC and the Global Facility. The first results were expected by September 2011 in form of a climate change vulnerability zoning of the Argentine regional economies. The final results could support decision-making within the project framework and ideally serve as a basis to conduct a net present value (NPV) analysis of the costs of inaction in the zone by the Regional Consultative Observatory on Climate Change and Desertification (component 1).
- GEF-Project “Sustainable Forest Management in the Transboundary Gran Chaco American Ecosystem” runs under the framework of the Subregional Action Plan held by the National Focal Points of the UNCCD of Argentina, Paraguay and Bolivia. The regional coordination of this project falls into the competence of the Directorate for Soil Conservation and Combat against Desertification of the SAyDS, and one of its main components is creation of an Early Warning System operated by a Transboundary Executive Committee[41].

[38] http://www.ambiente.gob.ar/?idseccion=25
[39] http://www.ambiente.gob.ar/?idseccion=143
[40] Information on LADA: http://www.ambiente.gob.ar/?idseccion=158
[41] http://www.thegef.org/gef/gef_country_prg/00

- Project on Sustainable Management of Arid and Semi-arid Ecosystems to Control Desertification in Patagonia (GEF-Patagonia): The intervention zone operates on an ecosystem that is similar to that of Southwestern Buenos Aires, and respective experience and lessons could be shared between the projects. It could also be possible to achieve a geographically contiguous application of the measures.[42]
- Project for the Construction of Strategic Financial Partnerships for the Consolidation of Argentina's PAN: From the standpoint of the proposed Project, the following interventions are relevant: review of the regulations on land use planning and soil conservation, first experiences in the application of revolving funds and design of a multi-sector fund to combat desertification, as well as experience of implementing the MERCOSUR Strategy to Combat Desertification.
- Creation of a national Observatory on Land Degradation and Desertification carried out together with the National Council of Scientific and Technological Research (CONICET).

Since this adaptation Project falls within the framework of the NAP, it is expected to benefit from the above mentioned experiences and specifically the review of regulations, development of an international early warning system, and the Good Agricultural Practices applied. Likewise, should implementation of a multi-sectoral fund to combat desertification be achieved, it could continue supporting adaptation measures that prove successful under this Project after it is completed. Further, the SAyDS has recently lead creation of a National Observatory on Desertification with CONICET, and a project on assessing economic impacts of climate change in dry lands throughout the country with CIMA and CEPAL. These are national-level activities with a great synergy and completion potential with the proposed Project.

In addition to NAP, the Ministry of Agriculture, Livestock and Fishing (MAGyP) has been promoting, since 2004, the use of alternative forms of energy through agricultural products. This includes: production of biofuels and bioethanol emphasizing production and use of vegetable oils and animal fats for biofuels, and sugarcane, corn and sorghum for bioethanol. It also encourages development of sustainable production systems in degraded areas through forestry practices and infrastructure improvements for agricultural services allowing an increase in competitiveness, exports and employment. The MAGyP attaches special importance to these issues with reference to Southwestern Buenos Aires, where it implements measures such as Productive Revolving Funds and no-interest credit lines in support of small and medium farmers. Additionally, it enforces the Farming Emergency Law in the affected counties. All these activities are framed within the National Strategic Food Plan.[43]

Starting in 2003, and within the new national macroeconomic context of recovering competitiveness of the productive system, the Provincial Agricultural Services Program (PROSAP) became the main tool to promote the provincial farming economies throughout the country. US$650 million have been invested by the Program in over 80 projects that have directly benefitted a very significant number of Argentina's farmers.[44] PROSAP is being

[42] http://gefpatagonia.ambiente.gov.ar/?IdArticulo=2215
[43] http://www.minagri.gob.ar/site/index.php
[44] http://prosa.gov.ar/

implemented with support of the Inter American Development Bank (IDB) and the World Bank.

The Secretariat of Energy promotes auto generation of electricity with the objective of achieving a contribution of 8% of renewable energy sources to the national power consumption in a 10-year period. The US$ 105,000,000 Rural Markets Renewable Energy Project (PERMER), which is being implemented with the objective of supplying electric power to Argentina's scattered rural population and improving their settlements and living conditions, promotes sustainable management of energy resources and adoption of renewable energies by eliminating market barriers. In many cases, these are concrete adaptation measures and can prove extremely useful for the project yet provided its similar geographical approach. This is especially true as according to the National Program for Disaster Risk Prevention and Reduction and Territorial Development, promoted by the Ministry of Federal Planning and Public Works[45], the zone presents high averages of infrastructure vulnerability as compared to the rest of the province. Installation of decentralized infrastructure in the rural zones of the area contributes to reducing vulnerability to impacts of climate variability and change, and some of its activities can be contemplated by the project as potentially eligible activities, e.g. electric pumping of water fueled by solar power.

Other governmental agencies such as the Secretariat of Public Works, Ministry of Federal Planning, Public Investment and Services, National Water Institute and Provincial Directorate of Public Sanitation and Hydraulic Works, have implemented measures which contribute to climate mitigation and adaptation, reinforcing infrastructure and repairing zones devastated or degraded by climate events.

The Provincial Agency for Sustainable Development (*Organismo Provincial para el Desarrollo Sostenible,* OPDS), the provincial counterpart of this project, operates various programs in the Province of Buenos Aires. Among these the Agrosolidarity Environmental Program is of particular relevance to the project, as it intends to promote a long term improvement of the population's quality of life and limit misuse of resources. Importantly, the OPDS is currently working on a provincial level NAP.

Outcomes and experiences achieved through component 2 of the project will serve as inputs to these programs, and especially the community focused activities where domestic sustainable use of resources and gender issues will play a key role.

In addition, the OPDS participates in the Regional Council for the Development of the Southwest of the Province of Buenos Aires, which was established by provincial law 13,647 with the specific purpose of promoting sustainable development of the intervention zone. This Council brings together a broad range of provincial and technical institutes, universities and trade associations. Law 13,657 establishes a Development Plan for the Southwest of the Province of Buenos Aires which, among other actions, implements revolving funds for pasture and seeds benefitting the farming sector. Further, the OPDS is currently developing a territorial environmental land use plan within the framework of the Law for the Protection of

[45] First Progress 2010 (developed with support from UNDP): http://www.planif-territorial.gov.ar/html/direcciones/riesgos.php

Native Forests that offers incentives for sustainable forest management throughout the country. The financing mechanism for this is a National Compensation Fund which pays for sustainable management plans presented by small and middle size farmers. This point is important for the proposed project, since a fundamental line in adaptation to climate change in the Province of Buenos Aires consists in maintaining the ecosystem services provided by the xerophilous forest *(bosque espinal)* of the intervention zone, favoring erosion control for agriculture and livestock. This project will help farmers to develop sustainable management plans (component 2) that could later on become eligible under the above mentioned compensation mechanism.

This project proposal located in the SWBA has a direct link with a number of above described national strategies and plans. The most direct and noteworthy links exist with and between the National Climate Change Strategy (NCCS) and National Action Plan to Combat Desertification (NAP).

In terms of the NCCS, the Project supports its following main objectives:

1. Improve agricultural systems and enhance food security by reducing vulnerability to climate change;
2. Strengthen natural resources management under projected climate change and variability scenarios; and
3. Strengthen monitoring systems and measurement of hydrological and meteorological variables.

The main objective of the NAP is to fight against desertification and mitigate the effects of droughts in order to contribute to sustainable development and improve the livelihoods of the people living in the dry land areas of Argentina. In this sense, the project area provides clear evidence of the linkages between desertification processes and short-term decision-making that favors immediate productivity over longer-term sustainability and resilience. Here, the SW region of BA provides an example that may be more relevant to other parts of Patagonia or the Pampas than to the rest of BA province.

The specific relevance of the selected project area in terms of impacts of climate change and desertification, and thus implementation of both the NCCS and NAP, was a key factor behind the decision on the project location. The project activities will facilitate strategic lessons from the borderline of the two agendas, and contribute to achievement of the named objectives within almost a model area set up. This is expected to promote political decision-makers to design synergic interventions addressing climate change adaptation and combat desertification beyond the project boundaries.

The proposed Project area is of great importance for food security at the national level. The Argentine economy is based on exports of agricultural commodities[46] and has thus two great challenges linked to agricultural productivity: first, assure a high rate of exports to obtain

[46] A pronounced growth of sowing production was an outcome of a strong devaluation in 2002 and high increase in international prices of agricultural commodities.

foreign currency in order to back the national currency and accomplish foreign obligations, and second, to ensure access to food at reasonable prices in the domestic markets.

Related with the above, Argentina has set up an important Federal and Participative Agri-food and Agribusiness Strategic Plan for 2010-2016 (PEA²), bringing together all relevant actors within the country. Additionally, the Argentine Government is currently carrying out several processes of mainstreaming climate change concerns into strategic fields of public policy, such as technical conversion of agro-ecological productive areas, creation of decentralized rural markets for renewable energy, etc. The Project will link up with these initiatives through its knowledge management component.

Further, the National Institute for Agricultural Technology (INTA) is currently developing a variety of potential adaptation options for local agriculture practices. Products and results of this project are expected to contribute to further identify and possibly test such practices and thus provide synergy between these strategically related initiatives. Moreover, the INTA will be directly involved in implementation of specific actions of this project throughout is project cycle.

E. Describe how the project / programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc.

The Project will be developed in accordance with applicable national standards and technical regulations, and will be executed in cooperation among various technical agencies of the National Government.

Since for the most part the Project comprises sustainable technical interventions at a micro-scale, it is important to note that the project will cooperate with the National Institute for Agricultural Technology (INTA) and the National Institute for Industrial Technology (INTI). Both institutions maintain technological innovation programs for sustainable development under national and international standards and have broad experience in the field as they maintain their respective extension services in the zone: INTA maintains two extension stations, Bordenave and Ascasubi, which, besides introducing new technologies, conduct training programs, vulnerability studies and research on crop impacts under different climate change scenarios. INTA is a national reference institution comprising a Climate and Water Institute, among others, with the mission of generating knowledge and technological developments related with impacts of climate variability and change on natural resources and the Argentine agrifood system. It is a national and international reference point in the areas of agro climatology, agricultural hydrology and remote sensing, through generation of technological outputs in these areas, designed to meet current and potential user needs.[47]

Instead of major infrastructural interventions, this Project proposes low-intensity technologies. As a starting point, the relevant technical standards are mainly based on the National Environmental Law No. 25,675, which determines the legal principles for public

[47] http://climayagua.inta.gob.ar/que_es_icya

environmental policy such as legal congruence, prevention, precautionary principles, intergenerational equity, continuous improvement, subsidiarity, solidarity and cooperation. This law implies an obligation to conduct an Environmental Impact Analysis (EIA) as well as provide for participation of affected stakeholders and the general public. In the case of EIAs, the local co-executive partner of the project, OPDS, is the mandated provincial authority to request an EIA if so determined in the provincial EA system in terms of the expected environmental impacts of a proposed investment.

Moreover, this Project has been screened by the World Bank's safeguard policies as the WB is the MIE for this Project. **Annex 11** describes how the Project will comply with each policy.

F. Describe if there is duplication of project / programme with other funding sources, if any.

Currently, there is no funding implemented or identified that would duplicate the measures proposed by this project, despite the number of above described programs and initiatives providing clear synergies described in **Annex 7**. It should be emphasized that the proposal has an environmental approach and comprises involved productive systems from an agro-ecological perspective. In this sense, the project complements the measures implemented in support of production that were described under compatibility with national strategies; it contributes to related ecological sustainability criteria aimed at preservation of local ecosystems and their services. Although there are important development plans related with agricultural production, without the requested funding, the National Secretariat of Environment and Sustainable Development (SAyDS), as the key agent of environmental policy, would not have sufficient resources to implement the proposed measures and disseminate respective lessons learnt. The proposed project is therefore considered essential to strengthen cooperation between the SAyDS and Ministry of Agriculture, Livestock and Fisheries (MAGyP), and improve MAGyP efforts in support of production with an integral approach. Concrete pilots on innovative adaptation measures aimed at incorporating climate resilience and sustainability aspects in the use of natural resources are needed in the most climate vulnerable counties of Argentina.

The Agricultural Emergency Law and the PDSO are focused on the agriculture sector and include revolving funds from a mere productivity-based perspective. The revolving funds provide seeds to farmers in order to support their production, but they don't assist farmers to install irrigation systems or support development of sustainable land management plans. On the contrary, this Project proposal seeks to complement these relevant activities by introducing for example environmentally oriented planning measures, rainwater harvesting and use, forestry, etc.

While the above mentioned, currently on-going domestic interventions aim at supporting and/or sustaining productivity, the proposed project focuses on fostering resilience and reducing vulnerability through sustained provision and use of ecosystem goods and services. The measures to be financed through the project strengthen adaptation to climate change focusing on sustainable land use, land recovery, promotion of sustainable alternatives in agricultural production and search for sustainable market opportunities, among others.

Annex 7 describes the scope of coordination with other related initiatives to this Project. It is based in a survey and analysis which justifies the relevance and opportunity for this proposal.

G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

The dissemination mechanisms are described in greater detail under descriptions of the components 1 and 3. The Project envisages developing a sequence of knowledge management (KM) mechanisms and dissemination of lessons learned from a local to national and international levels. To start at the local level, participatory approach will direct specific activities and development and dissemination of specifically devoted materials. The previously described participatory monitoring and control processes will be integrated into KM activities as they imply an ongoing involvement of the local population from the beginning of Project implementation. This aspect is especially relevant within the framework of the Sustainability Strategy (component 4), as it substantially aims at triggering institutional learning processes, participation, knowledge exchange, and replication and scale-up of good practices. Finally, Project demonstration sites will contribute, from the start and in an ongoing way, to sharing of lessons and training through local disseminators.

Related with the above, the SAyDS and its Directorate of Soil Conservation and Fight against Desertification run their own environmental communication program that includes a digital journal comprising thousands of contacts with related institutions and Civil Society Organizations around the country and world-wide. The SAyDS has a specialized technical team for dissemination of environmental information that produces maps and manuals and organizes training events. Additional to these resources, component 1 includes a specific training program for social disseminators and opinion leaders such as journalists and social workers that will be prepared in coordination with related work under the Third National Communication (TNC). A specific communication and KM strategy will be prepared for dissemination of lessons learned at different levels as outlined in **Annex 8**.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender groups.

During the identification phase of this Project proposal, consultations were carried out in five instances involving different stakeholders:

More precisely, the Project preparation included the following consultations:

(1) A specific workshop targeted to the beneficiaries and other relevant stakeholders for further discussion. SAyDS and OPDS made a joint presentation of the Project concept. The meeting was attended by 41 participants representing NGOs, academia, municipal and provincial governments, local producers, and the World Bank. The participants expressed their agreement with the Project design; its priorities and components, and facilitated identification of the key partners and participants as well as sources of relevant information

for the consequent Project preparation. The workshop provided the first mapping exercise of the key stakeholders and prioritization of the main activities under each Project component. During the event, the SAyDS conducted an assessment to determine the relevance and representativeness of the consultation and the level of interest in participating in the Project of the represented stakeholder groups. All of the assessed aspects gave satisfactory results. A detailed report on the workshop, including the results of the named assessments, was prepared, sent to the participants and disclosed at the SAyDS website[48].

(2) A joint World Bank-SAyDS-OPDS preparation mission in the Project target area that took place from October 3 till 7, 2011. The mission involved field visits and consultation meetings with stakeholders and potential beneficiaries in the counties where direct interventions are projected within GIAs and SISs. Majors (*intendentes*) in the three counties led the consultation meetings that involved participation of local experts, producers, teachers, NGOs and journalists. These meetings facilitated definition of priorities at the territorial level and the first set of the GIAs.

Further, this mission included technical meetings with the UNS, AGAVISA, UTN and the Municipality of Bahía Blanca. The outcome of these meetings included: (i) confirmation of the importance of gaining more and more detailed information on climate change/adaptation issues and land degradation at the local level and strengthening local capacities, (ii) access to critical information related to available technical and economic assessments and feasibility for the proposed pilot adaptation measures, (iii) conduction of a more detailed diagnosis of the problem to be addressed by the Project, (iv) identification of activities that can be executed by local partners, (v) identification of a potential demonstration area (Napostá field), (vi) the importance of increasing environmental education within the agriculture sector, and (vii) confirmation of a strong media interest in climate change impacts within the region and feasible adaptation measures, including sketch of the next steps concerning training and participation of journalists within the Project framework.. A detailed report on the mission was prepared, sent to the participants and disclosed in the SAyDS website[49].

I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

Taking into account a forthcoming new dry phase induced by the ENOS phenomenon (2015-2050), the Project will provide interventions with concrete adaptation measures in the critical aspects which compose the current vulnerability scenario at a key moment in which it is still possible to react to the threat of a new cycle of resource degradation.[50]

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48 http://www.ambiente.gov.ar/archivos/web/DCSyLD/file/Joaquin/Informe%20del%201er%20Taller%20de%20Validaci%C3%B3n-Tornquist.pdf

49 http://www.ambiente.gov.ar/archivos/web/DCSyLD/file/Joaquin/Resultados%2520Misi%25C3%25B3n%2520Preparatoria%2520AF_Oct_2011.pdf

50 Glave, Adolfo (2006): La Influencia climática en el Sudoeste Bonaerense y el Sudeste Pampeano, in: Revista Producción Animal 31, 18-23.

In addition to the Project zone's high degree of vulnerability in terms of energy and road infrastructure compared with the remainder of the province and alarming values of the main indicators of youth well-being, employment, unmet basic needs and population dynamics underscored by the National Program for Disaster Risk Prevention and Reduction and Territorial Development and promoted by the Federal Planning and Public Works Ministry,[51] there are clear indications that a substantial reduction in the number of farming units is taking place in the zone.[52] According to a study by *Universidad Nacional del Sur*[53], around 65% of the area allocated to wheat production in the intervention zone suffers from serious degradation processes which result in losses of 250 to 500 kg per hectare in each season.

For cattle breeding, a research conducted by the National Institute for Agriculture Technology shows that the consequences of the recent droughts on the production of grain and animal forage were disastrous implying nil yields and resulting in farmer bankruptcies and abandonment of farm land. Between 2005 and 2009, there was a 40% reduction of the cattle stock in the zone.[54]

Proposed capacity building, education and meteorological monitoring activities together with demonstrative pilots on more sustainable livelihoods would assist communities to better cope with climate variability and change, and to find concrete activities to help slowing down or even halting the on-going deterioration trends in the region. If particularly successful in terms of safeguarding continuity and injecting further replication and scale up, the project could facilitate a broader change towards reversing these trends.

At its best, and within the overall window of opportunity that increasing climate variability and change finally permit to the region in terms of maintaining and promoting agricultural activities, the project is expected to promote permanence of small and medium farmers in the zone and sustain their participation in the market. The fact that approx. 80% of the farming units (EAPs) in the zone correspond to private natural persons is indicative of a strong family link with the productive land, and for this reason there is a good potential for medium and long term work on the environment.

The funding requested would complement the public programs that are currently under way and expected to continue in order to alleviate the current situation of continued degradation of productive and natural assets at various governmental levels. Thus far the named programs have not been able to address full climate adaptation needs: the requested Adaptation Fund resources would provide a unique opportunity to pilot relevant adaptation measures with their full costs covered.

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[51] First Progress 2010 (developed with support from UNDP): http://www.planif-territorial.gov.ar/html/direcciones/riesgos.php

[52] Vulnerability study developed on the basis of the national census: La teoría social del riesgo. Una primera aproximación a la vulnerabilidad social de los productores agropecuarios del Sudoeste bonaerense ante eventos climáticos adversos María Isabel Andrade; Paola Laporta Centro de Investigaciones Geográficas, Facultad de Humanidades y Ciencias de la Educación, Universidad Nacional de La Plata

[53] Silenzi Juan C. and Nora E. Echeverría (2006): Erosión Eólica en el SO bonaerense - El trigo que se dejó de producir durante el período 2001/2-2005/6, Unidad de Conservación y Manejo de Suelos. Departamento de Agronomía, Universidad Nacional del Sur Bahía Blanca, Argentina

[54] Expedite estimation of the eroded soils in the district of Patagones.

J. Describe how the sustainability of the project/programme outcome been taken into account when designing the project.

Institutional development and capacity building activities have been built within the Project design as a cross cutting issue in order to work from the beginning on sustainability of the Project outcomes.

From an overall project-management perspective, components 1, 3 and 4 include institutional development and/or capacity building measures at different levels. The main objective is that these measures would sustain and enhance viability of adoption and continuity of technical measures that will be implemented under component 2. Then, components 1, 3 and 4 build upon each other and are mutually enriched through their particular outputs during the entire Project implementation process.

In Argentina, the Constitution (Art. 41) provides both federal and provincial levels of legal organization. At the local level, implementation of environmental policies depends on the provincial level of commitment. The specific sustainability component/strategy foresees continued provincial level support to sustain Project activities and outcomes after successful completion of the Adaptation Fund grant. This is to be achieved through targeted institutional arrangements and national support for further fund-raising activities in order to maintain and mainstream institutional capacity within the province, and thus secure sustainability of the outcomes.

The federally supported sustainability strategy aims at the province having, within 4 years from the Project inception, sufficient institutional and financial capacity to assume its own responsibility to sustain positive outcomes of the Project. This is especially valid for the Project's Observatory, taken that from the beginning it will be mainly composed by existing institutions and sector-specific representation. The Sustainability Strategy will help to foster the institutional and normative framework, promote mainstreaming processes and generate ownership and accountability through a specific action program. Moreover, the Project's potential influence on public policies through the Observatory and other activities of institutional strengthening will facilitate mainstreaming of adaptation activities in budgets and mandates of key institutions within the region, such as the SWBA Development Plan.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

This section describes the overall implementation arrangements, the policy framework for the Project implementation, and the role of the Steering Committee (SC) and other participating/executing entities.

Overall Implementation Arrangements

Based on the on-going climate change related cooperation with the World Bank with respect to the Third National Communication to the UNFCCC and related synergies, the Government of Argentina has requested the Bank to assume the role of a Multilateral Implementing Entity (MIE) of the Project. The Project's executive agency will be the National Secretariat of Environment and Sustainable Development (SAyDS).

At the provincial level, the Project counterpart is the Provincial Sustainable Development Agency (OPDS), which is the provincial institution with responsibility, mission and powers on environment and sustainable development in the Province of Buenos Aires. The SAyDS and OPDS have signed an institutional cooperation agreement which contemplates the Project.

The Project will be supported by a SC comprised of the SAyDS highest level as well as the Government of the Province of Buenos Aires through OPDS, with the objective and necessary mandate to advice on the central intervention lines.

The Project Implementation Unit (PIU) will be comprised of two SAyDS Directorates, Soil Conservation and Fight against Desertification and Climate Change, and OPDS. The PIU will be in charge of coordinating the Project activities, leading rigorous and participative monitoring and control process, developing and analyzing reports, as well as managing disbursements and controlling their proper application. The PIU will host a General Executive Coordinator who will coordinate activities with a Territorial Executive Manager. The latter will be located in an OPDS office in the intervention zone and be mainly in charge of the local institutional relations and the direct supervision of field activities.

In order to carry out the Project execution in accordance with the Project's purposes, the flow of benefits from the Project's management level towards the local beneficiaries will be managed through three functional frameworks: a Political-Institutional Framework that is made up by the Project's Policy Management, the Technical-Operational Framework that consists of the PIU, and a Local Management Framework that consists of the Project's Territorial Executing Unit (TEU). The details of this management structure, its composition and main roles and responsibilities are described in **Annex 3**.

Most of the Project activities will involve participating entities as co-executants after signing of an implementation agreement with the SAyDS. The overall scope of work agreed upon with the participating institutions concerning each component is described in the chart below,

which presents the connection between the institutions and the Project components and its outcomes.

Component: 1. Reducing Institutional and Community-level Vulnerability		
Subcomponent	Expected Outcomes	Participating entities
1.1: Creating Institutional Tools for Climate Resilience	Institutional response and prevention capacities developed to reduce local vulnerabilities to climate variability and change.	Municipalities-IPA-INAP, INTA (Ascasubi), UNS – National, Provincial and Municipal Governments – PDSO – Farmer Association – NGOs – INTA (Bordenave) – CERZO, National Observatory of Land Degradation and Desertification (SAyDS-CONICET) Cooperatives of media communication at the local level, UTN – FAUBA – INTI – UNS, Ministry of Education of the Province of Buenos Aires, Municipal governments – local civil society organizations
1.2: Promoting Climate-smart Socio-cultural Approaches to Land Management	Reduced vulnerability of livelihoods with a special focus on productive approaches.	
Component: 2. Implementing Adaptation Measures in Productive Agroecosystems		
Subcomponent	Expected Outcomes	Participating entities
---	Concrete adaptation measures piloted with a special focus on the productive agro-ecosystems.	INTA – UNS – Municipal governments
Component: 3. Applying Participatory Approach to Knowledge Management and local capacity - development for adaptation to climate change		
Subcomponent	Expected Outcomes	Participating entities
---	Enhanced local capacity for adaptation and response, developed in a participatory manner.	UNS
Component: 4. Developing a Sustainability Strategy		
Subcomponent	Expected Outcomes	Participating entities
---	Technical, institutional and material capacity developed to sustain the results obtained and contribute to their up scaling.	Municipal governments - PDSO – PROSAP – MINAGRI – MAA – MDS – INTA – INTI

B. Describe the measures for financial and project / programme risk management.

Table 3 identifies the main Project risks and the related mitigation measures.

Table 3: The main Project risks and their mitigation measures

Risks	Risk Mitigation Measures
Climate variability. Changing climatic conditions could affect the success of particular adaptation measures to be piloted during the life of the project.	Establishment of the Regional Consultative Observatory on Climate Change and Desertification, as the overall institutional and farmer-level capacity building included in the project design, will enable careful monitoring of climate variability in the region, and consequent consideration of potential adjustments (see components 1 and 2).
Complexity of financial management and procurement. Certain administrative processes could delay the project execution.	Professionals specifically dedicated to FM and procurement will be hired for project execution Related specific implementation arrangements were analyzed during project preparation in order to detect potential bottlenecks in time and define ways to resolve them. A draft procurement plan has been developed for the first 18 months of project implementation, and it will be further defined in cooperation with all the involved institutions and stakeholders. Financial management arrangements were defined during project preparation.
Changes in policy priorities. Policy priorities across administrative levels (national, provincial and municipal) could change or differ during the project implementation.	Establishment of a Steering Committee at a political level and the inclusion of the Provincial Agency for Sustainable Development in the Project Implementing Unit will make it possible to strengthen related decision making and safeguard pertinence and compatibility. Additionally, the overall participatory and inclusive project design will improve provincial, municipal and beneficiary level ownership throughout and thus enhance sustainability.
Inter-institutional complexity. The number and different levels of stakeholders involved slow down decision-making and potentially project implementation.	The project coordination will be based on participatory decision-making mechanisms in accordance with the specific activities described under component 3 in order to facilitate consensus, provide early detection of potential sources of conflict and promote constructive dialogue.
Staff turnover in the Project Implementing Unit. Local project counterparts could experience staff turnover that could delay project implementation.	No project component is conceived outside relevant, organic public structures. Every activity will be secured by institutional cooperation agreements.
Lack of incentives at community level. The local communities are not sufficiently incentivized by direct benefits and are thus reluctant to cooperate to achieve the medium and long term objectives.	The intervention lines and activities will be identified and expressed in a results-based management plan through participatory consultations to ensure a high level of involvement of the local communities. On the other hand, the project contemplates interventions through programs targeting the communities and key stakeholders in order to promote their willingness to cooperate at the level of the whole community (farmers and their families, teachers, local opinion leaders, etc.).
Lack of synchronicity between political and technical times. Due to the divergence between the	The project includes direct benefits for institutional strengthening. The project operates through multi-

political cycle and dynamics of ecosystem recovery, the political counterparts fail to prioritize cooperation in the project.	institutional and multi-sectoral structures so that transparent exchange and interplay of interests and necessary mutual support among them is expected within a clear organic framework. For that reason, special attention is focused on participation of the municipalities, which are directly exposed to local public opinion. In that sense, the project proposes management according to the principle of subsidiary.
Fluctuating exchange rate. Variations in the exchange rate could negatively impact project implementation in terms of interventions that require importing goods and services.	To date, the Government of Argentina is maintaining a relatively stable exchange rate with controlled fluctuation. On the other hand, the overall project aim of strengthening local capacity implies procuring local goods and services as far as possible.

C. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan. Include break-down of how Implementing Entity's fees will be utilized in the supervision of the monitoring and evaluation function.

The Project will include the following M&E activities financed under the execution costs:

Data Collection
Project activities will be reported by the PIU, which will be responsible for compiling data and reporting to the Steering Committee (SC) and the WB.

Semiannual Evaluations
Semiannual discussions are planned to coincide with WB supervision missions to identify and discuss lessons learned with Project stakeholders and beneficiaries. Prior to missions, the PIU will submit semiannual reports on lessons learned and plans for incorporating them into future activities.

Mid-Term Review (MTR)
The WB supervision team, together with a team of external reviewers and key stakeholders, will conduct a MTR of the Project execution. It will be conducted no later than 24 months after the first disbursement. The external review will focus on: (i) progress in achieving Project outcomes; (ii) status of the institutional arrangements for Project implementation; and (iii) review of the Project implementation plan and operational manual.

To prepare for the MTR, the SC together with the PIU will compile a report containing the following information: (i) executive summary of the overall Project status; (ii) updated description of the overall components' development and indicators; (iii) detailed work plan for Project completion; and (iv) copies of SC meeting proceedings.

Final Evaluation
A final evaluation will be conducted within 6 months after the Project has been completed. The key objectives of the final evaluation will be to assess: (i) attainment of the Project's expected results; (ii) use of the Project results in designing a national CC strategy and action plan; and (iii) progress towards integrating CC considerations into development strategies and relevant sector programs.

The monitoring instances are the following:

M&E ACTIVITY	EXPECTED OUTCOME	RESPONSIBLE PARTIES	ESTIMATED BUDGET	ESTIMATED TIMEFRAME
Data collection	Monitoring information	Project Implementing Unit General Coordinator Local coordinator	US$ 10,000	Within the first 60 days from the Project start and until the Project closing date
Semiannual evaluations	Evaluation report Supervision missions Aide Memoirs WB Implementation and Supervision Status Reports	Implementing Unit General Coordinator Local Coordinator World Bank	US$ 6,000	As from the Project effectiveness
External Mid Term Evaluation (*)	Evaluation Report	Implementing Unit General Coordinator Local Coordinator World Bank	US$ 3,000	Mid Term
:0Final Evaluation (*)	Evaluation report WB Implementation and Completion Report	Implementing Unit General Coordinator Local Coordinator World Bank	US$ 3,000	Six month after the Project closing date
TOTAL				**22,000**

(*) These activities are co-financed by the WB. The PIU will participate with provision of logistics in the field as well as key information.

D. Include a results framework for the project proposal, including milestones, targets and indicators and sex-disaggregate targets and indicators, as appropriate. The project or programme results framework should align with the goal and impact of the Adaptation Fund and should include at least one of the core outcome indicators from the AF's results framework that are applicable[6]

Results Framework and Monitoring

Project Development Objective: 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.

Impact: Increased resiliency to climate variability and change at the community, municipal, provincial, and up to the national level.

Indicator AF Indicator aligned with the Adaptation Fund Results Framework WB Indicator aligned with a World Bank core indicator	Unit of Measure	Baseline	Cumulative Target Values				Frequency	Data Source/ Methodology	Responsibility for Data Collection	Risk	Additional info on the indicator
			YR 1	YR 2	YR 3	YR 4					
Outcome indicator 1 Number of the targeted institutions that reflect institution-specific adaptation needs in their budget allocations to increase their capacity to address climate-related challenges[AF]	Institution	Annex 7 presents the work conducted on this baseline; the actual baseline value will be defined soonest after		4		10	Continued monitoring; verification at the mid-term review and Project closure	Specific communication channels will be established for continued monitoring; structured interviews and revision of budgetary documents at verification	Continued monitoring: Territorial Implementing Unit/ OPDS and Project Implementation Unit Verification: External evaluator	Competing institutional challenges won't allow sufficient resources to mainstream CC concerns (Medium)	The number of the targeted key institutions is 22[55]. Annex 7: Institutional coordination (with other ongoing programs and projects in the Project target area)

[55] Secretary of Environment and Sustainable Development (SAyDS), Provincial Agency for Sustainable Development (OPDS), National Institute for Agricultural Technology (INTA), Ministry of Agriculture, Livestock and Fisheries (MINAGRI), National Observatory of Land Degradation and Desertification, Provincial Ministry of Agricultural Affairs (MAA), Regional Council for development of the Southwest of the Buenos Aires Province (PDSO), Municipalities of Puán, Villarino and Carmen de Patagones, National Southern University (UNS), Center of Renewable Natural Resources in the Semiarid Zone (CERZO), School of Agronomy of the University of Buenos Aires (FAUBA), Ministry of Social Development (MDS), Provincial Public Administration Institute (IPAP), National Public Administration Institute (INAP), Regional School of Bahia Blanca of the National Technological University (UNT), Ascasubi and Bordenave Experimental Agricultural Stations (EEA) of INTA, local NGOs, Provincial Ministry of Education, and Provincial Agricultural Services Program (PROSAP).

		Project start.									
Outcome indicator 2 Productive agroecosystems in the pilot sites maintained or improved to withstand conditions resulting from climate variability and change[AF]	Index (0-24)[56] Score: 0 = Degrading 1= Maintained 2= Improving	Will be defined soonest after Project implmttn has started and the Specific Intervention Sites (SIS) have been defined[57]		7		10	Continued monitoring; technical verification at the mid-term review and Project closure based on FAO-LADA methods and field surveys	Field measurements	Continued monitoring: INTA/ Project Implementation Unit Verification: External evaluator	Recovery of badly degraded land might take longer than the Project period can observe, and specifically extreme weather conditions might compromise some of the targeted results (Medium)	The Project covers three geographic intervention areas (GIA) and 10 SISs that cover app. 100.700 ha. SISs represent the following three types: (i) Highly Degraded Area; (ii) Area with Moderate Degradation; or (iii) Conserved Area[58]. The scoring of each SIS will be determined by measurements through FAO-LADA methods and field controls based on soil conservation techniques.

[56] The 0-24 range of the index values reflects the extreme hypothetical cases where at the end of the Project the land where pilot adaptation measures have been implemented within all of the 12 SISs would be either degrading or vice versa improving.

[57] In this case the specific, the measure to demonstrate improvement would be discussed soonest after Project implementation has started and as part of the detailed design of action plans for site interventions. While during the preparation it is clearly demonstrated that the Project area is severely affected by degradation, the action plans to be prepared for each of the Specific Intervention Sites (SIS) will develop robust baselines in order to determine the soil conservation status and tendencies under specific management conditions.

[58] Specific Intervention Sites (SISs) are the specific intervention and evaluation areas where the actions undertaken will deliver direct outcomes. The indirect results that these interventions may generate are much broader, and could generate positive externalities outside the Project's area of direct influence. There are 3 types of SISs:

1) Highly Degraded Areas: Land is degraded to such a degree that only medium/long term rehabilitation alternatives can be proposed to alleviate degradation.

2) Areas with Moderate Degradation: Degree of degradation does not yet present a high impact on the environment. Mitigation practices can be applied and two intervention alternatives may be distinguished (i) changing the land use, and (ii) changing the management, while maintaining the land use.

3) Conserved Areas where resource management is sustainable. However, some aspects can be enhanced to further increase resilience in face of expected impacts of increasing climate variability and change.

Outcome indicator 3 Relevant threat and hazard information generated and disseminated to farmers and other stakeholders on a timely basis[AF]	Yes/No	No		Yes		Yes	Mid-term review and Project closure	Review of Project progress reports; documentation related with the Information and Early-Warning System (IEWS); and structured interviews	Continued monitoring: Territorial Implementing Unit/ OPDS and Project Implementation Unit Verification: External evaluator	Climate conditions worsening quickly might pose additional population groups under increasing risks beyond the scope of the Project (Low)	The indicator reflects the Information and Early Warning System (IEWS), information produced by the Observatory, varied diffusion material to be produced, etc.

INTERMEDIATE AND IMMEDIATE RESULTS; INTERMEDIATE OUTCOME AND OUTPUT INDICATORS PER PROJECT (SUB-)COMPONENT

Indicator [AF] Indicator aligned with the AF framework [WB] Indicator aligned with a World Bank core indicator	**Unit of Measure**	**Baseline**	**Cumulative Target Values**				**Frequency**	**Data Source/ Methodology**	**Responsibility for Data Collection**	**Risk**	**Additional info on the indicator**
			YR 1	**YR 2**	**YR 3**	**YR 4**					
Component 1, Intermediate Outcome: Institutional and community level response and prevention capacities developed to reduce land degradation and desertification and local vulnerabilities of the agricultural sector to climate variability and change											
Intermediate outcome indicator, sub-component 1.1, Creating Institutional Tools for Climate Resilience % of targeted beneficiaries satisfied with more climate resilient agricultural services (disaggregated by gender)[WB]	%	0		15% of both male and female participants		50% of both male and female participants	Mid-term review and Project closing	Representative surveys (combined with the survey needed to measure intermediate outcome indicators 2.1 and 3.1)	External evaluator		Based on the currently available data on female-led farms within the Project area, women's share of all the beneficiary participants is expected to be a minimum of 20%.

Output 1.1.1: Institutional capacity building program directed at local public officers											
Output indicator 1.1.1 % of targeted local public employees trained	%	0	20%	30%	50%	60%	After each training session to be organized; verification at the mid-term review and Project closure	Reports on the training program	Continued monitoring: Territorial Implementing Unit/ OPDS Verification: External evaluator	Change of priorities and of trained authorities in local institutions (Medium)	The % will be measured of the total of relevant public employees in the three counties where Project works directly. Even though specific gender objectives were not defined for this indicator, participation will be monitored by gender.
Output 1.1.2: Information and Early-Warning System (IEWS) on Climate Change and Desertification developed and run through inter-institutional cooperation											
Output indicator 1.1.2 IEWS developed/ operational through inter-institutional cooperation[AF]	Yes/No	No	Key inst. convened and the IEWS being planned/ under development	IEWS operational and has a growing number of users	IEWS fully operational and has a growing number of users	IEWS fully operational and has a growing number of users	Continued monitoring; verification at the mid-term review and Project closure	Frequent exchange with the participating institutions; Project progress reports; documentation related with the IEWS; and structured interviews	Continued monitoring: Territorial Implementing Unit/ OPDS and Project Implementation Unit Verification: External evaluator	Lack of coordination across institutions; Difficulties in validating data; Time mismatches between data taking and reporting (Low)	INTA, SAyDS and OPDS play the key roles on the necessary inter-institutional cooperation.
Output 1.1.3: Regional Consultative Observatory of Public Policies on Climate Change and Desertification in operation											
Output indicator 1.1.3 Active participation of	Yes/No	No	Yes	Yes	Yes	Yes	Continued monitoring; verification at the mid-term	Frequent exchange with the participating	Continued monitoring: Territorial Implementing	Complexity of the institutional coordinatio	The key institutions are UNS, municipalities, PDSO, NGOs, INTA EEAs Ascasubi and

at least the key institutions of the Observatory[AF]							review and Project closure	institutions; Project progress reports; documentation related with the Observatory; and structured interviews	Unit/ OPDS and Project Implementation Unit Verification: External evaluator	n processes (Medium)	Bordenave, CERZO, National Observatory of Land Degradation and Desertification (SAyDS-CONICET). Their participation is considered active if at least 70% of them are present in meetings and agree on specific action plans for each institution for the following meetings.
Intermediate outcome indicator, sub-component 1.2, Promoting Climate-smart Socio-cultural Approaches to Land Management % of consulted people who report on modification(s) in their Project-related practices (disaggregated by gender)[AF]	%	0		40% of both male and female		60% of both male and female	Mid-term review and Project closure	Representative surveys (combined with the survey needed to measure output indicator 2.1.2 and intermediate outcome indicator 3.1)	Continued monitoring: Territorial Implementing Unit/ OPDS and Project Implementation Unit Verification: External evaluator	Increased awareness and even capacity won't be enough to change old behaviors (Medium)	The targeted population refers to the 80,000 habitants of the three counties where the Project works directly.
Output 1.2.1: Training program for key local stakeholders, including specifically opinion leaders											
Output indicator 1.2.1 Number of beneficiary days of training provided[WB]	Training days	0	16	32	48	64	Continued monitoring; verification at the mid-term review and Project closure	Reports on the training days	Continued monitoring: Territorial Implementing Unit/ OPDS and Project Implementation Unit Verification: External evaluator		Estimated 8 sessions of 2 training days per year. Even though specific gender objectives were not defined for this indicator, participation in training will be monitored by gender.

Output 1.2.2: Teacher training program for environmental education specifically designed for the zone											
Output indicator 1.2.2 Number of teacher training institutes within SWBA that cooperate with the Project and offer related training	Teacher training institute	0		At least 6		At least 10	A specific communication channel will be established to facilitate communication between educational institutes; verification at the mid-term review and Project closure	Continued monitoring; simple surveys	Continued monitoring: Territorial Implementation Unit Verification: External evaluator	Difficulty in achieving official credits from the Federal Teacher Training Network, granted by the Province's Ministry of Education (Medium)	To provide an idea of the total number of teacher training institutes within the 12 counties covered by the environmental education program, there are 7 such institutes within the three counties that are direct beneficiaries of the Project.
Output 1.2.3: Gender-sensitive program on appreciation of the local culture and products, the role of farmers and their family in society											
Output indicator 1.2.3 Number of cultural and socio-productive activities carried out in the Project zone jointly with the municipal governments (fairs, exhibitions, etc.)	Activity	0	Min. two in each of the three counties, as well as a regional fair of sustainable alternative products and production experiences per year				Continued monitoring; verification at the mid-term review and Project closure	Activity reports, media coverage, and qualitative interviews	Continued monitoring: Territorial Implementing Unit/ OPDS and Project Implementation Unit Verification: External evaluator	Low receptivity of environmental issues in civil society. Coordination problems between thematic supply and demand (Low)	Even though specific gender objectives were not defined for this indicator, participation in these activities will be monitored by gender.
Component 2, Intermediate Outcome: Concrete adaptation measures to improve climate resilience and sustainability of productive agroecosystems defined and selected based on participatory processes and piloted by local farmers in cooperation with partner organizations											
Intermediate outcome indicator, component 2, Implementing Adaptation Measures in Productive Agroecosystems	People, male and female	0		200 people; 160 male and 40 female		1400 people; 1120 male and 280 female	Continued monitoring; verification at the mid-term review and Project closure	Frequent exchange with the participating institutions; Project progress reports;	Continued monitoring: INTA/Territorial Implementing Unit and Project Implementation Unit		The indicator follows the guidance provided for defining "technologies" respect to the WB core indicator "Technologies demonstrated in the project areas

Number of beneficiaries who have adopted an improved agricultural technology promoted by the Project (disaggregated by gender)[WB AF]								documentation related with the GIAs; and structured interviews	Verification: External evaluator		(number)". This will be reflected in the Project Operational Manual.
Output 2.1: Program of interventions in Geographical Intervention Areas (GIAs), predefined on a participatory basis according to biophysical, economic and social criteria, offering a menu of options related to the management of water resources, crops, cattle and grazing lands											
Output indicator 2.1.1 Number of adaptation/sustainable land management (SLM) technologies identified/verified through local participatory consultations under the Project framework that are demonstrated within the GIAs[WB AF]	Adapt./ SLM technologies	0	Target numbers will be defined during the first year of Project implementation after the technical consultations have started.		Continued monitoring; verification at the mid-term review and Project closure		Frequent exchange with the participating institutions; Project progress reports; documentation related with the GIAs; and structured interviews	Continued monitoring: INTA/Territorial Implementing Unit and Project Implementation Unit Verification: External evaluator	Because of the socioeconomic context and high degree of dependence on climate and market oscillations, farmers could be tempted to prioritize a short-term vision that is not consistent with the project cycle. (Medium)	The indicator follows the guidance provided for defining "technologies" and "demonstrated" respect to the WB core indicator "Technologies demonstrated in the project areas (number)". This will be reflected in the Project Operational Manual.

Component 3, Intermediate Outcome: Enhanced local knowledge and capacity for adaptation and response, developed in a participatory manner											
Intermediate outcome indicator, component 3, Applying Participatory Approach to Knowledge Management and Local Capacity Development for Adaptation to Climate Change Number of related articles/programs in the local media and political initiatives in the three municipal Councils of the directly targeted counties[AF]	Media articles/ prgrms and political inttvs	0-25%	24 media articles/ prgrms and 2 politicl inttvs	14 media articles/ prgrms and 2 politicl inttvs	16 media articles/ prgrms and 2 politicl inttvs	18 media articles/ prgrms and 4 politicl inttvs	Continued monitoring; verification at the mid-term review and Project closure	Frequent exchange with the participating institutions; review of Project reports and structured interviews	Continued monitoring: Territorial Implementing Unit/ OPDS and Project Implementation Unit Verification: External evaluator	Other competing themes decrease media and political attention (Low)	Specific champions will be identified within local media and municipal structures to support related monitoring.
Output 3.1: Combined consultation, coordination, training, and knowledge sharing at the local level in the three counties of direct Project intervention to develop and validate intervention proposals and work plans											
Output indicator 3.1 Workshops and other KM events meet their targets in terms of participation of different stakeholder groups	Yes/No	N/A	Yes	Yes	Yes	Yes	Continued monitoring; verification at the mid-term review and Project closure	Workshop reports	Continued monitoring: Territorial Implementing Unit and Project Implementation Unit Verification: External evaluator		Named targets will be defined and registered case by case in connection with planning of each event.

Output 3.2: Capacity building for indicator development and measurement plans, systems of continuous improvement, training for local application groups, and mutual knowledge sharing in terms of the proposed activities between and beyond the counties											
Output indicator 3.2 % of targeted beneficiaries who have participated in related training and carry out their own means of M&E and continued improvement related to the measures they have adopted through participation in the Project (disaggregated by gender)[AF]	%	0	At least 20% of both male and female participants	At least 40% of both male and female participants	At least 60% of both male and female participants	At least 70% of both male and female participants	Continued monitoring; verification at the mid-term review and Project closure	Annual monitoring visits including structured interviews	Continued monitoring: Territorial Implementing Unit and Project Implementation Unit Verification: External evaluator		Based on the currently available data on female-led farms within the Project area, women's share of all the beneficiary participants is expected to be a minimum of 20%.
Component 4, Intermediate Outcome: Improved local, provincial and national level technical and institutional capacity to sustain, scale up and replicate the Project outcomes											
Intermediate outcome indicator 4.1, Developing a Sustainability Strategy Number of assumed institutional commitments for the continuity and sustainability of the Project results per sector and activity	See the last column	0				At least one institutional compromise for continuity of the Project results per sector and activity	Continued monitoring; verification at the Project closure	Frequent exchange with the participating institutions; Project progress reports; structured interviews	Continued monitoring: Territorial Implementing Unit and Project Implementation Unit Verification: External evaluator		"Institutional commitments" could include specific budget allocations, hiring of new staff or modifying job descriptions, MoUs on relevant topics, ministerial degrees, new or revised policies and/or plans, submitted funding applications, approved grants, related initiatives with international cooperation, etc.
Output 4.1.1: Creation of a policy framework taking into account regulatory requirements and resources needed to continue the Project's main activities, and a commitment to disseminate the experiences and lessons learned											
Output indicator 4.1.1 Guidance material produced on critical pieces of policy framework, piloted adaptation practices, and potential sources	Yes/No	No				Yes	Verification at the Project closure	Material produced by the Project; structured interviews	External evaluator		

of financing to support continued efforts to promote climate resiliency at different administrative levels and facilitate dissemination of Project results											

E. Include a detailed budget with budget notes, a budget on the Implementing Entity management fee use, and an explanation and a breakdown of the execution costs.

Project budget

Component: 1. Reducing Institutional and Community-level Vulnerability				
Subcomponent	Expected Outcomes	Expected Concrete Output	Minimum required means/input	Cost estimate (US$)
1.1: Creating Institutional Tools for Climate Resilience	Institutional response and prevention capacities developed to reduce local vulnerabilities to climate variability and change.	Information and early-warning system for droughts, land degradation and desertification control.	Acquisition of meteorological stations, data loggers and software, portable computers, vehicles, mobility, training for local working groups and technicians, consultants, virtual platform, publicity and publishing.	303,585.00
		Regional Consultative Observatory of Public Policies on Climate Change and Desertification to mainstream climate change adaptation.	Initial consultation, meetings for annual planning, 3 annual committee - meetings, consultants for specific policy and legal studies, publicity and publishing.	89,855.00
		Institutional capacity building program directed at local public officers.	Initial consultations to identify institutional gaps at the county level, development of 6 training modules, material and virtual platform to complete an overall training course with official certificate on decision-taking level, personnel for conduction and execution of the course, including monitoring and evaluation.	45,197.00
1.2: Promoting Climate-smart Socio-cultural Approaches to Land Management	Reduced vulnerability of livelihoods with a special focus on productive approaches.	Training program on climate change and different adaptation options for disseminators and opinion leaders (journalists, town councilors, etc.).	A more detailed action plan is included in **annex 7**. Main items are: consultancies to prepare content development and deliver training, slots for advertising and publishing, and equipment and technical support for local media.	101,699.00
		Training program for rural school teachers to mainstream environmental factors, climate change and approaches to climate resilience into the curriculum.	Consultancy for content development, training, design of virtual education platform, personnel for maintenance of platform and implementation of courses, equipment for educational field sites, printing and dissemination of documents. See **annex 9** for more details.	123,633.00
		A gender-sensitive program to empower farmers and their families and strengthen their social role for sustainable development,	Specific consultations and training on related issues, consultancy and facilitation for content development, design and print. 4 showroom-events for regional domestic and alternative products including cultural products such as handicrafts. Annual itinerary of environmental cinema, taking advantage of related World Bank experience.	65,431.00
Component TOTAL				**729,399.00**

Budget note: AF funding under this component will be used to improve response capacity of local institutions and communities by fostering informative systems, capacity building at institutional and community level as well as creating instances for policy-coordination, analysis and implementation of participatory policy-solutions. AF funding will be targeted to: 1. technical information-processing such as data collection and processing, mapping and elaboration of useful information for political decision makers, local farmers and related services (IEWS); 2. Fostering of institutional coordination with participation of stakeholders such as farmers associations and local community through the construction of a policy- observatory and its conceptual and physical maintenance. Under this output, AF funding will finance meetings, assessment and investigation as well as other activities for analysis and development of public policy; 3. Furthermore, AF funding aims to finance activities leading to higher institutional capacity, awareness-raising and social commitment, through training courses, dissemination of informative and training material, as well as promotion of social events, as described.

Component: 2. Implementing Adaptation Measures in Productive Agroecosystems				
Subcomponent	Expected Outcomes	Expected Concrete Output	Minimum required means/input	Cost estimate (US$)
---	Concrete adaptation measures piloted with a special focus on the productive agro-ecosystems.	Water Resources Management: Installation of microsystems for irrigation and rainwater harvesting.	Development of alternative intervention models based on local ecosystem conditions, feasibility studies, acquisition of equipment, and installation of sustainable water management systems on field sites, training of local working groups, supervision and maintenance activities, reporting, publicity and publishing.	751,445.00
		Crop Management: Implementation of crop rotation systems, diversification, time alteration of sowing, and organic agriculture in demonstration sites.	Development of alternative intervention models based on local ecosystem conditions, feasibility-studies, acquisition of equipment, installation of sustainable crop management systems on local field sites, training for local working groups, supervision and maintenance activities, reporting, publicity and publishing.	771,076.00
		Livestock and Pasture Management: Implementation of adaptation measures such as forage banks, silvopastorile systems, rangeland recovery and sustainable plot management.	Development of alternative intervention models based on local ecosystem conditions, feasibility studies, acquisition of equipment, installation of sustainable livestock and pasture- management systems on field sites, training of local working groups, supervision and maintenance activities, reporting, publicity and publishing.	784,410.00
		Participatory development of Good Agricultural Practices (GAPs) aimed at enhancing management plans for production and adoption of a voluntary code of climate resilient GAP. Based on results of further stakeholder consultations, identification of alternative livelihood options and ways to facilitate their adoption.	4 thematic training sessions, one virtual course, consultancy for development of a voluntary code and final consolidating event, promotion and publishing.	93,068.00
Component TOTAL				**$ 2,400,000.00**

Budget note: AF funding under this component will be used to reduce climate vulnerability of productive agricultural and livestock rural ecosystems by implementing concrete adaptation measures and disseminating them on demonstrative Geographical Intervention Areas. These areas are selected under specific ecosystemic vulnerability criteria as well as under socioeconomic criteria, emphasizing their replication potential and comparability. These concrete measures constitute a specific set of Good Agricultural Practices and are defined on the base of former participatory consulting processes and scientific evidence, as produced by the FAO-LADA program and former project experience. The design of the operational action plans for each area which will provide more details on the concrete actions to be undertaken during the Project implementation will be achieved through a participatory planning process as described above. This methodology aims at being a start-up generation of local institutional and social commitment and ownership while simultaneously ensuring success through a bottom-up oriented process design. AF funding therefore will mainly finance technological input for on-site implementation of concrete, adaptation-oriented GAP as well as methodological training for planning of production processes and support for the planning process under participatory and continuous improvement methodology.

Component: 3. Applying Participatory Approach to Knowledge Management and Local Capacity Development for Adaptation to Climate Change				
Subcomponent	Expected Outcomes	Expected Concrete Output	Minimum required means/input	Cost estimate (US$)
---	Enhanced local knowledge and capacity for adaptation and response, developed in a participatory manner.	Combined consultation, coordination, training, and knowledge sharing at the local level in the three counties of direct Project intervention to develop and validate intervention proposals and work plans	One workshop per year and per county, final dissemination, travel and mobility, professional facilitation.	115,043.00
		Capacity building for indicator development and measurement plans, systems of continuous improvement, training for local application groups, and mutual knowledge sharing in terms of the proposed activities between and beyond the counties.	4 thematic training sessions, one virtual training course, consultancy for development of content, promotion and publishing.	65,041.00
		Participatory development of progress information through development of periodic reports to make information available to all stakeholders.	Consultation and knowledge management from the 2nd year on: travel and mobility, professional moderation and consultant for content development and design of dissemination materials.	39,129.00
		Training and knowledge management with stakeholders through joint demonstrative field visits.	6 visits, 3 specific knowledge sharing events, documents, consultancy for content development and design, publishing, print and promotion materials, travel and mobility.	62,486.00
Component TOTAL				**281,698.00**

Budget note: This component responds to the premise of participatory knowledge management which states that natural resource management aims at identifying and bringing together key stakeholders, illuminate their unique perspectives and involve them in problem-solving and decision-making about natural resource management issues. In this sense, AF funding will contribute to create the framework for stakeholders at all levels to learn from each other, share experience, gain access to information that is important for them, and use adequate knowledge in practical work. As described in the budget breakdown above, AF funding is targeted to actions fostering KM as a support process within the project cycle as a whole, built on Project experience and serving as well as input for further action. This approach includes the following activities: training courses (orientation), participatory knowledge sharing and market-places (exchange of experiences), field visits (research, use and learning), documentation and distribution of information (access to information).

Component: 4. Developing a Sustainability Strategy				
Subcomponent	Expected Outcomes	Expected Concrete Output	Minimum required means/input	Cost estimate (US$)
---	Technical, institutional and material capacity developed to sustain the results obtained and contribute to their up scaling.	A representative Working Committee for the Project's intervention area comprised by the regional Observatory with institutional capacity to maintain the IEWS and committed to provide information to the national and provincial Project focal points (OPDS and SAyDS) for a period of 5 consecutive years after Project completion.	Consultation, capacity building, knowledge management, and dissemination. Legal advisory, professional facilitation, travel and mobility, promotional activities.	53,513.00
		A compilation and publication of standard-formatted set of evaluation and tracking tools (specific reports on key issues).	Consultancy for content development, design, publicity and print, distribution. Consultation, dissemination, and promotion amongst stakeholders.	32,822.00
		A compilation and review of domestic and international sources of finance to secure continuity of the key Project activities.	Consultancy for content development, design, publicity and print, distribution. Consultation, dissemination, and promotion amongst stakeholders.	32,822.00
		Knowledge sharing on progress evaluation with involved stakeholders and publication and dissemination of lessons learned.	Coordination and knowledge sharing in each county and final joint dissemination event. Consultancy for participative content development, design, publishing, printing and distribution.	36,435.00
		Implementation of a program for dissemination and exchange of experiences from the local to the international level.	Promotional events at the local and national level, and participation through side-events at UNFCCC and UNCCD COPs or other international events. Content development, publishing, print, travel and mobility.	50,911.00
Component TOTAL				**206,503.00**

Budget note: AF contributions under this component will be used to ensure the continuity of successful Project experiences beyond the project cycle. Consequently, this component focuses on the promotion and networking, as well as on activities leading to future funding. At the political level, this component will bring together key stakeholders able to take forward institutional mainstreaming in the three aspects and formalize a mixed working group which should lead to the constitution of a multi-stakeholder steering structure in the future. Additionally, three further activities aim at (i) generation and sharing of background information needed to develop further activities, (ii) development a fund-raising strategy, and (iii) promotion of good practices and lessons learned. This will, among other benefits, foster the Project's chances to become part of a major state-run intervention program. Finally, a key activity under this component points out to sound dissemination of the Project both nationally and internationally in order to identify and activate possible synergies with other related activities, projects, programs and policies.

Total Project components:	**3,617,600.00**

Component N° 1

Expected Concrete Output	
1.1.1.1 Information and early-warning system for droughts, land degradation and desertification control	US$
Acquisition of meteorological stations	73,333
Data loggers, external disks and software	6,666
Portable and desktop computers	19,334
Vehicles	71,111
Mobility INTA, (28.000 km, in 4 years)	11,911
Training for local working groups and technicians	47,377
Consultants	18,000
Virtual platform	12,267
Publicity and publishing	20,000
Tender publication costs	20,000
Insurance of capital assets, taxes and miscellaneous	3,585
Sub Total	**303,585**

1.1.1.2 Regional Consultative Observatory of Public Policies on Climate Change and Desertification to mainstream climate change adaptation	US$
Initial consultations	8,967
Annual planning and committee meetings	29,480
Consultants for specific policy and legal studies	12,267
Publicity and publishing	35,556
Insurance of capital assets, taxes and miscellaneous	3,585
Sub Total	**89,855**

1.1.1.3 Institutional capacity building program directed at local public officers	US$
Initial consultations to identify institutional gaps at the county level	6,612
Development of 6 training modules, face-to- face and e-learning platform to complete an overall training course with official certificate on decision-taking level, personnel for training courses deliverables	21,394
Facilitation of continuous improvement process	13,605
siInsurance of capital assets, taxes and miscellaneous	3,585
Sub Total	**45,197**

1.2.1.1 Training program on climate change and different adaptation options for disseminators and opinion leaders (journalists, town councilors, etc.)	US$
Training, including consultants for content development and delivery	63,670
Slots for advertising and publishing	17,778
Equipment and technical support for local media	16,667

Insurance of capital assets, taxes and miscellaneous	3,585
Sub Total	**101,699**

1.2.1.2 Training program for rural school teachers to mainstream environmental factors, climate change and approaches to climate resilience into the curriculum	US$
Training, including consultants for content development and delivery, including design and maintenance of a virtual education platform	85,381
Equipment for educational field sites	1,333
Printing and dissemination of documents	33,333
Insurance of capital assets, taxes and miscellaneous	3,585
Sub Total	**123,633**

1.2.1.3 A gender-sensitive program to empower farmers and their families and strengthen their social role for sustainable development	US$
Consultations and training	20,629
Consultancy and facilitation for content development, design and print	14,222
4 showroom-events for regional domestic and alternative products, including cultural products such as handicrafts	18,106
Annual itinerary of environmental cinema	8,889
Insurance of capital assets, taxes and miscellaneous	3,585
Sub Total	**65,431**

Component N° 2

2.1.1.1 Water Resources Management: Installation of microsystems for irrigation and rainwater harvesting	US$
Development of alternative intervention models based on local ecosystem conditions	165,056
Feasibility studies	5,689
Acquisition of equipment, and installation of sustainable water management systems on field sites	459,726
Tender publication costs	80,000
Supervision and maintenance activities, reporting	9,600
Publicity and publishing	3,333
Insurance of capital assets, taxes and miscellaneous	28,040
Sub-Total	**751,445**

2.1.1.2 Crop Management: Implementation of crop rotation systems, diversification, time alteration of sowing, and organic agriculture in demonstration sites	US$
Development of alternative intervention models based on local ecosystem conditions	177,934
Feasibility studies	5,689
Acquisition of equipment, and installation of sustainable crop management systems on field sites	359,368
Tender publication costs	80,000
Supervision and maintenance activities, reporting	9,600
AGRICULTURAL SERVICES (tractor drivers, machinery operators, harvesting services, etc.)	96,000
Publicity and publishing	14,444
Insurance of capital assets, taxes and miscellaneous	28,040
Sub-Total	**771,076**

2.1.1.3 Livestock and Pasture Management: Implementation of adaptation measures such as forage banks, silvopastorile systems, rangeland recovery and sustainable plot management	US$
Development of alternative intervention models based on local ecosystem conditions	174,023
Feasibility studies	5,689
Installation of sustainable livestock and pasture- management systems on field sites	363,279
Tender publication costs	80,000
Supervision and maintenance activities, reporting	9,600
AGRICULTURAL SERVICES (veterinary, tractor drivers, machinery operators, fodder harvesting services, etc.)	96,000
Satellite images	13,333
Publicity and publishing	14,444
Insurance of capital assets, taxes and miscellaneous	28,040
Sub-Total	**784,410**

2.1.1.4 Participatory development of Good Agricultural Practices (GAPs) aimed at enhancing management plans for production and adoption of a voluntary code of climate resilient GAP. Based on results of further stakeholder consultations, identification of alternative livelihood options and ways to facilitate their adoption	US$
Thematic training, including development of an on-line course	19,160
Consultancy for development of a voluntary code	31,423
Promotion and dissemination, including publishing	14,444
Insurance of capital assets, taxes and miscellaneous	28,040
Sub-Total	**93,068**

Component N° 3

3.1.1.1 Combined consultation, coordination, training, and knowledge sharing at the local level in the three counties of direct Project intervention to develop and validate intervention proposals and work plans	US$
Consultation	98,715
Dissemination	15,245
Insurance and other office and field running costs	1,083
Sub Total	**115,043**

3.1.1.2 Capacity building for indicator development and measurement plans, systems of continuous improvement, training for local application groups, and mutual knowledge sharing in terms of the proposed activities between and beyond the counties	US$
Training, including a consultancy for development of content and an on-line course	55,068
Promotion and publishing	8,889
Insurance of capital assets, taxes and miscellaneous	1,083
Sub-Total	**65,041**

3.1.1.3 Participatory development of progress information through development of periodic reports to make information available to all stakeholders	US$
Consultation from the 2nd year on: travel and mobility, professional moderation and consultant for content development and design of dissemination materials	31,380
Promotion and publishing	6,667
Insurance of capital assets, taxes and miscellaneous	1,083
Sub-Total	**39,129**

3.1.1.4 Training and knowledge management with stakeholders through joint demonstrative field visits	US$
6 visits	27,157
3 specific knowledge sharing events	13,579
Consultancy for content development and design	10,667
Publishing and printing of promotion materials	10,000
Insurance of capital assets, taxes and miscellaneous	1,083
Sub-Total	**62,486**

Component N° 4

4.1.1.1 A representative Working Committee of the Project intervention area with institutional capacity to maintain the monitoring and early warning system with commitment to provide information to the Project focal point for a period of 5 consecutive years after Project completion	US$
Training	26,901
Dissemination	15,245
Legal advisory	9,389
Promotional activities	1,111
Insurance of capital assets, taxes and miscellaneous	867
Sub-Total	**53,513**

4.1.1.2 A compilation and publication of standard-formatted set of evaluation and tracking tools (specific reports on key issues)	U$S
Consultancy for content development	11,467
Design, publicity and print, distribution	15,556
Consultation and dissemination	4,933
Insurance of capital assets, taxes and miscellaneous	867
Sub-Total	**32,822**

4.1.1.3 A compilation and review of domestic and international sources of finance to secure continuity of the key Project activities	US$
Consultancy for content development	11,467
Design, publicity and print, distribution	15,556
Consultation and dissemination	4,933
Insurance of capital assets, taxes and miscellaneous	867
Sub-Total	**32,822**

4.1.1.4 Knowledge sharing on progress evaluation with involved stakeholders and publication and dissemination of lessons learned	US$
Coordination and knowledge sharing in each county	3,078
Final joint dissemination event	15,245
Consultancy for participative content development	6,133
Design, publishing, printing and distribution	11,111
Insurance of capital assets, taxes and miscellaneous	867
Sub-Total	**36,435**

4.1.1.5 Implementation of a program for dissemination and exchange of experiences from the local to the international level	U$S
Promotional events at the local and national level, and participation through side-events at UNFCCC and UNCCD COPs or other international events.	30,578
Content development, including translations	6,133
Publishing, printing	13,333
Insurance of capital assets, taxes and miscellaneous	867
Sub-Total	**50,911**

Budget breakdown of the World Bank usage of the Implementing Entity Fee

Stage	WB services	WB fee
Identification	Liaison between the WB as the designated MIE and the AF Secretariat Support to the GoA in the preparation of the AF concept proposal Preparation of the WB concept note Technical reviews with invited WB specialists Corporate review English translation & editionPreliminary review of the applicable WB environmental and social safeguards Preliminary procurement review Preliminary Financial Management review	5,000
Preparation	Support to the GoA in the preparation of the AF full-fledged proposal Preparation of the WB Project Appraisal Document Preparation mission in the field Support to consultations Support to the preparation of an Environmental and Social Management Framework, Indigenous Peoples' Planning Framework, Involuntary Resettlement Framework and Social Assessment FM and Procurement Assessment Support to the preparation of an Economic Assessment Technical assistance to the preparation of a diagnosis to identify and prioritize potential for institutional coordination and synergies with relevant on-going or planned initiatives English translation & edition Quality Enhancement Review by technical experts and the Environment Department Decision Review by the Country Management Unit Drafting of Legal Documents Creation of a parent and child trust fund to disburse grant proceeds Design of disbursement mechanisms Disclosure & access to information	35,000
Supervision	Technical review of No Objection requests Local team in Buenos Aires (task manager, fiduciary and safeguards) Biannual supervision missions with HQ-based team members, including safeguards support and supervision Ex post procurement reviews FM support and supervision missions Implementation and Supervision Reports (ISR) Grant Monitoring Report (GRM) Mid Term Review; internal and external	271,617
Completion	Implementation and Supervision Completion Report, including an external review	25,000
Agency fee		336,617

Budget breakdown of the execution costs

Project Execution Cost	
Minimum required means/input	**Cost estimate (US$)**
General Coordinator	$ 110,400.00
Territorial Executive	$ 81,600.00
Financial Assistant	$ 81,600.00
Administrative part time Assistant	$ 28,000.00
M+E Activities	$ 22,000.00
Operational - (PIU)	$ 8,000.00
Operational (PIU in the field)	$ 5,000.00
Office equipment and software	$ 4,000.00
Office inputs (paper, toner, asf.)	$ 2,000.00
Component TOTAL	**$ 342,600.00**

Project co-financing

The Adaptation Fund finances the full cost of adaptation measures. The Project can be implemented and executed with the grant proceeds, and an economic assessment has been prepared based on the full costs to be covered by the Adaptation Fund. However, preparation of this Project has demonstrated to have a robust contribution of in-kind co-financing from the participating entities.

SAyDS has estimated to commit US$ 962,000 in terms of staff and equipment to be assigned to the Project. OPDS has estimated to commit US$ 897,000. Both contributions represent staff time from qualified specialists and use of office space and equipment. The contributions have been estimated for the period of 4 years.

SAyDS has entered into cooperation agreements with the below listed entities. Forthcoming participatory process of defining the detailed Project activities and their respective budget allocations will include signing of implementation agreements where the detailed co-financing contributions will be quantified.

- Provincial Agency for Sustainable Development (OPDS)
- National Institute for Agricultural Technology (INTA)
- Southern National University (UNS)
- National Technological University (UTN)
- National Council of Scientific and Technological Research (CONICET)
- National Institute for Industrial Technology (INTI)

OPDS has entered into cooperation agreements with the following entities:

- Kk`l Rural Fund from Israel
- UNS

- INTI
- Municipalities of the SWBA
- Development Plan of the Southwest of Buenos Aires Province (PDSO)

The nature of the contributions from other entities is described in the chart below:

Participating Institutions	Nature of co-financing
Municipalities-IPAP-INAP	Supply of staff time, technical documents and venue for meetings and workshops.
INTA (Ascasubi)	Supply of qualified staff time, transportation, already existing local contacts and networks, and access to technical information and databases. Use of existing meteorological stations and monitoring networks.
UNS – Municipal Governments – PDSO – Farmer Association – NGOs – INTA Ascasubi/Bordenave - CERZO National Observatory of Land Degradation and Desertification (SAyDS-CONICET)	Venue for the Observatory at the Tornquist experimental station. Supply of staff time. Access to technical documents and venue for meetings and workshops. Supply of high qualified human resources, transportation, already existing local contacts and networks, access to technical information and databases.
Cooperatives of communication media at the local level	Access to regional local media platforms.
UTN – FAUBA – Ministry of Education of the Province of Buenos Aires	Supply of technical staff time. Contribution from the national program *Conectar Igualdad* (digital).
Municipal governments – local civil society organizations – UNS	Venues for meetings, exhibitions and workshops. Contribution from the SAyDS's *Somos Ambiente* program which will take part in these activities.
INTA – UNS – Municipal governments	Supply of high qualified human staff time, transportation, already existing local contacts and networks, access to technical information and databases. UNS will provide access and use of the Napostá demonstration plot in Bahía Blanca.
UNS	Supply of high qualified staff time.
UNS	Venue for trainings on participatory monitoring and evaluation. Access and use of Naposta demonstration lot. Supply of high quality staff time.
Municipal governments - PDSO – PROSAP- MINAGRI – MAA – MDS – INTA and other provincial sector agencies.	Supply of high quality staff time.

F. Include a disbursement schedule with time-bound milestones.

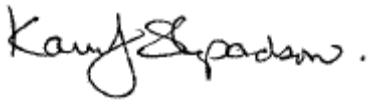
	Upon Agreement signature	One Year after Project Start[a/]	Year 2[b/]	Year 3	Total
Scheduled Date	March 2013	March 2014	March 2015	March 2016	
Project Funds	500,000	1,500,000	1,500,000	460,200	3,960,200
MIE Fee	84,154.25	84,154.25	84,154.25	84,154.25	336,617

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT[59] *Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:*

Mrs. Silvia Mucci – International Programs and Projects Coordinator - SAyDS	Date*: April, 20, 2012*

B. IMPLEMENTING ENTITY CERTIFICATION *Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address*

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, understands that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
 *Karin Shepardson* Program Manager, ENVGC – The World Bank	
Date: April, 24, 2012	Tel. and email: +1`202 458 1398, kshepardson@worldbank.org
Project Contact Person: Marcelo Acerbi and Tuuli Bernardini	
Tel. And Email: + 54 11 4 316 0614, macerbi@worldbank.org and +1 202 4733640, tbernardini@worldbank.org	

6. Each Party shall designate and communicate to the Secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

ANNEX 1

ENDORSEMENT BY THE GOVERNMENT OF ARGENTINA

BUENOS AIRES, April 20 ,2012
NOTE Nº

Subject: Endorsement for
INCREASING CLIMATE RESILIENCE AND ENHANCING SUSTAINABLE LAND MANAGEMENT IN THE SOUTHWEST OF THE BUENOS AIRES PROVINCE

Dear Ms. Levaggi

In my capacity as designated authority for the *Adaptation* Fund in Argentina, I confirm that the above regional project proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the region.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by World Bank and executed by Secretary of Environment and Sustainable Development (SAyDS),

Sincerely,

Lic. Silvia Mucci
Asesora de Programas y Proyectos
con Financiamiento Externo
Secretaria de Ambiente y Desarrollo Sustentable

THE ADAPTATION FUND BOARD
C/O ADAPTATION FUND BOARD SECRETARIAT
MANAGER
MS. MARCIA LEVAGGI
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Jefatura de Gabinete de Ministros
Secretaría de Ambiente y Desarrollo Sustentable

Buenos Aires, 20 de abril de 2012
NOTA Nº
Asunto: Endoso propuesta revisada del Proyecto "Argentina – Proyecto de Incremento de la Resilencia Climática y Mejora de la Gestión Sustentable del Suelo en el Sudoeste de la provincia de Buenos Aires"

SEÑORA SECRETARIA GENERAL:

En mi capacidad de Autoridad Designada ante el Fondo de Adaptación por la Argentina, confirmo que la propuesta de proyecto arriba mencionada se encuentra alineada con las prioridades del Gobierno Nacional y Provincial en materia de implementación de actividades de adaptación que apuntan a la reducción de los impactos adversos y el riesgo del cambio climático en el sudoeste de la Provincia de Buenos Aires, Argentina.

En tal sentido, tengo el placer de endosar el mencionado proyecto con apoyo del Fondo de Adaptación. De ser aprobado, el proyecto será implementado por el Banco Mundial y ejecutado por la secretaría de Ambiente y Desarrollo Sustentable.

Atentamente.

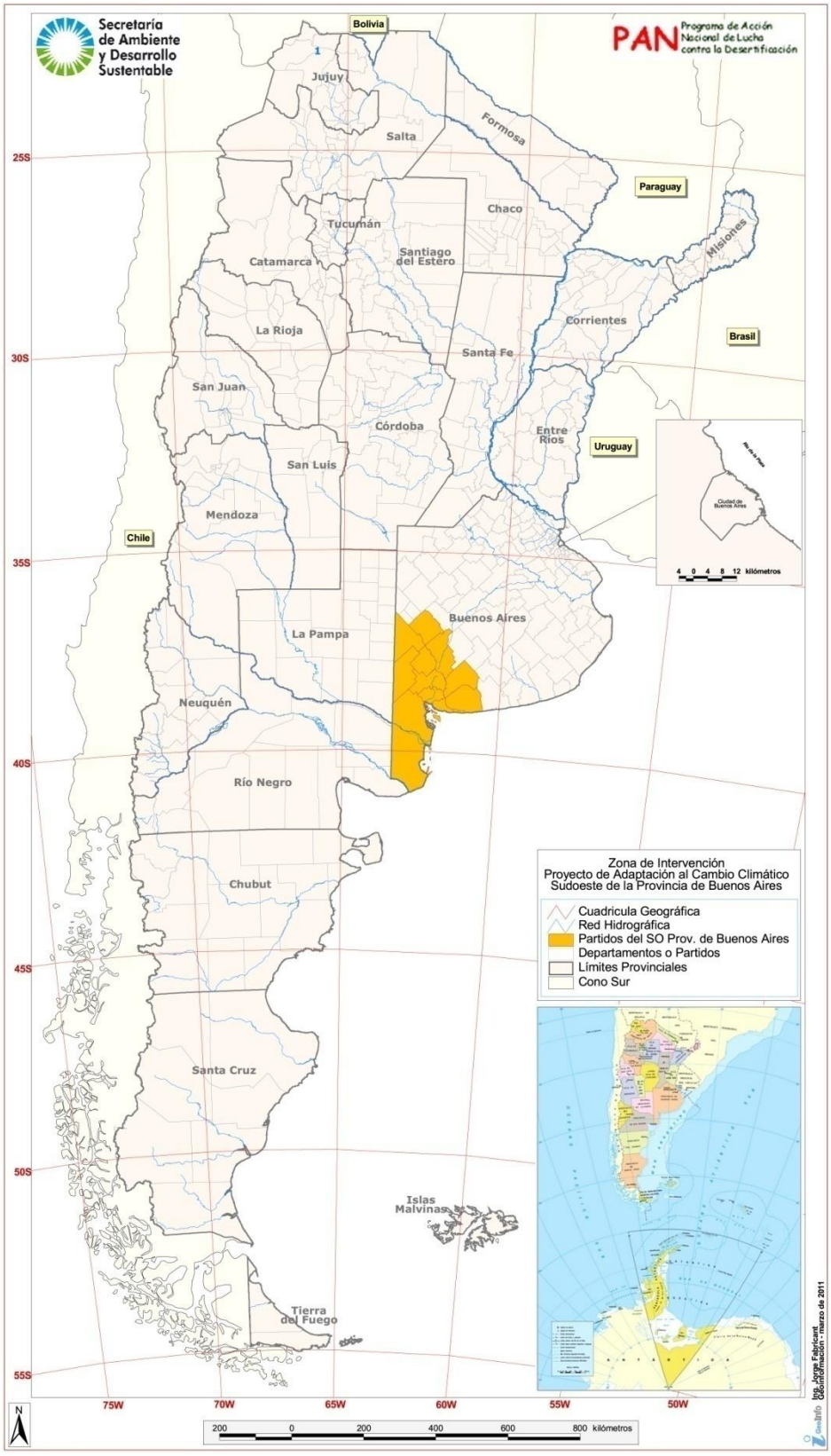
Lic. Silvia Mucci
Asesora de Programas y Proyectos
con Financiamiento Externo
Secretaria de Ambiente y Desarrollo Sustentable

A LA SEÑORA SECRETARIA GENERAL
DE LA JUNTA PARA EL FONDO DE ADAPTACIÓN.
DNA. MARCIA LEVAGGI
S_____/_____D
E-mail: secretariat@adaptation-fund.org
Fax: + 202 522 32 40/5

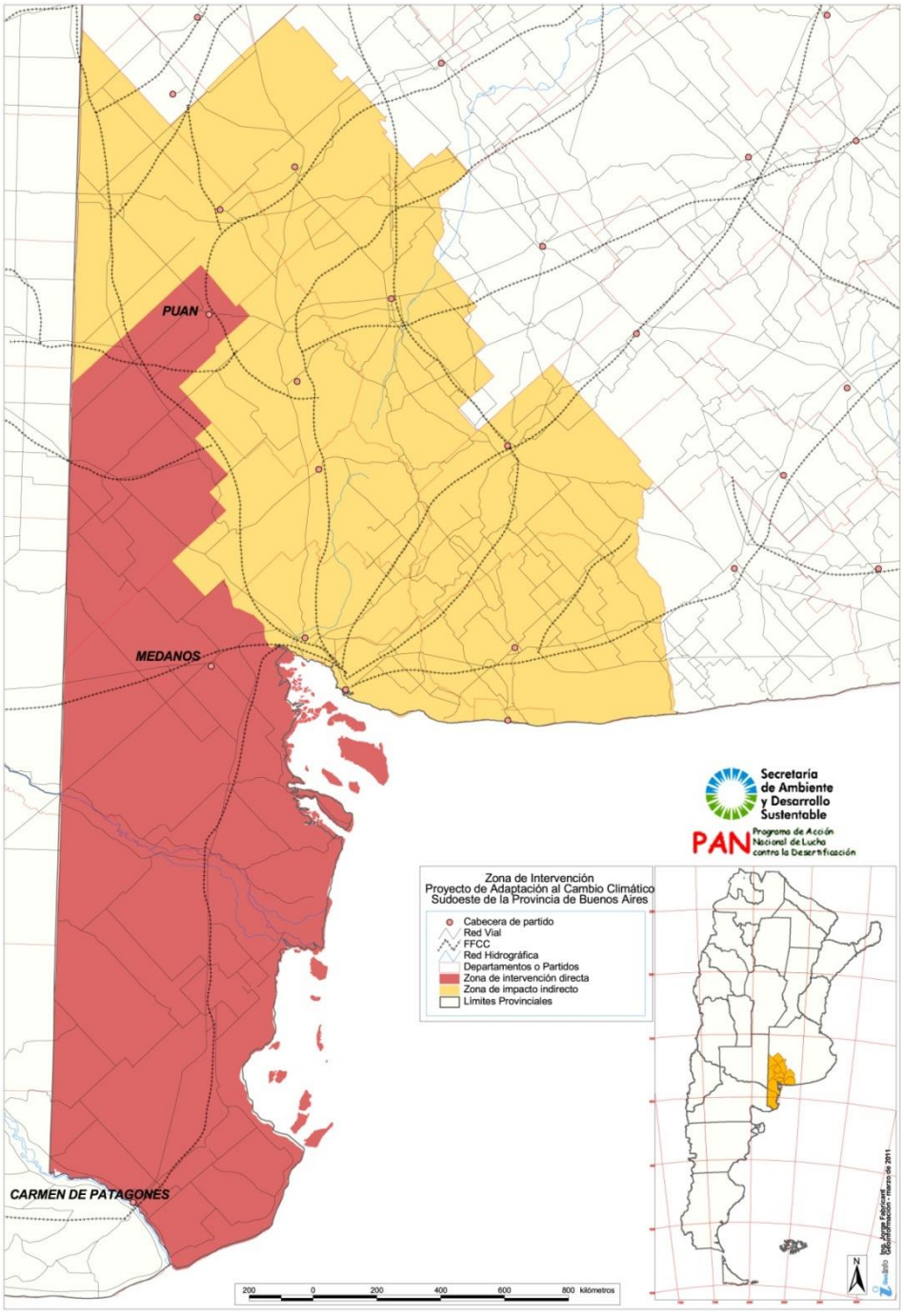
ANNEX 2

MAPS

Map No. 1: Location of the Project's Area of Influence in the Argentina Republic



Map No. 2: Location of the Project's Area of Direct (red) and Indirect Impact (orange)



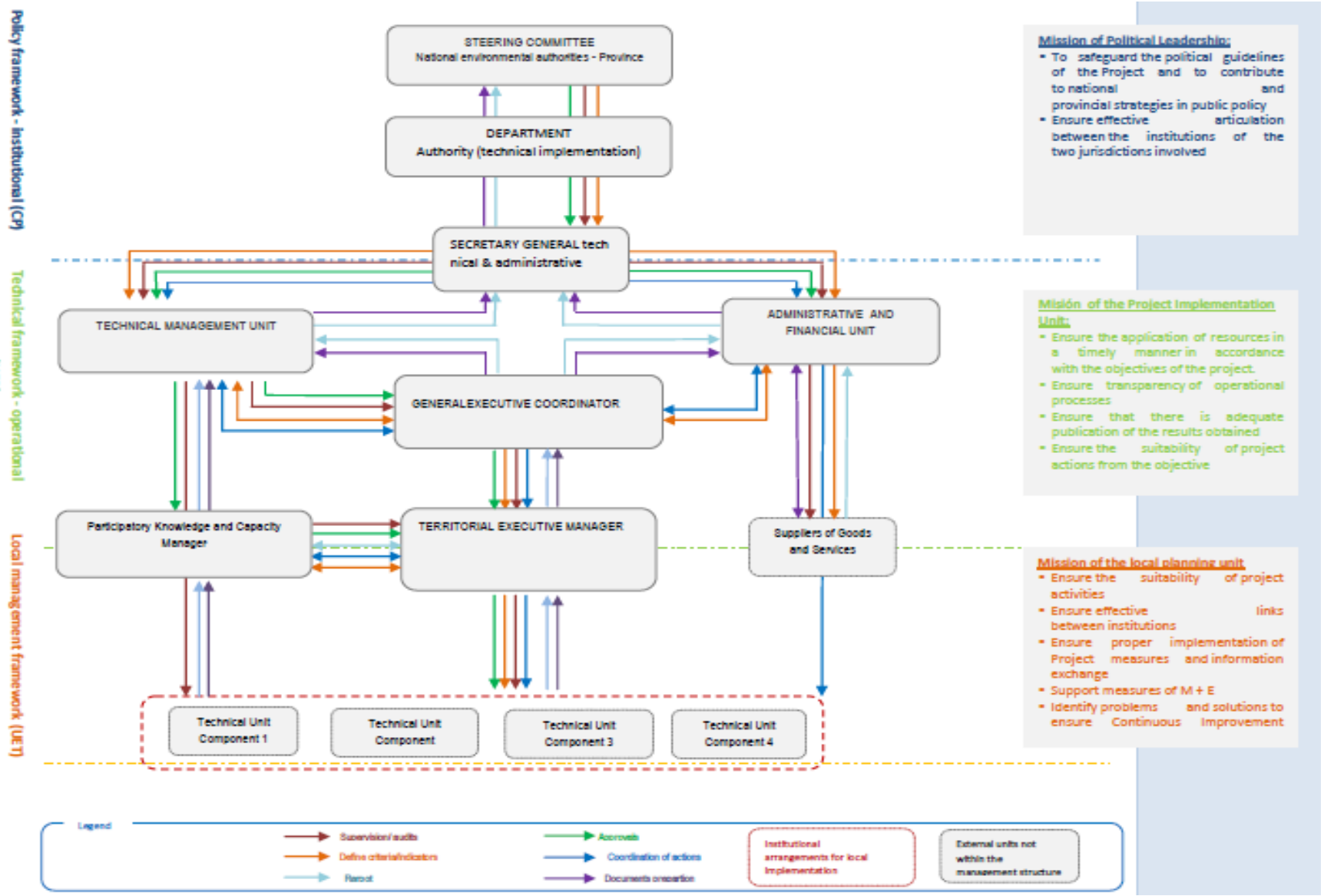
ANNEX 3

IMPLEMENTATION ARRANGEMENTS

Introduction. This Annex provides details related to the implementation arrangements described in Part III of the Project proposal. In order to carry out the project execution, the Project would be managed through three functional frameworks: the Political-Institutional Framework that is made up by the (i) Project's Policy Management, (ii) the Technical-Operational Framework that consists in the Project Implementing Unit (PIU), and the (ii) Local Management Framework that consists of the Project's Territorial Executing Unit (TEU). The implementation frameworks are linked through decision-making processes which are described in the graph attached to this Annex below.

Methodologically, the planning processes respond to a Results-based Management System in which all management levels play a role, especially the Project Executing Unit, receiving input from the territorial level and guidance from the project's policy direction level. The main roles in this structure are described below.

Figure 15 - Project Management Structure



1. **Policy-Institutional Framework.** The mission of this Policy Institutional Framework is to set up an adequate institutional/policy decision-making framework to safeguard the project's policy guidelines, ensuring that its actions, activities, outputs and outcomes are in line with and contribute to the national and provincial objectives in terms of priorities. In that sense, the policy-institutional framework endows the State with a legitimate leading role in the project's implementation and its broad insertion within Sustainable Development public strategies. It would also seek to ensure the sustainability of the Project's measures along time, beyond its implementation cycle. Moreover, since it is a public intervention in the territory, it is vitally important to ensure an effective articulation between the institutions involved in both jurisdictions, supporting decision making processes in a spirit of cooperation, transparency and oriented towards the expected outcomes.

1.1. **Project's Steering Committee.** In the context of the above-mentioned policy-institutional framework, the main function of the Steering Committee would be to provide political strategic leadership to the Project, creating effective coordination among the highest level environmental authorities involved at the national and provincial levels. The Steering Committee members include the National Environmental and Sustainable Development Secretariat, reporting to the Chief of Minister's Cabinet, and the Government of the Province of Buenos Aires through the Provincial Agency for Sustainable Development, with the necessary empowerment and the role of defining the intervention policy and strategic guidelines. This will ensure the alignment of the Project with the government strategies and programs underway in the territory, ensuring the consistency of the interventions at both jurisdictional levels. In addition, this Committee will ensure transparency with regard on the Project's intervention processes.

1.2. **Department Authority**. The function of the Department Authority would be to serve as a linkage between the project's policy-institutional framework and the technical operational level. It will ensure consistency and compliance of policy guidelines at the project's Technical Management Unit. It will also supervise operations and ensure the submission of the project's substantive information to the Steering Committee. This authority would be responsible for supervising the technical teams comprised within the PIU. This Department Authority would be responsible for managing the technical team on soil conservation issues and lead the fight against desertification and sustainable development of Drylands in Argentina. It would be established by the Environmental Policy and Planning Under secretariat of the Environment and Sustainable Development Secretariat and would be headed by a Coordination Secretary selected from its open-ended staff to facilitate the work-flow.

1.3. **General Secretary.** The General Secretary main function would be to coordinate the decision-making processes in the PIU, keeping the records and submitting them to the Directorate-General for the assessment and subsequent reporting to the Steering Committee. This Secretary would organize and order the information flowing from the technical-operational framework and would transmit it to the policy-institutional framework for processing, as required. The General Secretary will have a close relationship with the Project's Department Authority. The Secretary will also have the technical skills to evaluate the Project's processes and the actions by the Technical

Management Unit, and a policy-institutional background so that they are able to apply the policy context to such policies and actions. In addition, the Secretary would supervise the actions of the Administrative and Financial Management Unit in terms of appropriate performance. This Secretary would report to the Environmental Policy and Planning Undersecretariat of the National Environmental Secretariat.

2. Technical-Operational Framework and Project Implementation Unit (PIU). The implementation of the technical, operational, administrative and financial actions required to comply with the project objectives will be carried out within the Technical-Operational Framework which also comprises the PIU. It carries out the monitoring and evaluation activities as well as the coordination of the territorial actions. The PIU will ensure:

- The proper application of resources as per the envisaged objectives.
- Transparency in the operational processes.
- The dissemination of the outcomes.
- The consistency between project's actions and objectives.

2.1. **Technical Management Unit.** The Technical Management Unit would provide the required technical execution guidelines to comply with the Project objectives and will provide support and advice to the Project's National Directorate on the decision-making process by providing strategic orientation and ensuring the effective participation of its member institutions. The Project's Technical Management Unit would have as key members: the Directorate of Soil Conservation and Fight against Desertification as well as the Directorate of Climate Change of the National Secretariat for Environment and Sustainable Development (SAyDS), and the Directorate of Sustainable Production and Consumption as well as the Climate Change Area of the Agency for Sustainable Development of the Province of Buenos Aires (OPDS).

2.2. **General Executive Coordinator**. This Coordinator would be responsible for the overall Project execution and for supervision of staff to be contracted by the Project. This Coordinator would work under the supervision of and reporting to the TMU and will coordinate with the units in charge of Territorial Execution, Monitoring and Evaluation and the heads of the Administrative and Financial Management Unit. Likewise, it should provide feedback to the project execution process and would support and provide technical advice to the TMU when making operational decisions and formulating the annual strategic and operational plans. This coordinator would articulate and coordinate the technical activities, reporting to the TMU for the subsequent processing of the reports from the institutional-policy framework and their submission to the World Bank for supervision purposes.

2.3. **Administrative and Financial Management Unit.** The Administrative Financial Management Unit would ensure the proper application of the project funds towards the timely achievement of its objectives. In that regard, it is responsible for carrying out its relevant actions in the stages of project preparation, management and supervision, assisting the TMU's technical staff, the General Coordinator for Operations, and the

Secretary General in the preparation and documentation required for the procurement of goods and services as well as other procurement required by the Project. Similarly, it would coordinate with the WB to ensure the suitability and transparency of said processes during all the implementation stages by the application of the relevant rules for grants financed by the WB. The Administrative Financial Management Unit would operate within the Programs and Projects with Financial Assistance of International Credit Agencies of the Project's executing agency (SAyDS).

3. **Local Management Framework: Territorial Executing Unit (TEU).** This Unit would lead the Project´s interventions in the field as well as the coordination with relevant institutions, stakeholders and beneficiaries in the Project's target area. This Unit would be staffed by experts that are strongly linked to the territory allowing it to organize actions by engaging the key stakeholders, maintaining a fluid communication with municipal authorities and agencies, as well as with public and civil society organizations. The Territorial Executing Unit is also responsible for the broad public dissemination and for managing perceptions of the outcomes at the local level, monitoring the actions executed, and ensuring local cooperation in a context of transparency, mutual trust and continuous improvement. As part of its mission, the Territorial Executing Unit will:

- Ensure the suitability of the project's actions *vis-a-vis* the needs of the local stakeholders and the territorial public policies.
- Achieve an effective articulation across the institutions involved at the local level.
- Promote the proper application of measures and exchange of information across the stakeholders in the territory and the technical-operational framework (PIU).
- Support the monitoring and evaluation measures assigned by the TMU to the project's head of monitoring and evaluation.
- Identify issues and continuous improvement solutions in real time.
- Facilitate the implementation of the Project's Sustainability strategy.
- Facilitate the implementation of a Project's Communication and Dissemination strategy.

3.1. **Territorial Executing Manager.** This position would serve as the Project's focal point linking general-level planning with the participatory implementation in the territory, and facilitating feedback processes through a close relation with the Project's Head of Monitoring and Evaluation. Thus, this expert would serve as a link between the general planning and the execution on the ground. This position would be located in the local office within the institutional structure provided by the Project's provincial counterpart.

3.2. **Participatory Knowledge and Capacity Manager.** This position would provide the means to monitor and evaluate progress and performance in all the components, as well as the achievement of the Project's objectives. This expert would provide input to the Sustainability Strategy, generating dissemination materials, lessons learned and Knowledge Management mechanisms. The decision-making connected with data gathering would fall on the PIU. Project general evaluations would take place twice a year to comply with the WB progress reports standards. This expert would report directly to the TMU.

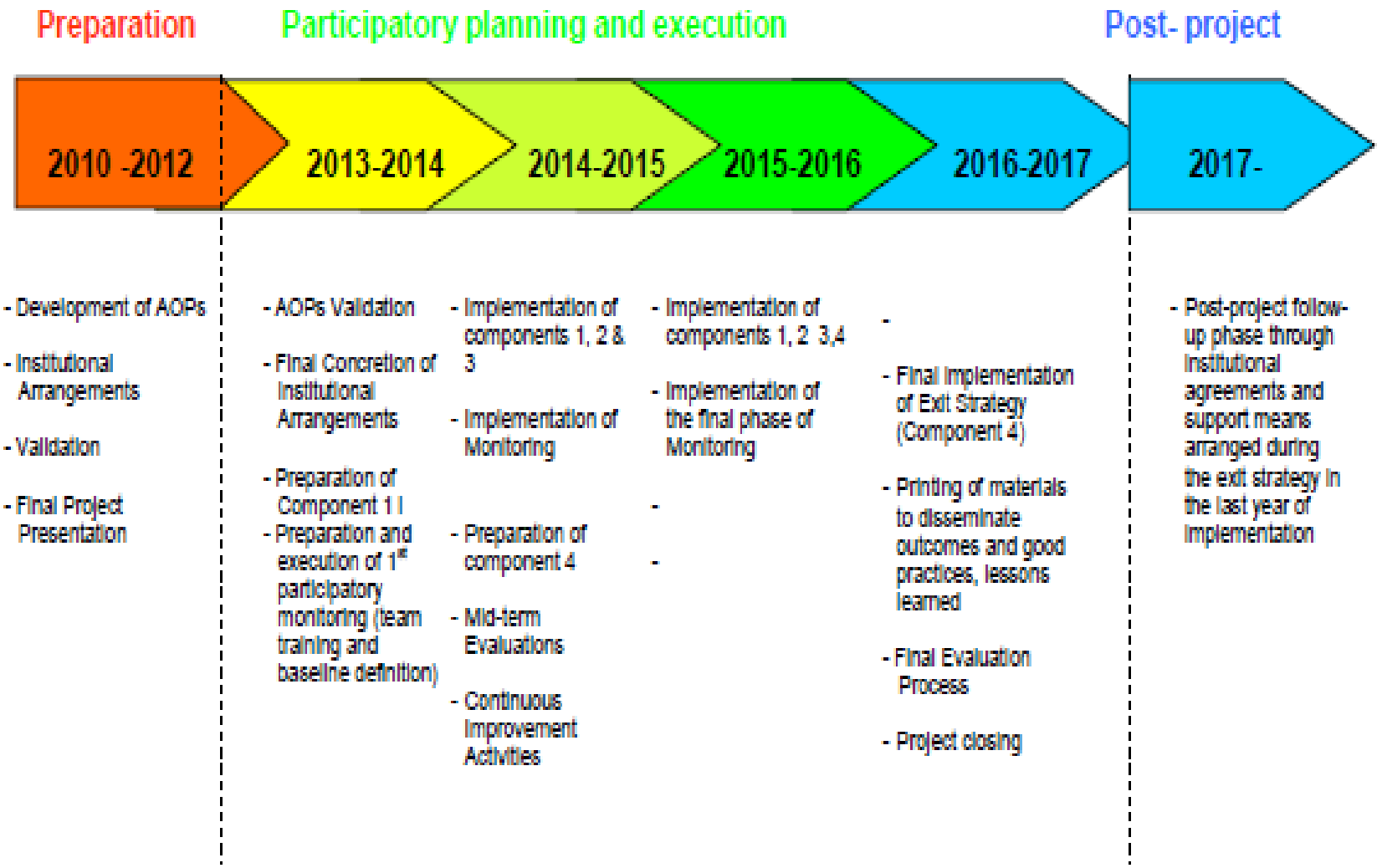
Field Implementation and Participation Agreements. The Project's implementation in the territory would be done through participation agreements with different institutions which would become responsible for executing all or part of the activities included in project components. During project preparation, these institutions have been actively participating in specific consultations and providing technical inputs. Overall scopes of work have been defined between them and the Project. In most of the cases, SAyDS and OPDS have already signed a cooperation agreement which in the future, and during implementation, would be the framework to prepare and sign the specific Project participation agreement. The establishment of management consortia involving more than one institution per component would potentially be established to ensure that synergies are fully leveraged and also to strengthen the institutional framework in order to ensure the sustainability of these measures in the future. The participation agreements would provide in-kind support and resources to the local participating institutions according to detailed work plans to be agreed with each of them. At the same time, the participating entities would contribute with their own staff and resources in their relevant areas. These plans would be monitored and assessed during the Project implementation phase.

Proposed Implementation Plan. The Project implementation cycle is structured in three concrete stages after the approval stage by the donor: participatory planning, execution of field activities, and preparation for continuity (see Figure 16 at the end of this annex). Special emphasis would be given, in the first year, to generate optimum conditions for the operation, monitoring and support of the Project through time. For that reason, during the first year, Project activities will focus on the institutional strengthening component, preparation of the monitoring procedures (including preparation, validation and application of baseline indicators) as well as, from the onset, validation of the operating plans together with all the pertinent stakeholders involved. Furthermore, all the administrative and political arrangements that allow for an optimum performance of components 1and 2 will be put in place.

During the second and third year, the execution would focus on the pilot interventions in GIAs and SISs (component 2). These activities would be accompanied by an ongoing monitoring process. The last six-months of the third year would be devoted to reinforcing the monitoring activities and the Sustainability Strategy. The Sustainability Strategy, based on the experiences from monitoring activities, seeks to obtain as a comprehensive output an institutional mechanism that is suitable to maintain a follow-up of the activities once the project has been completed. Although it is not part of the financing requested, the Post-Project phase is crucially important and it will include a monitoring and evaluation system developed by the institutions involved.

All the components will be planned annually on a results-basis during the pilots preparation phase, and will be validated during the first implementation phase.

Figure 16 - Implementation Plan



ANNEX 4

INFORMATION AND EARLY WARNING SYSTEM

Introduction. This annex provides detailed information related to the proposed Information and Early Warning System (IEWS). This system, included under the Project subcomponent 1.1, will be established to increase the preventive and response capacity of the affected stakeholder groups such as municipal governments, farmer cooperatives and provincial institutions. This system will have a multi-institutional structure involving local technical institutions and universities and connecting them to higher-level information systems to allow easy access to data and active participation and sharing of data among i.e. INTA, National Weather Service, ORA, and private entities).

The creation of the IEWS will follow the international guidance on effective EWSs that are people-centered and integrate four key elements: (i) knowledge of the risks faced; (ii) technical monitoring and warning service; (iii) dissemination of meaningful warnings to those at risk; and (iv) public awareness and preparedness to act[60]. The technical monitoring service will consist of installing metering stations, including expansion of existing meteorological stations. The IEWS will be fed by technical teams trained in each of the 12 counties in the Project area of influence. It will potentially have the capacity to monitor an area of 6.2 million hectares and allow harmonization of monitoring criteria, indicators, emitted warnings and decision-making support.

Background and rationale. Based on international good practice, people-centered early warnings need to be: (i) clearly understood; (ii) easily and readily accessible; (iii) timely; and (iv) tied to response actions to be taken by the people in advance of, during, and after the event. During the drought at the end of the last decade within the Project area, INTA and other agencies were asked by the provincial and national government to provide a technical analysis about its effects. This information was presented in reports based on pre-existing and partially completed reports that were available. Information related to prediction and effects of droughts was prepared on an *ad hoc* basis for the municipalities, the Development Plan of the South West of the Buenos Aires Province, the National Ministry of Agriculture, institutional authorities, cooperatives and farmer associations.

The Project aims at developing a systematic and integrated IEWS guided by the principles of international good practice to generate convergence among the named agencies to harmonize information and disseminate complete, systematic, multidisciplinary and inter-institutional reports. A detailed design process of the IEWS will be initiated promptly as Project implementation starts. The following description presents the current status of the respective plans.

[60] 3rd International Conference on Early Warning (EWC III, Bonn, Germany, 2006. See http://www.ewc3.org/upload/downloads/checklist/final_pdf.pdf

Key IEWS activities. The IEWS will include the following key activities:

- Creating a multi-institutional structure, engaging technological institutions and universities in the area;
- Generating and disclosing periodic public information to increase the awareness and response capacity of farmers and public and private organizations on risks posed on productive agroecosystems and other natural resources with focus on the most vulnerable zones of the South West of Buenos Aires; and
- The development of the institutional capacity and the participatory approach among local stakeholders for decision-making purposes.

Geographical Scope. The information generated and systematized by the IEWS would consider the twelve counties that encompass the direct and indirect Project area of influence. The primary focus of the system will be put on the counties with greatest susceptibility to desertification processes. To that end, actions will be first focused on Patagones, Villarino and the South of Puán (Patagonic and Semi-arid subregions). This is consistent with the three counties the Project has identified as priority areas for direct interventions in GIAs and SISs.

IEWS users and beneficiaries. The potential users and beneficiaries of the IEWS will include:

- Provincial technical institutions (MAA, CORFO, Universities)
- National technical institutions (INTA, SENASA, Southern National University (UNS), etc.)
- Municipal Governments of the 12 counties
- Provincial Government (OPDS, MAA)
- National Government (SAyDS, Ministry of Agriculture)
- Farmer associations in the area, Civil Defense, NGOs, etc.
- Communities

Implementation arrangements. The IEWS design and implementation will be based on inputs coming from inter-institutional coordination meetings. For this purpose, each institution will appoint a representative and the overall process would be supported and supervised by the Project management structure. The following institutions will participate in the IEWS final design and implementation: INTA, SAyDS, OPDS, Ministry of Agriculture, UNS, and farmer associations and cooperatives.

Training for users and operators. Trainings to manage the IEWS will include:

- Explanatory brochures;
- Meetings with potential users; and
- Meetings with operators, including preparation and use of handbooks and specific training sessions.

Information generation, processing, and monitoring. Each of the participating entities and/or projects joining the IEWS will be in charge of participating in generation and sharing of information. All of them will generate data using their own means or already existing data. However, all participants will use same formats/templates to produce, process and monitor relevant variables so that information is collected and interpreted in a comparable way.

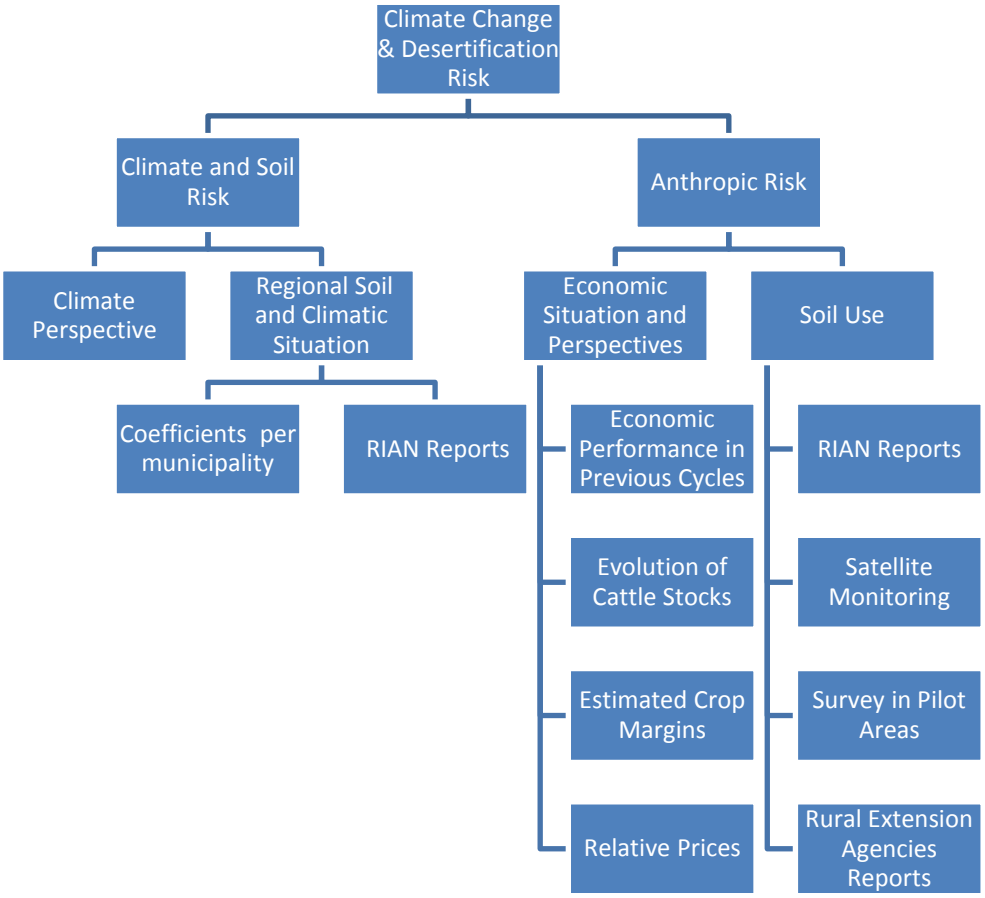
Dissemination of information. The information produced by the IEWS will be disseminated through reports targeted to different user groups such as farmers, public agencies, local and provincial media, and appropriate websites. Use of information in scientific research and papers will also be considered as a valuable channel for dissemination.

Equipment and budget requirements. The implementation of the IEWS will demand investments and operational expenditures during the entire Project implementation phase. Automatic meteorological stations will be installed in each county to support the existing network of stations. Data analysis will be reinforced in the most critical Project areas (GIAs and SISs).

Generation and systematization of information. Figure 17 describes the types of reports to be generated and systematized through the IEWS. IEWS reports will be prepared with a bottom up approach, taking into account the viewpoints of all relevant stakeholders. The Climate Change & Desertification Risk Report (top box in Figure 17) will be developed based on the reports of Climate and Soil Risk and on the Anthropic Risk reports. These will be issued with a minimum frequency to be agreed during the IEWS final design. The presence of extraordinary climatic events would trigger the production of *ad hoc*/specific reports.

The description following Figure 17 provides details on each report's type, output information, frequency, sources, responsible agency and participants to be involved in each of them. This structure has been agreed upon during Project preparation.

Figure 17: Reporting structure in the Information and Early Warning System



1. Climate Change and Desertification Risk report

Type: Report to be generated during Project implementation.
Output information: Quantitative and qualitative evaluation of the factors that may promote desertification in the region and their correlation with observed climate variability and projected change. Critical variables will be determined for analysis to verify related processes through monitoring.
Minimum frequency: Half-yearly during March and September by the beginning of Autumn and Spring in the Southern hemisphere, respectively. Specific reports will be prepared under emergency situations.
Sources: Climate and Soil Risk report and Anthropic Risk report.
Responsible agency: IEWS executing agency (INTA Ascasubi).
Participants: All the institutions participating in the IEWS.

1.1. Climate and Soil Risk report

Type: Report to be generated during Project implementation.

Output information: Rainfall probability, temperatures, risk of frost, etc. Analysis of the potential impact of future climate situations on an edaphic-climatic scenario determined for the region.
Frequency: Quarterly, four times per year, during February, May, August and December, before each season. *Ad hoc*/specific reports will be prepared under emergency situations.
Sources: Regional climate prospects and edaphic-climatic situation reports.
Responsible agency: INTA Ascasubi, Natural Resources Division.
Participants: INTA Ascasubi, UNS and MAA.

1.1.1. Climate Perspective report

Type: Analysis of existing sources of information.
Output information: Rainfall probability, temperatures, risk of frost, etc. Year-on-year comparison and with averages per time series. Estimation of the situation in the next year's seasons.
Frequency: Quarterly, four times per year during February, May, August and December. *Ad* hoc/specific reports will be prepared under emergency situations.
Sources: National Meteorology Bureau, INTA Castelar Climate and Water Institute, National Space Activities Commission (CONAE), and other sources.
Responsible agency: INTA Ascasubi and UNS.

1.1.2. Regional Soils and Climatic Situation report

Type: Report to be generated during Project implementation.
Output information: Diagnosis of the situation of soils and crops in the region. Past climate evolution and soil humidity. Study of the continental-marine air circulation system.
Frequency: Half-yearly, two per year during February and August. Specific reports will be prepared under emergency situations.
Sources: Coefficients per locality, RIAN reports.
Responsible agency: INTA Ascasubi Natural Resources Area.
Participants: Natural Resources Areas in INTA's Southwest EEAs.

a. Coefficients per Municipality report

Type: Report to be generated during Project implementation.
Output information: Edaphic-climatic information from the following cities and towns: Bahía Blanca, Bordenave, Hilario Ascasubi, Cardenal Cagliero, Carmen de Patagones, Coronel Dorrego and Pigüe. Information is measured through a rating per municipality, made up of a base coefficient and a variable coefficient. The coefficients have a double structure. They respond to a historic average which reflects a more or less constant behavior of climate variables (base coefficient) and the variable fraction which responds to the current year. Both, duly weighted, make up the index coefficient for each municipality, giving it a quantified value.
Frequency: Quarterly, four times per year during February, May, August and December.
Sources: Meteorological stations, soil cartography, regional fertility of each locality.

Responsible agency: INTA Ascasubi Natural Resources Area
Participants: Development Plan for SWBA, OPDS, CONICET, MAA, Universities, SAyDS.

b. RIAN reports (Network of National Agricultural Information)

Type: Pre-existing reports.
Output information: Soil humidity, condition of crops and pastures, and rainfall analysis. Information will include maps and comparative charts. The real time information obtained from the field will be a key input to model the region.
Frequency: Monthly.
Sources: Field trips, information from meteorological stations.
Responsible agency: INTA Ascasubi and the RIAN INTA project.

1.2. Anthropic risk report

Type: Report to be generated during Project implementation.
Output information: Evolution in land use, risk of increasing agricultural use, risk of deforestation, and farmers' economic needs.
Frequency: Half-yearly, during February and August. *Ad hoc*/specific reports will be prepared under emergency conditions.
Sources: Economic situation and land use prospects.
Responsible parties: INTA Ascasubi Economy Area, RIAN project.
Participants: INTA Natural Resources Area, SAyDS, OPDS, MAA, Universities.

1.2.1. Economic situation and prospects report

Type: Report to be generated during Project implementation.
Output information: Economic results obtained by the farmers and future prospects of all the economic and social variables which may influence land degradation.
Frequency: Half-yearly, during February and August. *Ad hoc*/special reports will be prepared under emergency conditions.
Sources: Economic results of the relevant productive systems, evolution of cattle stocks, and *ex ante* margins of the main crops; population and agricultural censuses, surveys, etc.
Responsible agency: INTA Ascasubi Economy Division
Participants: Economy Divisions in the INTA Southwest EEAs, MAA, Universities.

a. Economic results of relevant productive systems report

Type: Report to be strengthened through the Project implementation.
Output information: Economic results obtained per relevant productive systems in each region.
Frequency: Annual, during February or August, depending on the specific region. *Ad hoc*/special reports will be prepared under emergency conditions.
Sources: Databases from farmers, economic diagnoses produced within INTA economy projects, specialized publications.

Responsible agency: INTA Ascasubi Economy Division
Participants: Economy Division from INTA's Southwest EEAs. INTA Economic projects, Universities, and the MAA.

b. Evolution of cattle stocks report

Type: Report to be developed using pre-existing data.
Output information: Composition of herds per category per district and/or zone or vaccination agency.
Frequency: Twice a year, during February and August.
Sources: SENASA, Regional Vaccination Agencies.
Responsible agency: INTA Ascasubi Economy Division
Participants: Economy Areas in INTA's Southwest EEAs. Economy and Sociology Area, INTA Balcarce. Centro de Investigación en Ciencias Políticas, Económicas y Sociales INTA, SENASA, Vaccination entities in the region.

c. Estimated crops margin report

Type: Pre-existing reports.
Output information: Partial economic analyses of the main economic activities in the region (agriculture and cattle ranching).
Frequency: Half-yearly, twice a year during February and August.
Sources: INTA projects, national economic publications.
Responsible agency: INTA Ascasubi Economy Division
Participants: Economy Divisions in INTA Southwest EEAs, MAA, Universities.

d. Relative prices reports

Type: Report to be developed using pre-existing data.
Output information: Comparison and evolution of the main supplies and product prices.
Frequency: Half-yearly, two per year during February and August. *Ad hoc*/special reports in case of emergency situations would be prepared.
Sources: International, domestic and regional markets. INTA Pergamino grain market reports, regional wholesale and retail cattle prices. Regional prices for different types of firewood. Domestic periodical publications.
Responsible agency: INTA Ascasubi Economy Division
Participants: Economy and Sociology Division, INTA Balcarce.

1.2.2. Land use reports

Type: Report to be generated during Project implementation.
Output information: Current use of soil, changes, trends and prospects.
Frequency: Half-yearly. Two per year during February and August. Special reports would be prepared under emergency climatic conditions.
Sources: RIAN reports, satellite monitoring, surveys in pilot areas subject to be extrapolated, technical reports from rural extension agencies.
Responsible parties INTA Ascasubi Economy Division, RIAN project.

Participants: INTA Ascasubi Remote Sensing and GIS Laboratory, INTA Natural Resources Area, SAyDS, OPDS, and the MAA.

a. RIAN reports (Network of National Agricultural Information)

Type: Pre-existing reports.
Output information: Soil humidity, condition of crops and pastures, rainfall analysis. Information will include maps and comparative charts.
Frequency: Monthly.
Sources: Field trips, information from meteorological stations.
Responsible agency: RIAN INTA project

b. Satellite Monitoring reports

Type: Reports to be strengthened through the Project implementation.
Output information: Current land use, changes, trends and prospects with detailed analysis in pilot areas.
Frequency: Half-yearly in February and August.
Sources: Satellite images processed by Remote Sensing and GIS Laboratories in INTA.
Responsible agency: INTA Ascasubi Remote Sensing and GIS Laboratory.

c. Surveys in Pilot Areas

Type: Reports to be generated during Project implementation.
Output information: Current use of soil, changes, trends and prospects.
Frequency: Annual, by February.
Sources: Surveys of farmers in pilot areas to support GIS data.
Responsible agency: INTA Ascasubi Remote Sensing and GIS Laboratory. Rural Extension Agencies involved with the priority zones.

d. Rural Extension Agencies reports

Type: Reports to be generated during Project implementation.
Output information: Trends and prospects. Compilation of news coming from producers connected to the INTA “Rural Change” groups and the Agencies.
Frequency: Half-yearly during February and August.
Sources: Interviews, meetings of Rural Change groups, personal communications with farmers, sector leaders and other local stakeholders.
Responsible agency: Rural Extension Agencies.

ANNEX 5

REGIONAL CONSULTATIVE OBSERVATORY OF PUBLIC POLICIES ON CLIMATE CHANGE AND DESERTIFICATION

Introduction. This Annex provides detailed information related to the Regional Consultative Observatory of Public Policies on Climate Change and Desertification (the Observatory) which has been discussed and agreed during Project preparation. As is it described under sub-component 1.1 in the Project, this intersectoral initiative would be critical to develop institutional level response and prevention capacities to reduce land degradation and desertification and local vulnerabilities of the agricultural sector to climate variability and change. The Observatory will assist the sectors involved in adaptation of the agroecosystems in the SWBA.

Its main functions will be to monitor the land degradation processes induced by growing impacts of increased climate variability and change. In addition, it will serve as a forum for dialogue for public decision-making on related policy options. The Observatory will assess studies related to the vulnerability of various ecosystems to hydrometeorological events that require establishing an Information and Early Warning System (see Annex 4) on the status and trends related to desertification and climate change, applicable at different levels and scales. The Observatory will provide an instrument to use information as a guide for the parties involved in the various implementation processes. This will be essential for the stakeholders to be able to better determine which actions need to be taken to properly fight desertification and adapt to climate change and variability. Likewise, in the process of monitoring the implementation of public policies on environmental issues, it is necessary to develop dynamic inventories regarding the existing policies and the tools that these promote. This entails generating the bases required to strengthen the existing public policies, and creating new policy tools to promote a sustainable use of the natural resources available.

Rationale. This initiative would address the need for a structure intended to provide information for decision-makers, to create an improved evaluation process related to desertification, climate change and variability and their impacts on natural resources. To create this structure, it is necessary to have ongoing and standardized information, extended through time, dealing with different factors. The Observatory will collect, standardize, harmonize, and promote the existing public policies on natural resources, continue the fight against desertification and climate change adaptation/mitigation as well as generate the information necessary for new policies to be promoted in order to solve the problems arising from these issues. It will also enable improved decision-making regarding interventions in the territory and an appropriate performance by the organizations which execute them .The information to be managed by the Observatory would help to define public policies to manage the use of the territory in connection with the carrying capacity of the environment and the degree of human intervention capable of supporting it without modifying its sustainability and considering climate change and the risks associated with it. Among the multiple needs for information related to climate change and its impacts, and land degradation, this Observatory would have the objective of reporting on the status of desertification and land degradation at different

scales within the project's area of influence. It will likewise be part of the National Observatory on Land Degradation and Desertification, which is led by SAyDS, together with other Scientific and Technical Institutions in the country. For this reason, the establishment of an Observatory that includes Provincial Institutions and which involve various stakeholders, such as the Scientific and Technical Institutions (INTA, CERZOS, Provincial Universities), the Municipal Agencies, the Associations that bring together various stakeholders, (such as the Council for the Development of the Southwest of the Province of Buenos Aires), is fundamental to be able to leverage the existing capacity and improve the use of the information already being generated by these players towards a common goal.

Climate change approach. Beyond its institutional and political scope, the purpose of the establishment of the Observatory is to monitor the effects of climate change, including recurrent seasonal droughts and floods and assess their impact on the processes of desertification in the Project target area. In the medium term, this Observatory would provide unprecedented information to improve the modeling of climate change and its effects on productive land, informing the design and implementation of public policies and private livestock agriculture in the region.

This initiative responds to the need to develop a systematic monitoring of the impacts of climate change on land use in the region to help advance the understanding of the effects of hydrometeorological changes in the productive capacity of the soil and how it acts synergistically with other processes leading to desertification and increased social and economic consequences. The generation of reliable information on long series of monitoring will simultaneously improve the capability of modeling the climate-soil interface in the research centers of the country, thus achieving progress in understanding the processes that sustain one of the bases productive in the country.

The Observatory actions in the Project area aim to establish monitoring techniques to promote the sustainable management of natural resources. The data management and production activities of environmental information would include the following aspects:

- Automatic processing chains to extract relevant biophysical parameters
- Tools to analyze the database of long-term vegetation, biophysical parameters related to water resources with medium resolution, including the creation of capacity for down-scale processes in order to ensure a better understanding of the lad degradation in the context of the climate change and variability.
- Monitoring systems on the change of soil cover from low to high resolution
- Systems analysis for management and monitoring dryland pastures

The main functions related to the Observatory role in climate change includes:

- Establishing a system of indicators on desertification and climate change, related to the impact of adaptation policies, as well as on the vulnerability and effects on agricultural production, which will serve for the proposed monitoring and assessment of

climate change policies and combating desertification, to detect erosion and intervention needs and to identify priorities in research and development in this area.

- The creation, maintenance and management of a database and a web platform on climate change and desertification, gathering and analyzing information from different sources, which will support their training functions, information dissemination, data exchange, knowledge, tools, and methods.
- The use of the web platform for the development of a program of communication and social participation.
- The coordination of a network of scientific experts to provide a basis for collaboration and common knowledge to facilitate communication and collaboration between different authorities and institutions.
- The regular reporting and follow-up evaluation on the effects of climate change policies in the agricultural sector.

The adoption of the climate change approach by the Observatory would require training trainers in the region on specific modules on climate change. This will strengthen local capacity to disseminate essential knowledge. Under this basis, capacity of decision makers (public and private) would be strengthened to include the climate dimension in the implementation of policies and measures. In this line, training activities would include:

- Improve the supply of skills in climate change and create a team of coacher in the region.
- Build local capacity in the project area to design and implement policies, strategies and programs to respond to climate change

The trainings would seek to transfer knowledge and skills to key stakeholders on the issue of climate change and will also include specific procedures on how to transfer knowledge. The focus of the training may include, among others:

- Training techniques and methodologies
- Knowledge transfer systems and technologies
- Climate Information Management
- Risk Management
- Monitoring and Evaluation Systems

General objective. The creation of an Observatory of Public Policies focusing on Climate Change and Desertification has the main objective of contributing to knowledge/dissemination and strengthening the existing environmental public policies for the prevention, control and adaptation of the rural producers in the Project area to the effects of climate change and variability, and desertification. This observatory will also contribute to the National Observatory on Land Degradation and Desertification.

Specific objectives. The Observatory would:

- Define and develop mechanisms and channels for communication across the institutions that will be the observatory's members and supporters.
- Gather public policies related to environmental issues in the province of Buenos Aires. Specifically, it will gather data on policies related to implications for the Southwest of the province, identifying possible synergies with the Project, detecting existing gaps to improve their application, ensuring disclosure, and reviewing the overlaps existing in the various policies identified.
- Compile those relevant policies with sustainable use of resources implications.
- Analyze the impact and the associated risks of the relevant policies identified at the social, territorial and environmental level.
- Establish a system of indicators/variables for each of the issues identified as relevant, to strengthen the database of the National Observatory.
- Articulate a Communication Program for the observatory and to be developed under the project. This will strengthen the dissemination of the policies identified and in terms of climate change and land degradation/desertification.

Missions and functions. The Observatory members would develop the following functions:

- Set up a platform for the development of the Observatory.
- Identify the sources of available information and ensure that members can gain access to this information
- Create a standardized version of the information, selecting the pertinent data
- Identify data gaps and demands for new public policies and develop new projects based on these gaps and demands
- Ensure the ongoing update, continuity, and robustness of data collection in order to strengthen and/or formulate public policies focusing on climate change, land degradation and desertification.
- Add value to the existing policies, programs and projects.
- Coordinate knowledge and activities across the various participants and stakeholders.
- Conduct activities to train human resources in the topics and issues which are relevant to the Observatory.
- Develop and submit recommendations on the respective issues (ie potential public policy instruments and laws) to the relevant institutions for their potential implementation.
- Generate geo referenced information to feed a website.
- Implement a comprehensive communication plan.

Implementation arrangements. The Observatory will be organized as a non-profit entity, with the mission of achieving commitments for the integration and dissemination of public policies referring to environmental issues in the province of Buenos Aires, with a focus in the Southwest. The Observatory will have an inter-institutional and multidisciplinary approach, at a local and provincial scale. It will, ensure the participation of the sectors involved and would become a group of reference for the public and socio-productive sector of the Project's area of influence.

The structure of the Observatory would be initially set up as detailed below:

a. A Steering Committee that will be chaired by the National Secretariat for Environment and Sustainable Development and the Provincial Agency for Sustainable Development (OPDS).

b. An Advisory Committee which will be formed by one representative from each of the institutions (detailed below), with the possibility of incorporating more institutions in the future:

- *Programa de Acción Nacional de Lucha Contra la Desertificación PAN (NAP)*
- *Instituto Nacional de Tecnología Agropecuaria (INTA);*
- *Universidad Nacional del Sur (UNS);*
- *Universidad Tecnológica Nacional (UTN);*
- *Consejo del Plan de Desarrollo del S.O. Bs. As.*
- *Centro de Recursos Naturales Renovables de las Zonas Áridas (CERZOS).*

Once created during Project implementation, an immediate activity would be the set up of its organizational structure and operational mode. The following chart describes how this first objective would be addressed.

OBJECTIVE 1: Develop the organizational structure and mode of operation of the Observatory				
Activities	Expected outcomes	Timeframe	Budget	Responsible parties
I. Develop the organizational structure and operation mode of the Observatory, defining the articulation across the institutions that will compose and support it.				
I.1 Identification of capacities (human resources, others) at the local and provincial level. Preparation of the foundational document for the initial consultation	Foundational document completed	Within the first 6 months after project start	Budget from component 1	Steering Committee (SC)
I.2 Definition of activities, roles and participation levels; agreement on guidelines to develop the Activity Plan under the Project	Workshop conducted with the expected outcomes	Within 8/10 months from Project start	Budget from component 1	Steering Committee Workshop participants

The following chart lists the activities that will be carried out during the Project's first year. This list will be discussed with the participating institutions during the initial consultations.

Estimated schedule for the first set of the Observatory activities	2013				2014/4			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Preparation of the Base Document for the Initial Workshop								
Initial consultation								
Observatory created and operational								
Review of sources of base information available								
Agreements to access and process required information								

The operation of the Observatory during the Project implementation period will be financed by the AF grant. The plan for ensuring long term sustainability will be part of component 4 and its specific fundraising activities. The Sustainability Strategy aims at two specific ways of enhancing long term financial stability: (i) networking for institutional mainstreaming (creation of the committee under component 4), and (ii) supporting future fund raising activities (compendium and promotion of potential sources of funding under component 4) Mainstreaming is expected to provide the institutional framework for continuity and thus assure adequate budgeting for related activities. The Observatory is a multi-stakeholder structure from the beginning to bring together key stakeholders on a high institutional level as well as counterparts from the private sector, academy and civil society. This will foster institutional networking per se and, most important, will lead to concrete social demands and concrete technological and political products. These three aspects neatly inherent to the construction of the Observatory will per se foster future chances of continuity.

Activities roadmap. Once the structure and operation of the Observatory have been put in place, four main implementation phases have been envisaged to meet the aforementioned objectives:

1) Public policy survey and analysis:

- An agreed definition among participants on what is understood by public policies to be considered by the Observatory, and their categories
- Identification of all the public policies being executed in the territory, and those that could be potentially implemented
- Definition of basic variables and key data to be gathered on each public policy (e.g.: access, budget, etc.)
- Development of a data base
- Identification of overlaps in terms of territory, beneficiaries, types of production, etc.
- Identification of policy and intervention gaps
- Analysis of potential synergies to be developed across the policies identified
- Development of a document with recommendations to improve the implementation of policies relating to land degradation and climate change in the Southwest of Buenos Aires

2) Evaluation of the impact of public policies[61]

- Definition of the set of variables that will be used to evaluate the impact of the policies at the territorial, environmental, social, economic and other levels that may be identified.
- Development of statistical series of the variables identified.
- Development of a database[62]
- Development of a set of impact indicators to be followed-up through time.

3) Risk Identification and Analysis:

- Conduct an analysis of the existing and potential risks in policy implementation.
- Development of a report with recommendations for risk management.

4) Creating a space for debate:

- Define a mechanism for debate for the users and stakeholders involved, to improve the policies and their implementation.

5) Development of a strategy for institutional mainstreaming and funding

[61] In this phase, the interaction with the National Observatory on Land Degradation and Desertification is extremely significant.

[62] The databases generated by the project should be connected to the databases of the National Land Degradation and Desertification Observatory.

ANNEX 6

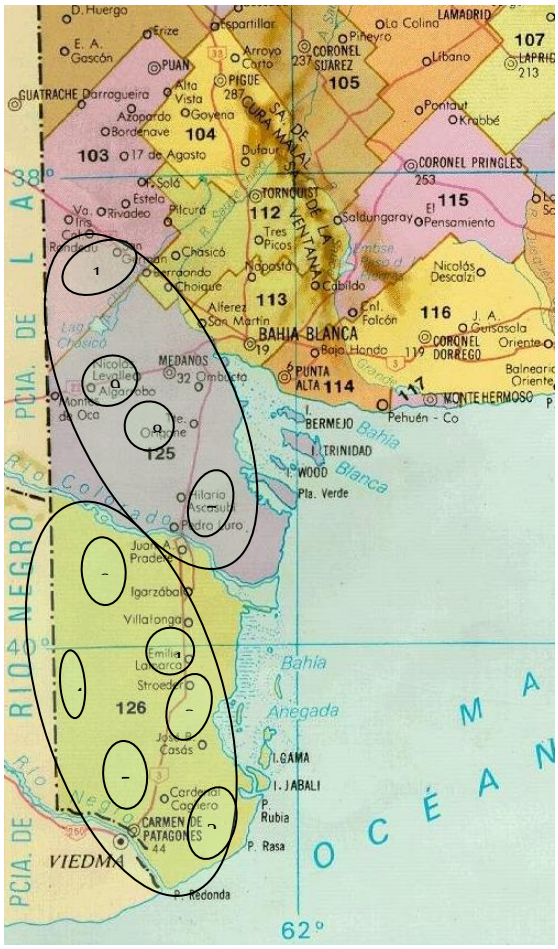
ASSESMENT OF PROPOSED PRACTICES IN THE PROJECT SPECIFIC INTERVENTION SITES

Introduction. This annex provides information related to the preliminary technical assessment to select the Geographical Intervention Areas (GIAs) and Specific Intervention Sites (SISs) and the potential practices under component 2 in the Project. As it is explained in the component description, the GIAs approach has been adopted by the Project to characterize and identify the sites where pilot practices would be specifically carried out. These GIAs would include SISs which are the specific intervention and evaluation areas, where the actions undertaken will deliver direct outcomes. Once the GIAs are fully agreed during Project implementation, and SISs have been selected and agreed, implementation activities would begin in the proposed zones by the preparation of participatory actions plans.

Proposed Intervention Sites. The INTA Ascasubi has an extensive experience in the region and has conducted several technical assessments to justify the relevance and priority practices under specific implementation conditions. Based on INTA assessment, the following geographic intervention areas (GIAs) have been proposed in order to attain the Project objectives under component 2:

1) GIA 1: Arid (Patagones)
a. SIS 1: Stroeder
b. SIS 2: Cagliero East
c. SIS 3: Coast
d. SIS 4: Bushland
e. SIS 5: Cagliero West
f. SIS 6: Juan A. Pradere

2) GIA 2 and GIA 3: Semiarid (Villarino and south of Puán)
a. SIS 7: Hilario Ascasubi
b. SIS 8: Sand dunes
c. SIS 9: Mixed zone Villarino
d. SIS 10: Mixed zone Puán



GIA 1: Arid Zone (Patagones)

The current production systems in the arid zone are mainly cattle ranching-agriculture and wheat growing prevails. However, breeding-age cows have been lost due to the drought. There are also important wind and water erosion problems. In the North, the irrigation in some plots complements extensive productions. Six specific intervention

sites have been identified, including the following aspects:

1) SIS 1: Stroeder: High subdivision of farms, small in area. Highly degraded soils from the physical and chemical standpoint. The site is emblematic of the drought in the region. Deeply rooted wheat growing culture.

2) SIS 2: Cagliero East: Slightly more favorable climatic conditions due to the proximity to the sea, wheat-growing culture.

3) SIS 3: Coast: Different conditions due to proximity to the sea. Greater chances of success of agricultural crops.

4) SIS 4: Bushland: Constant reduction of the area with perennial woody species. Bushland cattle ranching with green pastures and wheat in cleared plots. Generally more unfavorable conditions. Larger plots.

5) SIS 5: Cagliero West: High levels of degradation, wheat-growing culture.

6) SIS 6: Juan A. Pradere: Dryland fields with irrigation integrated. Problems of salinization.

GIA 2 and GIA 2: Semiarid (Villarino & South of Puán)

1) SIS 7: Hilario Ascasubi: small farmers with diversified irrigation possibilities. Incipient incorporation of no-tillage sowing in production approaches.

2) SIS 8: Sand dunes: cattle ranching in natural bushland, cultured grasslands and green pastures. Live sand dunes.

3) SIS 9: Mixed Villarino zone: agriculture-cattle ranching and cattle ranching-agriculture systems, with degraded soils and lack of cattle. Remaining bushland in defined sectors.

4) SIS 10: Mixed Puán zone: agriculture-cattle ranching and cattle-ranching agriculture systems with erosion problems.

Proposed interventions in the zone[63]. Due to the zone's limited agro climatic potential, production should avoid compromising the sustainability of the resources. As for the general production orientation, the mixed system is considered to be the best adapted to climate and market variations, providing greater flexibility to the land system. It reduces risks, generates more labor possibilities, and a better use of the territory. In this line, INTA has made the following technical recommendations:

- Develop agriculture in soils with minimum management suitability, adjusting the cultivation method employed.

[63] Adapted from the EEAs INTA Ascasubi, Bordenave and Barrow internal workshop

- Increase the extension with the use of permanent pastures in their various alternatives.
- Contribute alternatives that stimulate nitrogen to the soil such as vetch and alfalfa.
- Permanent no-tillage agriculture should always be analyzed for each case especially taking into account the edaphic-climatic characteristics of the zone/field. For example, analyzing extended agriculture cycles in a sector of the field where the soil is more suitable to that end.
- The heterogeneity in the area operated by the farmers does not mean that the same alternative should be proposed for all situations. In some cases, alternatives such as olive trees, rural tourism, farms, sheep, pigs, aromatics, agroindustry, etc. are complementary, making them very important contributions. Alternatives may mean that some members of the family have the opportunity of remaining as part of the productive unit instead of migrating to the city.
- A situation defined as one in degradation will not have an "easy/ quick fix" single recipes regarding possible actions to be developed to remedy the situation. This is especially true in the degraded zones of the Southwest of the Province of Buenos Aires, and in the dryland zone of the county of Patagones (arid zone). Any options implemented by this Project would seek exploratory purposes and would be conditioned to the climate signals. Actions to be developed would address the need to rapidly stabilize the areas with severe erosion.

Strategy. The activities to be develop for each proposed GIA and its SISs would rely on a consortia consisting of the most relevant institutions. Different institutions and/or agencies would be able to participate justifying their contribution to the Project's purpose. Once Project becomes effective, and these institutions are established as partners, a series of coordination meetings to establish the operation mechanism would be conducted by the Project Territorial Unit, including identifying the roles and responsibilities of each party under the project. In principle, four operating teams would serve these subregions: Patagones, Hilario Ascasubi, Médanos and Puán/Bahía Blanca. A general coordination team would be based in Hilario Ascasubi. The proposed activities would belong to one of the following four groups:

1) **Activities to promote production diversification and intensification.** These activities will be promoted through experiences, technical assistance, training, direct support, etc. The interventions would be prioritized for each SEI. These activities could cover: beekeeping, aromatics, forestry, intensive animal husbandry (poultry, pigs), etc.

2) **Promotion of rural partnerships.** Partnerships would be promoted to conform groups with different degrees of formalization, according to the activity to be developed by the each of them. To this end, the Project would coordinate with the 22 "Rural Change Groups" (INTA local extension groups) that are currently active.

3) **Actions in support of the intervention**. These actions could cover:
- Equipment for extension technicians with instruments for field work to carry out simple determinations.

- Machinery for field work (i.e. mechanical plowing, sowing and management of crops and pastures).
- Participatory development of Good Practice protocols.
- Promoting the study of biodiversity in the region.
- Promoting the study of ecosystem service contributions.

4) **General technology adaptation actions.** These actions could include:

- Adaptation of cereals and forage crops to drought conditions (through field tests of different options.
- Gardens for the introduction of forage species; new seed and grass varieties.
- Design of machinery adapted to the region including possible specific development agreements, and the promotion of existing alternatives such as chisel with sowing box.
- Micro-dripping irrigation systems

For each SIS the following actions are also envisaged:

1. **Survey of information on the condition and evolution of productive systems (monitoring & evaluation).** In each site, actual production systems would be identified. Socio-productive information would be gathered. The starting point would be a complete diagnosis of the situation including the accounting for the levels of degradation, the economic situation, productive activities currently undertaken, and the strategy of the farmer and his/her family. The evolution of the production system through time would be monitored. This information would be used an input for the Information and Early Warning System (IEWS). The main participants envisaged for this first step would be: INTA, SADS, OPDS, UNS, MAA, farmer associations, municipal governments, and farmers.

2. **Conducting field experiences with farmers (adaptation practices).** In each SIS, direct actions will be implemented in plots with 2 or 3 productive systems. These would consist of plots with similar degradation and climate change adaptation management practices. In each SIS, institutions and farmers involved would sign voluntary agreements to ensure the proper implementation of the proposed actions. Priority would be given to those places where data can be obtained that are deemed pertinent for Project purposes, and where the continuity of the management of the plots through time can be ensured (land under ownership, long term contracts, etc.) The remediation measures to be undertaken and evaluated would be determined together with the farmers and local stakeholders. Likewise, the management systems that are best adapted to climate change would be proposed and evaluated. Participants envisaged for these activities would include: INTA, SAyDS, OPDS, UNS, MAA, farmer associations, municipal governments and farmers involved. Table 4 illustrates the menu of the adaptation options and potential specific activities to be piloted in each SIS.

Table 4: Menu of adaptation options and activities in the SISs

Main issues	Menu of options/ adaptation measures to address issues	Description of activities under each option[i]	Technical feasibility of options and activities	Budget (by output)	Estimated intervention area and investment per hectare	Selection criteria of specific intervention areas to deliver activities	Participation process (Action plans)
Wind/water erosion	Sustainable land management and erosion control	Erosion remediation / Forestry GIA 2&3 (Semiarid, Villarino and south of Puán): SIS 8 (Sand Dunes) and 10 (Mixed zone Puán)	Former experience through LADA – FAO project in Argentina provides evidence for the feasibility of the proposed actions in a similar ecosystem and productive context in the La Pampa Province, Argentina.	70,000	20,000 Ha 3.50 US$/Ha	The main selection criteria are: * The community and/or group of farmers should show interest in an intervention; there must be a commitment on the part of the local communities. * Areas should be representative of larger areas and provide outcomes that can be extrapolated. * Areas with varying degrees of desertification and vulnerability to climate change and variability; areas that will serve as samples for evaluation and monitoring.	Once starting the Project implementation, a series of consultation and coordination meetings will be launched to establish operational mechanisms, including roles and responsibilities for each partner involved in this part of the Project. The activities taking place within each SIS are prominently linked to promotion of diversification and intensification of production, promotion of rural cooperatives, and support to adapt general technology.
Degraded soils	Enhanced crop management	Closures / pasture plantations soils GIA 1, 2&3 (Arid and semiarid zone). SIS:1 (Stroeder), 2 (Caglireo east), 3 (Coast), 4 (Bushland), 5 (Cagliero west), 8 (Sand dunes) and 9 (Mixed zone Villarino)	INTA and UNS have developed this option through technical studies focused on addressing impacts of climate variability and change in the agroecosystems of the Project. This kind of intervention for pasture and rangeland-management has been applied successfully in the framework of many projects worldwide.	640,000	70,000 Ha 9.14 US$/Ha		
Drought	Enhanced crop management / Rainwater harvesting and improved irrigation technology	Intensive vegetation actions / irrigation systems GIA 1, 2&3 (Arid and semiarid zone). SIS:1 (Stroeder), 6 (Juan A. Pradere) and 7 (Hilario Ascasubi)	These activities have shown to be feasible as documented in *"Technologies for adaptation to climate change"* (2006) published on behalf of UNCCD, and also in *"Building Response Strategies to Climate Change in Agricultural Systems in Latin America"* (2009) published by the World Bank. On a local level, the FAO – LADA project and the local National Institute for Agricultural Technology (INTA) have	400,000	30,000 Ha 13.33 US$/Ha		

			made recommendations (see earlier in this annex) in order to address the impacts of drought in the agroecosystems considered by the Project.				
Reduced area with perennial woody species	Silvopastorile livestock production / Rangeland and forage management	Herd management practice / Forestry GIA 1, 2&3 (Arid and semiarid zone). SIS: 3 (Coast), 4 (Bushland), 5 (Cagliero west), 9 (Mixed zone Villarino) and 10 (Mixed zone Puán).	The UNS and INTA haves developed many recommendations to improve different activities, like herd management and forestry to resolve constant reduction of perennial woody species and make these ecosystem productive in a sustainable way.	840,000	50,000 Ha 16.80 US$/Ha		
Salinization	Rainwater harvesting and improved irrigation technology	Management of saline / Irrigation system GIA 1, 2&3 (Arid and semiarid zone). SIS: 6 (Juan A. Pradere) and 7 (Hilario Ascasubi)	INTA and UNS have developed several studies on the feasibility of this topic. As adaptation measure, efficient capture and storage of rainwater and installation of microsystems for irrigation is essentially a means for reduction of vulnerability at the household level, permitting, among others, diversification of the production and thus risk-straying. For overall installation of an irrigation system on a greater scale, there are several projects aiming at the construction of canals and the connection of the Rio Negro and Rio Colorado Rivers. The irrigated area of CORFO is such an example and there are also some irrigated agricultural areas in the southwest of the Patagones county.	450,000	20,000 Ha 22.50 US$/Ha		

ANNEX 7

COORDINATION WITH OTHER ONGOING PROGRAMS AND PROJECTS IN THE PROJECT TARGET AREA

Introduction. This annex presents those existing or proposed initiatives in the Project are and with convergent objectives with this proposed operation. Project preparation has put detailed attention to identify potential synergies with the key counterparts to coordinate ongoing programs with the Project. The purpose of this analysis has been to set forth the baseline for the Project's coordination strategy. This baseline suggests a potential menu of synergies, which, if successful, could lever the Project effectiveness. In addition, the Project seeks to increase the institutional capacity to address climate change, coordinating with the programs and projects that some of these institutions are already executing.

Approach. During the Project preparation phase various types of initiatives were identified to have a direct relation with the project's activities, targets and results. Other important initiatives were identified such as a consultation round that took place in April 2010 and August 2011 in the first and second International Desertification Congress in the Province of Buenos Aires. The first congress had 700 participants, and the second included a workshop to present the Project at the conceptual level to 41 local representatives of different interest groups. The Project preparation mission took place in October 2011, whereby interaction was organized with around 100 representatives of local leaders, universities, farmer associations, farmers and journalists. Also, the institutions which participate in the Steering Committee contributed additional information and contacts with other Government agencies to supplement the survey.

At the end of this Project preparation phase, 83 Project related programs and projects of a different character (private and public, local and national in scope, productive, social, educational, etc.) were identified. The agencies that are part of the Project's Steering Committee then conducted an exercise to prioritize a list of the related programs based on: (i) the high complementarity of the actions, in which case coordination will be necessary to adequately take advantage of potential synergies; or (ii) a certain degree of synergy across the actions, to which end the Project will seek to take as much advantage as possible from the existing structures and ongoing experiences to avoid duplicating efforts and, reinforce them or redirect them, as may be required

A great share of the initiatives that were identified is not part of the Project or part of the Project's key partner institutions. However, they represent an opportunity for joint work and the Project team is committed to work towards their gradual incorporation and articulation under the Project's Sustainability Strategy (Component 4).

Ordered per Project components, the identified initiatives that have a large potential for coordination are listed below with an explanation of the required type of coordination and the steps contemplated to make it effective.

Component 1: Reduction of Vulnerability at the Institutional and Community Level

Sub-component 1.1: Creation of Institutional Tools for Climate Resilience

a) Information and Early Warning System (IEWS)

Under INTA's RIAN/RIAP project (National Agricultural Information Network / Pampas Agricultural Information Network), a network of small meteorological stations has been established to record and analyze rainfall, temperature and heliophany data at different points in the country. In the area of influence of the Ascasubi Experimental Agricultural Station (*Estación Experimental Agropecuaria,* EEA) there are 15 of these meteorological stations and 27 in the area of the Bordenave EEA. This network is used to evaluate and report on the condition of the main components of the country's productive systems. The Project's coordination with this network, in particular with the Bordenave and Ascasubi nodes, is considered essential for the establishment of the IEWS. It has already been agreed to entrust the field execution of the IEWS to these EEAs, and they have presented a concrete implementation program under the Project. The Project undertakes to strengthen the RIAN/RIAP project by supplying tools to enhance and expand its monitoring network (e.g. new meteorological stations, computers and software), as well as the development of homogenous criteria to collect and process data related to climate change, desertification and early warning.

Furthermore, INTA[64] also has a Climate and Water Institute and a Soil Institute. Both of these research institutions are also reference centers in their respective areas of interest and have an enormous stock of information, knowledge, and technological and human resources which are of essential value in terms of inputs for the IEWS. These institutions will be invited to become involved both in the IEWS and the Observatory.

The Office of Agricultural Risk (*Oficina de Riesgo Agropecuario,* ORA) of the National Ministry of Agriculture, Livestock and Fisheries (MAGyP)[65] monitors the water reserves in the soil, forecasts the ENSO phenomenon and related impacts on crops. Further, it develops maps on water surplus and stress for different crops. The ORA has a Risk Evaluation System and a Climate Change Area. The maps published, however, do not include the southernmost portion of Buenos Aires. The corresponding institutional contacts have been initiated to propose cooperation to establish a coordination team to manage a platform of shared and mutually strengthened information. This organization can contribute with risk assessment methodology as well as a framework to homogenize the information collected and displayed. Further, it is to be expected that including the ORA in the IEWS will enhance the Project's possibilities to influence the MAGyP policies regarding climate risk in the Project area in terms of insurances,

[64] Beyond direct contacts with INTA's information networks and the named EEAs, INTA has a National Research and Development Coordination Office. The Project will engage in contact with this central agency of INTA to secure their awareness of and commitment with the Project related cooperation.

[65] The MAGyP has recently developed a 2010-2020 Strategic Agrifood and Agroindustrial Plan, which needs to be supplemented with adaptation measures. MAGyP's participation in the Observatory facilitates replication of the lessons learned in the South West of Buenos Aires to influence the MAGyP policies at the national level.

agricultural emergency measures, etc. The ORA is also expected to become part of the Observatory.

LADA project by FAO/SAyDS has an objective to develop and implement strategies, tools and methods to determine and quantify the impacts of land degradation in dry zones and build evaluation capacity at the national level to allow for design and planning of interventions to reduce land degradation. LADA contributes with a standardized evaluation and monitoring system of dryland degradation. The Project has already adopted the LADA methodology to establish the selection criteria for the Geographical Intervention Areas (AGIs). LADA operates under the Project Executing Entity.

b) Regional Consultative Observatory of Public Policies on Climate Change and Desertification

Besides the institutions and projects mentioned above, the following institutions and projects have been identified to be invited as an initial group of participants in the Observatory, together with representatives of the productive sector [66] and the organizations included in the Project Steering Committee[67]. The initial participants will discuss and agree upon the final set-up and operational procedures of the Observatory, including definition of the specific roles of each participating organization. Binding agreements will be signed as necessary to facilitate specific functions such as facilitation of meeting space, hosting a secretariat and sharing of administrative expenses.

Development Plan of the South West of Buenos Aires (PDSO, Law 13647) includes a Regional Council and a Regional Operational Unit (*Unión Regional Operativa,* URO). It reports to the Under-secretariat of Rural Production, Economy and Development of the provincial Ministry of Agricultural Affairs. It has the purpose of analyzing and developing development policies for the region in a participatory way. It has outlined a Plan which includes the following programs: Southern Meats (includes a subprogram on forage); Olive; Forest; Soil Conservation; and Water Use. The Plan divides the region into zones. A high synergy of objectives has been identified and optimal cooperation forms will be defined to maximize synergies between the Observatory and the Plan to avoid duplicating structures. Several members of the Regional Council will also be part of the Observatory.

Agricultural Emergency Law 26,509 provides the regulatory framework to declare emergency zones at the national level. It operates within the MAGyP and has a **Consultative Council**. It manages a National Emergency Fund and decides on the application of various instruments such as direct targeted subsidies, tax exemptions, etc.

[66] The Observatory includes representatives of the public, private and academic sectors. Identification of the private sector representatives is yet to be concluded.

[67] The agencies that make up the Steering Committee are responsible for the development of several programs which are highly complementary of the Project, such as: the Environmental Plan of Buenos Aires Native Forests, and the Agricultural Solidarity Program (OPDS); the National Climate Change Strategy and the Third National Communication (SAyDS, Directorate of Climate Change), the National Action Plan to Fight Desertification, the Patagonia and Great Chaco GEF projects and the LADA project (SAyDS, Directorate of Soil Conservation and Fight against Desertification).

Provincial Emergency Council has among its core functions: organization of courses, seminars, congresses and symposiums related to emergencies and disasters in order to strengthen human resources; conducting studies and research on emergencies and disasters together with relevant organizations at all levels; evaluation of the infrastructure and training needs in human resources, technology and materials; planning and proposing emergency and disasters prevention, mitigation, response and recovery policies; and proposing emergency related administrative and legal reforms required within the province. Consequently, in addition to participating as a member of the Observatory, the Council will be invited to participate in the activities of subcomponent 1.2.

National Southern University–Center of Renewable Natural Resources in the Semiarid Zone (UNS–CERZO) conducts research on the following related issues: soil cartography, natural grasslands ecology and management, and animal productivity in semiarid zones. It is a local reference center in Bahía Blanca city with human resources, information and knowledge to participate both in the Observatory and sub-component 1.2.

There is an Observatory of Public Policies operating in the Economics Department of the UNS. Through this area, the UNS has already expressed its interest in becoming part of the Observatory, as they agree with the need to focus on the issues related to climate change and desertification. The coordination between this Project and this Observatory will have the purpose of leveraging their experience.

Family Agriculture Under secretariat is a national agency dedicated to the promotion of rural development with a focus on small farmers. Their participation in the Observatory is strategic to promote grass-roots level dissemination of the Project results.

The School of Agronomy at the University of Buenos Aires (UBA) is a reference institution in research and knowledge regarding the Argentine agricultural sector. When actively engaged in the Observatory, it will provide an excellent channel to disseminate Project results and influence related research agendas.

Ministry of Social Development, in particular the Plan Argentina Works (*Argentina Trabaja*) has potential to channel resources for the implementation of community projects.

Institute of Geomorphology and Soils of the National University of La Plata (UNLP) includes a Center of Research on Soil and Water for Agricultural Use (CISAUA), established through an agreement between the UNLP and the Ministry of Agricultural Affairs of the province. It is a leading academic institution in its area of and will contribute key expertise to the Observatory.

Sub-component 1.2: Promoting Climate-smart Socio-cultural Approaches to Land Management

The Zonal University Education Program (PEUZO) of the Provincial University of the South West offers distance learning activities and regional university centers with academic branches in Villarino, Puán and Carmen de Patagones (diplomas of University Technician in Agrifood Projects, Creation and Management of SMEs, Grain Management and Marketing, and Agricultural Projects). These academic structures and human resources will offer an important channel for the training activities of the Project.

Program M2P, executed by CONAE and consulting company Sur Emprendimentos, provide training for public employees, communities, schools and teachers on the use of satellite technologies and information using the program *Conectar Igualdad*. This program could offer an interesting format for the strategic dissemination of the IEWS. They already have a working relationship with OPDS, and participated in the 2nd Desertification Congress in Tornquist.

INTA's PROCADIS Program for distance training program: Its development and/or potential in the zone will be analyzed, as well as its suitability for the Project's training demands.

Provincial Public Administration Institute (IPAP) has a Program of Continuous Improvement for Local Management. It offers training activities on public management subjects, but with flexibility to adapt to specific local requirements. IPAP's adequacy will be analyzed in light of the Project's training requirements.

National Public Administration Institute (INAP) hosts a training school and courses for Government officials; Investigation and Documentation Center specialized in National Public Administration; Programs; Continuous Education; Innovation in Training; Technical Assistance for Training Planning and Evaluation; Managerial Training; and a Quality Management System. INAP's adequacy will be analyzed in light of the Project's training requirements.

Regional School of Bahia Blanca of the National Technological University has expertise in hydraulic engineering and environmental engineering. Its participation in the Project will be analyzed in light of the Project's training requirements.

Component 2: Implementation of Adaptation Measures in Agroecosystems

INTA's Experimental Agricultural Stations (EEAs) Ascasubi and Bordenave form a part of the national level authoritative organization in agricultural technology. They develop and validate field production and resource management technologies adapted to the Project area. They also conduct extension and agricultural transfer activities through specific programs such as *Cambio Rural, Pro Huerta* and *Minifundio* which address different issues and beneficiaries. Close cooperation with INTA is essential to develop component 2 of the Project. According to the diagnosis shared with leaders in the local INTA office, the extension actions could be reinforced with the incorporation of qualified professionals (rural sociologists, communication experts, extension technicians). To this

end, agreements will be put in place with both EEAs, specifying the production models and practices to be disseminated, the methodology (in demonstration fields, through the existing programs, etc.) and the resources involved. The Project is also expected to provide a means to influence the type of technology developed and promoted by INTA in the zone, so that it promotes adaptation to increased climate variability and climate change. In addition, the Project will seek to include INTA staff in other Project activities, particularly those under component 1.2. The participation of the members of the Local Advisory Council of both EEAs[68] in the Project's activities will also be sought.

The family Agriculture Under secretariat carries out rural development extensions and promotion actions through organization strengthening activities and community investments. In the zone there are at least 6 technicians working in Carmen de Patagones, Tres Arroyos, Bahía Blanca, Pedro Luro, Puán and Alsina.[69] Including the Undersecretariat's extension technicians in component 2 is considered fundamental, since they serve a specific audience, complementary of the audience served by INTA. The linkage mechanisms and themes are expected to be equivalent to those mentioned in the previous point.

Agricultural Innovation System Strengthening Program AR-L1064 is an INTA project financed by IDB and focusing on institutional strengthening. Its component 4 addresses Investigation for Small Family Agriculture (*Pequeña Agricultura Familiar,* PAF). This program is considered to be highly complementary of the actions in component 2, and articulating with it is strategic to influence INTA's policies.

The following initiatives, in turn, could potentially support development and strengthening of production chains contemplated under this component through: training, diagnosis information, technical assistance, seed funds, etc. These components could also support, each with its specific mechanisms, the broader adoption of the technologies proposed in the demonstration fields such as production models and practices, water capture, and irrigation systems. Once the technical details of the practices and investments are defined, the feasibility of accessing specific support lines will be studied together within each of these programs. Where it is feasible, mechanisms will be developed jointly with the respective agencies to facilitate access to support putting into place protocols and criteria in each institution, and thus contributing to component 4 on the Project Sustainability Strategy.

[68] A so-called Local Advisory Council operates in each INTA Experimental Agricultural Station. Its members are representatives of the zone's major agricultural organizations. The Council's functions are to: participate in setting the objectives of the EEA's technical services; cooperate in the development of work plans to achieve the proposed objectives and learn about the results obtained; make suggestions to the EEA as convenient or required to better attain its objectives; cooperate in the most effective way possible to improve production and rural life and strengthen the link between the farmers and the EEA; and participate with their advice and at its express request in the formulation of the EEA's annual budget and the subsequent administrative management of the same.

[69] The regional coordination office is located in Carmen de Patagones. The Pedro Luro office works closely with the Ascasubi EEA.

Component 3: Applying Participatory Approach to Knowledge Management and Local Capacity Development for Adaptation to Climate Change

The Youths for a Healthy Environment Program is an organization offering the facilitation of participatory workshops for the collective generation of environmental knowledge and its management to transform the environment at a community level to make it more sustainable. Although the program targets youth, its workshops are open to the general public.

This component seeks to develop local capacity to measure project indicators and conduct participatory monitoring, process control and impact evaluation. The main target of this capacity building will be the institutions that the Project proposes to create or strengthen. Therefore, the Regional Council of the Buenos Aires South West Development Plan and the Consultative Observatory on Climate Change and Desertification will be included in these activities, as well as the institutions they comprise.

Component 4: Development of a Sustainability Strategy

This component seeks to incorporate the Project's outcomes and lessons learned in the application of policies for land degradation and climate change, taking into account both the needs for regulation and the resources that are required to continue with the main Project activities. Here, as well, the institutions with the capacity to implement policies for adaptation to climate change will be included in the Consultative Observatory on Climate Change and Desertification, and the Regional Council of the Buenos Aires South West Development Plan. These institutions will participate actively throughout the Project and play an important role in decision making and Project control instances to foster taking ownership of its outcomes. This component will actively seek formal institutional commitments with a view of continuing the activities carried out under the Project. Other target institutions include those mentioned under component 1.1, local universities (UNS–CERZOS, UNLP–CISAUA, and INAP), INTA offices and local offices of the Family Agriculture Under secretariat, and the Scientific Investigations Commission and the Youths for a Healthy Environment Program.

ANNEX 8

COMMUNICATION AND KNOWLEDGE MANAGEMENT STRATEGY

Introduction. This annex presents the scope of the Project's gender-sensitive communication and knowledge management (KM) strategy on local adaptation approaches. KM mechanisms and dissemination techniques will be defined to use participatory activities for sharing of lessons learned. This includes development and dissemination of specific materials in a local context. The participatory M&E processes will be integrated into the communication and KM activities, since they imply an ongoing involvement of the local population from the start of the activities.

The Project includes a comprehensive Communication and KM Strategy supported by the following outputs: *An institutional strengthening program directed at local public officers*, *Training program for key local stakeholders, specifically including opinion leaders; Teacher training program on Environmental Education specifically designed for the Project area; Program on appreciation of the local culture and products, the role of farmers and their family in society; Program to develop local capacity in participatory monitoring, implementation control, and result and impact evaluation*.

Operational priorities and objectives of the Project Communication and KM Strategy. The Project will address three communication priorities:

a) Strengthen the communication and KM support provided to institutions, scientific agencies and civil society organizations in the Project area;
b) Influence pertinent processes and stakeholders to adequately address the issues related to climate change adaptation, desertification and land degradation; and
c) Reach critically important target groups which are either not currently participating at all, or participate insufficiently.

In particular, the Project will seek to implement seven operational objectives:

a) Increase attention on climate change impacts and related dynamics in the Project area, providing useful information and hands-on guidance for policy and production related decision-making;
b) Mobilize social support for the application of adaptation measures through awareness raising and education;
c) Establish links and channels with and between key stakeholders to facilitate broad communication and dissemination of information in the Project area;
d) Improve the capacity of the main target groups, including in particular municipal and provincial liaison officials, journalists and Project beneficiaries, so that they can effectively recognize the links that exist between climate change, desertification, and land degradation to raise the profile of these issues and their potential solutions;
e) Establish solid and effective structures to facilitate local communication throughout the Project area, strengthening the stakeholders' role as change agents by increasing critical capacity and creating a technological basis for environmental communication; and

f) Dissemination of the Project experiences in order to foster their scale-up and replication and to increase the probability of interchange with related projects and agencies at the national and international level.

Key messages. The main messages the Project seeks to disseminate through communication tools include providing information and motivating social engagement to search for solutions, generating a favorable social context for transformation through cooperation among a number of local stakeholders. Therefore, the messages to be disseminated will focus on the potential solutions and opportunities related to adaptation to climate change and land degradation for the stakeholders involved. As a result, the Communication and KM Strategy will promote, in principle, the following four key messages:

a) Adaptation to climate change through sustainable land management conveys an important rural development potential and constitutes an opportunity for the local population.
b) Land restoration and preventive action are fundamental to solve the challenges of rural development at local level.
c) Solutions to the local problems are the responsibility of the society as a whole, making it critical to develop appropriate social and economic cooperation tools, strengthening the interactions between society and its institutions, and increasing the sense of confidence and motivation for change in a community environment.
d) The local stakeholders are not the targets of benefits but rather the subjects of transformation; they contribute to the necessary change that will allow for local rural development with social justice and democratic transparency.

Target groups, media promotion, and correlation with the Project activities. Broken down into the eight main target groups, it is possible to define the appropriate media for the Communication and KM Strategy summarized in the following chart. This strategy will be cross-cutting by providing support to each Project component.

Target Group	Medium	Actions	Rationality
Public officials	Face-to-face events; Dissemination materials	Professional training; Dissemination of materials for technical, legal and policy support	Quarterly workshops per intervention county, starting on the first year; 1 annual publication
Local public opinion in general	News media; Community events	Making agreements / joint actions on media coverage of activities, special issues and advertising space in the main mass and local media	At least 1 advertising insert/media coverage per quarter as from the second year (16 advertising inserts/ media coverage in total)
Mass and local media	Professional training	Organization of environmental journalism congresses	1 activity organized within the framework of the yearly Provincial Desertification Congresses organized by OPDS (4 in total)
Local opinion leaders	Face-to-face events; Community events	Thematic professional training for journalists; Strengthening the technical capacity of local media cooperatives	Events to be organized starting from the second year with the objective of providing environmental training to communicators in the 12 SWBA counties, and training the population in general in information analysis and production; Involvement of the Program *Somos Ambiente* (SAyDS) together with local media cooperatives in the Project area.
Local education and science community	Professional face-to-face and on-line training	Teacher training courses	Starting from the second year, training will be provided on both technical substance and media use and analysis in teacher's work with students, through the Program *Somos Ambiente*, and local media cooperatives
Local community, with emphasis on farmers and their families	Print media; Professional training; Social events	Production and dissemination of useful information through local as well as mass media	The results of the IEWS analysis will be replicated as well as the activities of the Observatory (at least 1 biweekly ad in the months of critical climate conditions); Knowledge will be conveyed and exchanges promoted through participatory monitoring; Awareness raising activities will be organized under the Local Culture Strengthening Program such as free environmental films, photo competitions, news article competitions, etc. The local media cooperatives will participate as well as the Program *Somos Ambiente* with the possibility of adding the World Bank's environmental films program as a partner (at least 3 actions per year in the direct intervention zone)
Related projects at the national and provincial level	Specific technical materials	Events for institutional dissemination	At least 1 specific event will be held annually targeting related institutions to disseminate the Project outcomes within the framework of the Provincial Desertification Congress organized by OPDS
International organizations and donors	Specific technical materials		Reports on successful experiences will be published at mid-term and Project closure and disseminated to multilateral organizations working on the Rio Conventions

ANNEX 9

TEACHER TRAINING PROGRAM ON ENVIRONMENTAL EDUCATION

Introduction. This annex descirbes the training program proposed for teachers under subcomponet 1.2. The program is targeted to mainstream environmental factors, climate change and approaches to climate resilience into the curriculum. The proposed Environmental Education Program would consist of different modules covering different education levels. The first target would be the secondary education; the second target addresses university education and would be executed by the UNS and the Veterinary School of the University of Buenos Aires; and the third will focus on distance training for teachers and the general public and would be executed by the INTI.

1. Training Program on Evironmental Education for Teachers. The overall objective is to develop, through a participatory methodology, a specific teacher training program on Environmental Education in the intervention area, and its integration into the official structures of teacher education. The three main objectives for the proposed programme would be:

a. Participatory development of specific materials for the intervention area, with possibility of joining to *Conectar Igualdad* for teacher education, incorporating local knowledge and gender perspective.

b. Teacher training implementation using the material described in (a), and its insertion into formal teacher training programs, once the official support from authorities has been issued.

c. Setting up of an Environment Education Forum for teachers of the SW of Buenos Aires Province, where discussion will take place regarding shared documents ,curricular formats, and actions plans to be executed.

The programme implementation would be performed through a four -stage plan: 1) Participatory scoping of materials, contents and formats for teachers training with key representatives of local education system. This participatory process would be part of the Environmental Education Forum; 2) Design and development of materials trainings (face-to-face and virtual) with key local education representatives; 3) Pilot teacher training and the start up process of institutionalizing the proposed approach and; 4) Monitoring and evaluation of first round of implementation process and possible final formalization of the proposed training approach.

2. Training Program for university students. The UNS would create a “Unit for Education, Research and Transfer of Sustainable Agricultural Practices in the Semiarid Pampas Region in the Fight against Desertification". Its aim would be to promote the development, teaching and transfer of sustainable agricultural practices in the semiarid Pampas region by setting up an education support, technical development and agricultural research unit as a methodology to combat desertification.

The Department of Agriculture of the UNS would carry out extension activities in different areas, including: services to farmers, teaching as part of the professional training, and relationship with the rural environment. The latter should become a major

training activity; as through it teachers and students would be able to identify the real needs and concerns of rural communities, bringing them to the university to seek solutions to these problems through research.

This program would base its main activities a plot for educational, research and outreach purposes (*Campo Napostá*). This is a rural plot, run by the UNS, of 711 hectares for teaching activities, research and technology transfer, together with commercial production in a totally sustainable environment. This plot might include diversified units or modules of technological production and research alternatives in the plot. These would serve for students to carry out their practices, carry out rural jobs, prepare their graduation thesis, and participate in teacher research projects and in technology transfer meetings for farmers.

This plot includes a sustainable agriculture unit has 180 hectares and is divided into two modules:

a. *Teaching Support and Commercial Grain Production module covering 80 hectares.* In this module, students acquire conceptual and instrumental knowledge related to daily production, management and commercial agricultural activities. The students, led by teachers, are responsible for identifying and diagnosing real production problems at the farm level, finding solutions based on the resources available and market conditions, applying and implementing with their own hands technologies compatible with the material resources and respect for the principles of environmental sustainability. In this module production focuses on wheat growing, applying conservation tillage systems, state-of-the-art cultivars and diagnosis-based fertilization criteria.

b. *The Sustainable Agriculture Research and Transfer of Technology module has 100 hectares.* It is an optimal tool to improve the teaching/research/outreach relationship through “problem solving” as the centerpiece. This module also helps to improve teachers’ didactic performance, update teaching in relation to scientific progress and relate documentary research to field research and transfer the outcomes to farmers.

The students’ participation in research work allows them to confront theory and practice, question the knowledge acquired in the classroom and gain a sense of responsibility as part of a team. In addition, it encourages their creativity, curiosity and the exercise of the doubt to develop critical and creative problem-solving capacity.

The research lines developed cover many aspects of sustainable crop production: varietal behavior, comparison of tillage systems and their edaphic, productive and environmental implications, pest and disease control, responses to fertilizers, etc. The outcome of the research is reflected in scientific and technical publications and at one or two field meetings targeted to farmers. At these meetings the trials are shown, the results are discussed *in situ*, new lines of work are proposed based on the problems encountered by the farmers and state-of-the-art tools are presented.

Production tasks are performed annually concurrently with the crop cycle from the fallow land to the marketing of grains. In addition, the research work is also developed

throughout the year, while the field meetings are usually held towards the end of the year, with an average attendance of 80 farmers and 160 students.

3. Distance learning training module. The National Industrial Technology Institute (INTI) would assist in the design and implementation of comprehensive training and cooperative remote work with the use of ICTs for different project stages and lines. It would also help to make the educational platform available with ample capacity for multiple courses and attendants, with internal communication tools, forums, document sharing and will facilitate and assist in the design of training materials. It would disseminate training proposals and their implementation, from the management of attendants to the final learning monitoring. These may be courses, workshops or communities of practice, with higher or lower levels of attendance and distance activities. INT would also participate in training to make use of ICTs for education or cooperative work based on interactive projects, in the implementation of benchmarking methodologies/ good practices and dynamic knowledge reservoirs. It would also support the design of action strategies based on institutional learning networks and socially distributed knowledge management and the coordination of the 28 INTI sector centers and 12 regional centers throughout the country to facilitate the transfer of different technologies.

ANNEX 10

TRAINING PROGRAM FOR KEY STAKEHOLDERS AND OPINION LEADERS

Introduction. This annex presents the scope of a training program for key stakeholders and opinion leaders. This program has a dual structure considering that the Project intends (i) to raise the importance of the issue of climate change and land degradation to the media's and public agenda, to which the main Project partners would be the mass media but also, on the other side, and (ii) to strengthen the capacities of local stakeholders to assume their role as social transformation agents in the community and in a transparent democratic environment that provides opportunities for participation in the process of change.

This program would strengthen the Project as a whole through feedback mechanisms; making use of several social dissemination media processes, increasing the potential for the multiplication of successful measures and experiences (mainstreaming) and raising social awareness and acceptance (ownership). Thus, this intervention line contributes to all the other project components, especially to the Reduction of Vulnerability at the Institutional and Community Level (Component 1) and the Sustainability Strategy (Component 4).

1. Strategic guidelines. The dual program structure is based on the defined lines, as follows:

a) *Increased visibility in the mass media of environmental issues related to climate change adaptation or soil degradation.* For this line, the main partners are the media with greater audience in the area. Agreements for the publication of the project outcomes would be generated, as well as for the coverage of certain actions or issues related to the Project and the climate change and soil degradation issue. This would take into account the key objectives and messages of the Project Communication Strategy. The implementation of this intervention also seeks to strengthen the media's perspective on specific environmental problems and promote information exchange, debates between experts and media workers. Therefore, in addition to the ads and news coverage, the intention is to strengthen the sector through Environmental Journalism Congresses organized by the project together with the main media in the zone and within the framework of the Provincial Desertification Congresses organized annually by the OPDS. This line would involve at least:

- One advertising insert/media coverage per quarter as from the second year (12 advertising inserts/coverage in total) as it is necessary to await the first Project outcomes.
- Four environmental journalism congresses focusing on climate change adaptation and soil degradation issues within the framework of the Provincial Desertification Congresses organized by the OPDS.

b) *Strengthening the cooperation approach of media with a focus on social action.* The purpose of this activity is to strengthen the critical capacity of the local population, increasing their potential to participate in information analysis, production and

processing regarding environmental issues related to climate change adaptation and soil degradation based on the work with local cooperatives. Therefore, work has been underway with local cooperatives through a comprehensive training program in environmental communication and institutional strengthening of local media in the Southwest of the Province of Buenos Aires, involving the following stakeholders:

- Cooperatives of communication: media center of the Southwest of Buenos Aires and newspapers and journals of the Southwest of Buenos Aires (both for the provision of services)
- Work cooperative *EcoMedios* (it publishes the weekly *EcoDias* and the digital newspaper of Bahía Blanca), work cooperative *Ondas del Sur* (manages LU3 AM 1080), work cooperative *Viento Sureño*, composed of communicators from different districts in the region (it publishes the web newspapers with the same name).

This media network is currently composed of communicators from the districts of Bahía Blanca, Coronel Rosales, Saavedra, Tornquist, Adolfo Alsina, Patagones, Coronel Dorrego and Puán and invitations to join have been sent to communicators in Coronel Suárez, Villarino, Coronel Pringles and Guaminí.

Based on the role played by small and medium media in the districts of the SWBA and their close relationship with their communities and educational institutions, training for social communicators on environmental issues is proposed, focusing especially on the desertification and climate variability. Training will encourage active participation of communicators, who will be invited to generate proposals connected with these issues with their communities and, in turn, disseminate them to other communicators.

This training would seek the following specific objectives:

1. Develop notes about the environmental problems of the SWBA.
2. Publish news relating to environmental care and prevention actions against desertification in the SWBA.
3. Promote and consolidate media networks and promote working on the topic of desertification early warning in the SWBA.
4. Encourage government agencies and companies to advertise in the media belonging to such networks to publish and disseminate the project against desertification in the SWBA, their activities and early warning outcomes.
5. Promote communication proposals involving local communities, such as literary and photo competitions, photojournalism, among others, organizing itinerant events to improve inter-district communications.

Some of the media involved in this work would be:

- Newspapers and journals of the Southwest of Buenos Aires (*Diarios y Periódicos del Sudeste Bonaerense,* Dypso). Service cooperative composed by the publishers of *EcoDias*, of Bahía Blanca; *Cambio 2000* of Caruhé (district of Adolfo Alsina); weekly *Reflejos* and *Vamos* of Pihué (district of Saavedra); *Observador Serrano* of Tornquist; weekly *Perfiles* of Puán and magazine *Obras y Protagonistas* of Bahía Blanca. They will be joined by *La Opinión* of Huanguelén, and *Ecos de mi Ciudad* of Coronel Dorrego.

- Usina de Medios del Sudoeste Bonaerense (Umso). Service cooperative composed of the work cooperative EcoMedios (manages *EcoDias* and *El Diario de Bahía*), work cooperative *Ondas del Sur* (manages LU3), work cooperative *Viento Sureño* (manages the portal *Viento Sureño*), work cooperative K688 (produces K688 TV program), work cooperative Uníxono (freeware), and some small and medium enterprises. AM La Dorrego and LU34 of Pigüé are in the process of joining.
- Weekly journal *EcoDias*. Free distribution. 3,000 copies (1,200 in hand to teachers). *El Diario de Bahía*. Digital newspapers with local news. Both produced by the work cooperative EcoMedios.

ANNEX 11

ENVIRONMENTAL AND SOCIAL SAFEGUARDS POLICIES

Given that the investments and their specific locations are not known by Project appraisal, the GoA has developed an Environmental and Social Management Framework (ESMF) that includes an Indigenous Peoples Planning Framework (IPPF) and an Involuntary Resettlement Policy Framework (IRPF). Participating entities will use the ESMF when executing adaptation pilots.

Project investments will undergo a social and environmental screening and/or full assessment for the pertinent works following the ESMF. If involuntary resettlement and/or the presence of indigenous population is identified within the SISs, the Borrower will, prior to the carrying out of any said works, prepare and furnish to the Bank a resettlement plan and/or an indigenous plan including relevant consultation and disclosure in accordance with the provisions of the IPPF and IRPF, as the case may be.

The ESMF was disclosed in country on April 20, 2012 and in the Bank's Infoshop on April 23, 2012.

Environmental Assessment OP/BP 4.01 (including social issues)

The policy is triggered by the implementation of adaptation measures through interventions in productive agroecosystems which will be discussed, defined and put in practice jointly with local stakeholders and related technical institutions during the Grant implementation period. Given there is previous positive experience on the proposed base interventions from around the world, and the fact that no particularly sensitive environmental conditions are known to prevail in the target area, the Project is classified as a Category B. The main intervention areas will cover management of water resources, crops, and livestock and pasture management. For example, production oriented adaptation is expected to include decentralized measures to efficiently capture and storage rainwater and install microsystems for irrigation. To strengthen food and agroecological diversity and directly raise the standard of living of the local population, creation of organic vegetable gardens will provide multiple benefits beyond increased climate resilience at family level. Further adaptation measures proposed for transitioning from the current situation to more climate resilient and sustainable land management approach are crop rotation, organic pest control, adjusted sowing, cover crops, sustainable land tillage, adaptation of cattle ranching systems through use of forage banks, forest grazing, and sustainable management of pasture plots. The principal adaptation measures included in the Project proposal are: (i) rainwater harvesting and improved irrigation technology, (ii) enhanced crop management, (iii) Rangeland and forage management, (iv) silvopastorile livestock production, and (v) sustainable land management and erosion control.

The proposed SLM interventions will include training and capacity activities. As many of these interventions could be new to project beneficiaries there may be some initial resistance to adopting non-traditional, therefore a strong knowledge sharing and training program will be develop as an important aspect of the Project.

A social assessment was prepared based on a desk review of relevant documents on social condition in the SWBA, as well as information provided by key stakeholders during several field visits in 2011 and 2012. The assessment concludes that the Project would lead to mostly positive social development outcomes and impacts. Small and medium farmers are one of the priority target groups of the Project. Positive social development outcomes and impacts include: (i) increased access to social opportunities for the target groups, through improvements in access to anticipated information regarding land degradation, climate change, and the impact in rural activities; (ii): decrease in the rural migration to urban areas; (iii) increased climate resilience; (iv) increased access to information, more predictability, decreasing vulnerability, educational program fitting in regional conditions; access to decision making processes; and (v) strengthening indigenous peoples recognition and inclusion, by promoting respect to their visions.

Natural Habitats OP/BP 4.04

While during preparation it has not been possible to determine the presence of natural habitats in the Project's area of influence, the policy is triggered under a precautionary basis. The project will not result in any expansion of the agricultural frontier or conversion of natural habits to agricultural which may result in adverse impacts to natural habitats. The activities related to the SISs will be placed on already transformed areas.

Forests OP/BP 4.36

The policy is triggered because the Project could finance small forest plantations to build shelter belts and wind backers). In addition, and in some cases, the project could finance some management plans at farm level to ensure compliance with the native forest law at the provincial level. This law includes the identification of forests with critical conservation value. As per the requirements of OP 4.36, small and restricted pilot forest plantations (shelter belts, forestall wind-breakers) supported under the Project would not cause loss or degradation of these forests, but would rather contribute to their reforestation and conservation efforts, including the planting of trees native to the region.

The target area is situated in the Argentine Espinal ecoregion, which characteristic feature is thorny deciduous shrub land forest. This ecoregion has been heavily modified as most of it has been used for agriculture and its forests have been highly exploited and dismantled. Both the caldenal and the talares types of sparse xerophytic forests have been exploited by removal of firewood. The caldén trees have also been used to obtain fence posts, make wooden paving blocks for streets and to operate sawmills for making parquet floors. Furthermore, they have become seriously threatened by the expansion of the agricultural frontier that, thanks to modern irrigation systems, is now reaching areas that in the past were not suited for this type of land management.

Pest Management OP 4.09

This Project seeks to reduce use of and dependence on harmful agricultural chemicals and will not increase or promote use of pesticides, so a pest management plan will not be prepared. It should be noted, however, that small amounts of pesticides will probably continue to be used by a portion of pilot farmers. The Project will provide training on the proper use of pesticides and the safe disposal of containers by communities to prevent any health and environmental risks associated with pesticide use. This disposal will follow the Bank OP 4.09 guidelines as well as pertinent national laws and regulations. Also an Integrated Pest Management approach to dealing with pests will be supported.

Physical Cultural Resources OP/BP 4.11

While it has been not possible to determine the presence of physical cultural resources in the Project's area of influence, the presence of physical cultural resources in SIS will be determined by the final design of pilot interventions during the Project implementation. The Project includes in the ESMF, screening criteria to avoid any known areas to have physical resources and a process to address any chance finds which may arise during implementation.

Indigenous Peoples OP/BP 4.10

Based on the Bank's screening and a Social Assessment that is annexed to the ESMF, during Project preparation presence of Indigenous People was confirmed within the Project area. Given that the proposed investments are neither technically defined nor specifically located by appraisal, an IPPF was prepared in case indigenous people would live also within the Project specific intervention sites (SIS) in rural areas. A consultation process on the IPPF is on-going with representative indigenous organizations and will be concluded prior to the Project's appraisal within the WB.

During Project preparation, the OPDS conducted several informal meetings with (i) key stakeholders, a local representative from Indigenous People Participatory Council (*Consejo de Participación Indígena)*, (ii) academic researchers from several institutes, and (iii) field trips. Additionally, local municipalities were requested to confirm presence of indigenous people living in the targeted rural areas.

Historical information refers to the *Mapuches* as the native people for this region. Many of the *Mapuches* people were taken out from their lands and obliged to migrate to urban areas during the civil war when people were forced to move from their lands or needed to migrate in search of better livelihood. According to the statistical information available from Indigenous People Complementary Survey 2004-2005 *(Encuesta Complementaria de Pueblos Indígenas del Instituto Nacional de Estadísticas y Censos)*, there are no registered *Mapuche* communities living in rural areas. The National Indigenous People Institute informed that there are *Mapuche* communities in urban areas of Carmen de Patagones registered in ReNaCi *(Registro Nacional de Comunidades Indígenas)*. In addition, the presence of indigenous people was confirmed in the Project's area of influence in the Carhué region. There could be indigenous people living also within the SISs, so close consultation will be continued along Project implementation.

Involuntary Resettlement OP/BP 4.12

Although no involuntary resettlement is planned under any of the components, activities under component 2 could trigger the policy. In compliance with the policy, in order to avoid, minimize or compensate for any adverse impacts in this regard, an Involuntary Resettlement Policy Framework has been be developed to ensure proper consideration before and during execution of pilot interventions. Additionally, all work toward pilot interventions will include participatory planning processes with stakeholders.

Safety of Dams OP/BP 4.37

Although construction of and/or dependency on a planned/existing dam is not envisaged, the policy is triggered in order to ensure compliance with safety standards in case that small water reservoirs or micro irrigation systems are constructed. The ESMF will include the basic safety requirements for such works in line of the policy.

Consultation

This Project has been prepared on the basis of a participatory process. The Project identification was made during the First Desertification Congress in Buenos Aires province during 2010. Then, and during the Project preparation phase after the Adaptation Fund Board endorsement of the concept note, the Project was presented during the Second Desertification Congress in Buenos Aires Province during August 2011. This Congress took place in Tornquist within the Project's area of influence. The meeting was attended by more than 40 stakeholders, including, scientific and technical institutions, NGOs and farmers. During the meeting, the environmental and social measures which are *per se* mainstreamed in the Project technical design were presented, discussed and prioritized. The meeting was also attended by OPDS representatives. In October 2011, a third round of consultations was done in the field covering more than 100 different stakeholders in the Project's target area. During this visit, the Project concept was presented and the environmental and social measures to address climate change and lad degradation were identified. Finally, the Project preparation benefited from a significant communication and disclosure effort made by the leading agencies. Project documents were uploaded to the SAyDS website, and the Project initiative was widely disseminated by the local media in the Project's target area.

ANNEX 12

ECONOMIC EVALUATION OF THE PROJECT

Introduction

The Project area comprises the Southwest of Buenos Aires Province (SWBA) which includes 12 counties[70]. The Project is focused on the agricultural sector, which covers an area of 6.23 million of ha, involving 7,796 agricultural, livestock and horticultural producers in both rainfed (*secano*) and irrigated areas.

The Project strategy involves institutional strengthening, training and awareness rising and knowledge management, including development of an information and early warning system (IEWS) to climate change and desertification that will cover the entire SWBA. The IEWS will entail necessary mechanisms to properly disseminate collected data among producers, public officers and institutions with responsibilities in public sector policies. Thus, it is expected **to guide production decisions and public policies in order to reduce negative economic impacts generated by climate variability and change** throughout the SWBA. An estimated value of the IEWS impacts was calculated as a benefit to the Project and is included in the economic assessment.

The main Project component (component 2) will implement concrete adaptation measures and sustainable land management practices in productive systems aimed at positive impacts on farmers' productivity and economic performance. For the purposes of maximizing the targeted Project results and promoting their sustainability after Project completion, the Project will carry out training and dissemination activities to promote, scale up, and replicate successful pilot practices.

Component 2 will focus on the most vulnerable zone of the SWBA in terms of climate variability and its impact on agricultural production: the counties of Patagones, Villarino, and Puán. In these three counties, there are about 2,772 producers in an area of 2,69 million ha.

The Project has selected 10 specific intervention sites (SIS) which have heterogenic environmental and productive conditions (see annex 6). The direct intervention area within the SISs will be about 100,000 ha. The productive systems that are representative of the overall production set up in the SISs are named in table 1.

Heterogeneity of environmental conditions and production systems makes it impossible to propose a simple or uniform strategy for all situations. However, the productive orientation to be applied by the Project is generally based on a mixed production system that means an **integrated beef and crop production**. This kind of mixed production

[70] The Region of the Southwest of Buenos Aires Province was established by Law 13647 and includes the following counties and districts: Adolfo Alsina, Saavedra, Puán, Tornquist, Coronel Rosales, Coronel Dorrego, Bahía Blanca, Villarino, Patagones, Districts: II, III, X, V, VI of Guaminí, Districts: XI, V, XV, VI, XIII, VII, VIII, XIV, XII of Coronel Suárez, Districts: X, XI, XII, VIII, IX, VII, IV, V of Coronel Pringles.

used to be typical for the Argentine pampas[71], and it's widely considered as a sustainable form of production. This is because with **a proper rotation between crops and pastures**, after cultivating annual crops for a couple of years, soil fertility and physical properties can be recovered during the pasture stage. Managing rotation among cultivated crops and between crops and pastures is a critical part of a smart climate strategy due to its positive impacts on soil sustainability, erosion control, water catchment, and economic diversification. A properly managed rotation approach is itself an adaptive practice, as its fundamental idea is to adjust to local soil, climate and technological conditions. Consequently, solid information base and know-how on rotation management to deal with changing conditions and developing climate trends is a more critical adaptation asset than a specific rotation calendar.

Another set of adaptation technologies to be promoted by the Project address **grazing and herd management as well as forage banks**. They also promote mutually adaptive and climate smart approaches to cattle raising as they allow farmers **to balance the seasonal forage supply**, dependent on climate conditions and availability of appropriate land, **with the forage demand** (herd size and composition, birth and sale seasons, etc). Finally, **sustainable tillage systems** will be promoted to minimize negative tillage impacts on fragile soils.

The above described technologies will form the intervention basis within the SISs, where mixed production systems will be mostly implemented through **integrated crop and pasture management[72]**. For the purposes of this economic assessment, moreover, it would not have been realistic to differentiate the benefits of single measures, as the impacts of integrated crop and pasture management are significantly different than those of single measures.

Additionally to integrated crop and pasture management, three kinds of further measures will be promoted in specific sites[73] as presented below:

a) Land and natural resource restoration through rangeland closures and restoration of native grasslands, reforestation, silvopastorile management, and forest curtains: Most of these measures provide positive impacts on a long term basis and mainly focused on the quality of environment. Trying to translate these impacts into economic benefits would be a difficult task full of uncertainties. However, there is some reliable economic data on restoration of degraded native grasslands and eroded soil that has been included into the economic assessment.
b) Improvement of irrigation systems and water management: The economic assessment incorporates increased productivity based on improved water efficiency of irrigation systems and strengthened control of salinization processes.

[71] During the last 30 years, commodity prices and technological development have promoted a differentiation between agriculture and cattle raising. In some regions like the SOBA, mixed production still remains, but the pasture stages within the rotation cycle have become shorter than needed to ensure environmental sustainability.
[72] Integrated crop and pasture management is included in the detailed budget through modules 2.1.1.2 Crop Management and 2.1.1.3 Livestock and Pasture Management.
[73] The particular practices to be implemented at each site will be planned during Project implementation together with local actors in line with the Project's participatory approach.

c) Development of alternative production approaches: Activities such as beekeeping, cultivation of aromatic plants, berries, and sweet corn, and poultry and pork production will help diversification of income sources and generate additional income. As the specific activities and their locations will be defined in agreement with beneficiaries and other stakeholders, it is not possible to estimate their scope and impact for the purposes of the economic assessment. However, an illustrative cost-benefit analysis per hectare is presented in table 8 for some of the alternative production activities.

Sensitivity Analysis

The economic assessment was conducted under the assumption that there is a *ceteris paribus* situation; that is, no change in other variables, even climatic conditions. However, in order to estimate possible adverse climatic situations, and particularly their impact on producers' benefits, the assessment includes a sensitivity analysis.

The sensitivity analysis considered three probable climatic events that can take place during the Project implementation period. Each of the following events includes an estimated impact on producers' net benefits: 1) moderate drought, 2) severe drought, and 3) extreme drought. Each event has a probability of occurrence and economic impacts estimated by INTA (see table 10).

Economic Benefits of Implementing Integrated Crop and Pasture Management

The economic analysis used INTA's calculations on the expected incremental income and costs derived from integrated pastures and crop management to be piloted with local agricultural producers. INTA has estimated the costs and benefits of 1) the current situation versus 2) the expected outcomes derived from the adoption of sustainable crop and pasture management. These estimations were made for each intervention zone and typical production systems (see tables 1 to 4)[74]. For the economic assessment, the difference between the two situations presents the incremental net benefit derived from adoption of Project measures.

Tables 1 to 4 reproduce the original data from Iurman et al. (2009 and 2010) that was used in this assessment to estimate the impact of adopting an integrated crop and pasture management approach.

[74] Changes in agricultural income and associated costs of traditional and improved models were estimated based on statistics, producer surveys, measurements, and direct experience of INTA in experimental plots and farmers' fields. All this data fueled a simulation model of Monte Carlo called SimulAr. For more information on the assumptions for estimating benefits and costs associated with implementing adaptation measures, see: Iurman, et al., 2010. "Representative Faming System of Patagones and Villarino" INTA.
http://anterior.inta.gob.ar/f/?url=http://anterior.inta.gob.ar/ascasubi/info/documentos/econ/Evalasca09.pdf

Table 1: Intervention Zones and Representative Production Models

Zone	Production System
Rainfed Villarino	Small-Mixed
	Medium-Mixed
	Livestock
Rainfed Patagones	Small-Mixed
	Medium-Mixed
	Livestock
Valley of Rio Colorado (*Valle Bonaerense del Río Colorado*)	Small
	Medium
	Large

Table 2: Estimated economic impacts on traditional and adaptive productive systems in dry lands in Villarino (AR$ at 2010)[75]

	Small Mixed		Medium Mixed		Livestock	
	Traditional	Adaptive	Traditional	Adaptive	Traditional	Adaptive
Ha (Total)[76]	412	412	860	860	759	759
Agriculture (Gross Income)	94,639	104,220	161,685	87,590	38,849	58,581
Livestock (Gross Income)	73,676	128,079	174,320	308,251	343,555	275,580
Gross Income (Total)	168,315	232,299	336,005	395,841	382,404	334,161
Operational Costs	90,334	84,652	172,094	141,813	182,668	115,234
Structural Costs	32,613	32,613	77,438	77,043	58,000	58,000
Net benefit	45,368	115,034	86,473	176,985	141,736	160,927
NB/ha	110	279	101	206	187	212
NB/ha (USD)	27.9	70.7	25.5	52.1	47.3	53.7
Difference (Adaptive/ Traditional)	42.8		20.6		6.4	

Table 3: Estimated economic impacts on traditional and adaptive productive systems in dry lands in Patagones (AR$ at 2010)

	Small Mixed		Medium Mixed		Livestock	
	Traditional	Adaptive	Traditional	Adaptive	Traditional	Adaptive
Ha (Total)	618	618	1,110	1,110	1,242	1,242
Agriculture (Gross Income)	135,551	104,486	167,977	122,534	32,241	29,805
Livestock (Gross Income)	80,200	139,497	170,853	300,828	115,002	158,403
Gross Income (Total)	215,751	243,983	338,830	423,362	147,243	188,208
Operational Cost	161,833	116,809	243,246	205,266	58,911	53,170
Structural Cost	32,919	32,919	83,830	83,830	66,067	66,067
Net Benefit	20,999	94,255	11,754	134,266	22,265	68,971

[75] All the estimations are on an annual basis. Producers' operating and structural costs of implementing management measures are displayed with respect to the differences between traditional and adaptive systems. In this sense, the implementation costs of a producer are subsumed in incremental gross margin of the practice (net benefit).

[76] Surface and other characteristics of each production system are the result of local data modeling.

NB/ha	34	153	11	121	18	56
NB/ha (USD)	8.6	38.6	2.7	30.6	4.5	14.1
Difference (Adaptive/ Traditional)	30.0		27.9		9.5	

Table 4: Estimated economic impacts on traditional and adaptive productive systems with access to irrigation in the Valley of Rio Colorado (AR$ at 2010)

	Small		Medium		Large	
	Traditional	Adaptive	Traditional	Adaptive	Traditional	Adaptive
Ha (total)	73 (55 w/ irrigation)	73 (55 w/ irrigation)	150 (100 w/ irrigation)	150 (100 w/ irrigation)	776 (250 w/ irrigation)	776 (250 w/ irrigation)
Agriculture (Gross Income)	63,628	125,349	306,038	259,577	449,027	424,317
Livestock (Gross Income)	46,228	98,435	369,908	492,210	276,464	431,359
Gross Income (total)	109,856	223,784	675,946	751,787	725,491	855,676
Operational Cost	48,802	90,040	452,293	443,083	319,281	321,170
Structure Cost	47,424	50,222	111,224	112,537	235,679	248,807
Net Benefit	13,630	83,522	112,429	196,167	170,531	285,699
NB/ha	187	1,144	750	1,308	220	368
NB/ha (USD)	47.3	289.7	189.8	331.1	55.6	93.2
Difference (Adaptive/Traditional)		242.4		141.3		37.6

Within the SISs, the Project aims to directly implement adaptation and sustainable land management measures in representative, yet diverse local conditions (small, medium, and large farms). Taking this into account, and based on the above information, an "average incremental net benefit" of the proposed Project measures was calculated for each zone. Calculations were based on net benefit per hectare. The increase in expected net benefits due to the adoption of integrated crop and pasture management in the production area is presented in table 5.

Table 5: Average Net Incremental Benefit derived from integrated crop and pasture management

Zone	Production System	Expected increase in Net Benefit (U$/ha[77])	Expected increase in Net Benefit (Average-U$/ha)
Rainfed Villarino	Small Mixed	42,8	25,3
	Medium Mixed	26,6	
	Livestock	6,4	
Rainfed Patagones	Small Mixed	30,0	22,5
	Medium Mixed	27,9	
	Livestock	9,5	
Rio Colorado Valley	Small	242,4	140,4
	Medium	141,3	
	Large	37,6	

In order to quantify the aggregate benefits of the Project interventions, current conditions and practices within the SISs from 1 to 5 are considered equal to the dry land conditions of Patagones. Likewise, SISs 6 and 7 are equivalent to the described conditions of the Río Colorado Valley, and SISs 8, 9 and 10 correspond to dry land conditions of Villarino.

Surface to be covered by Project activities within each SIS during the five years of Project implementation is presented in table 6[78].

[77] Exchange rate of December 2010, source: *Banco Central de la República Argentina*.

[78] Incremental surface to be covered in the direct target area of 100,000 ha, considering an estimated baseline of 30% of the land being under some kind of land management scheme.

Table 6: Area (ha) where the Project would implement adaptation measures to climate change and desertification

Corresponding Intervention System		Year 1 (0%)	Year 2 (30%)	Year 3 (40%)	Year 4 (50%)	Year 5 (55%)
Patagones	SIS 1	0	1,500	2,000	2,500	2,750
Patagones	SIS 2	0	3,000	4,000	5,000	5,500
Patagones	SIS 3	0	3,000	4,000	5,000	5,500
Patagones	SIS 4	0	4.500	6,000	7,500	8,250
Patagones	SIS 5	0	4,500	6,000	7,500	8,250
R. Colorado	SIS 6	0	1,500	2,000	2,500	2,750
R. Colorado	SIS 7	0	1,500	2,000	2,500	2,750
Villarino	SIS 8	0	4,500	6,000	7,500	8,250
Villarino	SIS 9	0	3,000	4,000	5,000	5,500
Villarino	SIS 10	0	3,000	4,000	5,000	5,500

The Project is also expected to cover, indirectly, a larger area through dissemination of demonstration activities, partly beyond the Project duration. For purposes of this analysis, however, only measurable impacts were considered. It is further assumed that the Project area of influence remains the same after the five-year implementation period.

The "aggregated incremental benefits" of implementing integrated crop and pasture management in a given year was calculated as follows:

Total Benefits in year x= [(area of Villarino with adaptation measures in year x)(average incremental benefit/ha in Villarino) + (area of Patagones with adaptation measures in year x)*(average incremental benefit/ha in Patagones) + (area of Ró Colorado with adaptation measures in year x)*(average incremental benefit/ha in Rio Colorado)].*

Based on that calculation, the Net Benefit flows derived from implementation of integrated crop and pasture management through year 5 is as follows:

Table 7: Incremental net benefit of integrated crop and pasture management

	Year 1	Year 2	Year 3	Year 4	Year 5
Increased profits resulting from integrated crop and pasture management (U$)	0	1,057,873	1,410,497	1,763,122	1,939,434

From year 5 onwards, the flow of the Project's incremental benefits is expected to be constant.

Investment costs of integrated crop and pasture management

Intervention costs of the discussed Project activities are included in the detailed Project budget as output 2.1.1.2 and half of the output 2.1.1.3[79]. This adds to a total of US$ 1,163,281, including direct on-farm investments, but also consultation, training, professional services, and dissemination. A relatively high cost scenario was adopted for the purpose of this assessment, and the costs were all computed for year zero of Project implementation.

Cost-benefit analysis of integrated crop and pasture management

The economic assessment has been calculated using the traditional economic valuation methodology of projects[80].

The considered economic evaluation horizon is 10 years and has a discount rate of 12%[81]. All values are expressed in current dollars and calculations are performed to compute market prices without paying taxes, so the presented evaluation approach is purely economic.

Considering the costs and benefits described for integrated crop and pasture management implementation, **the Net Present Value of this single intervention is of US$ 6,135,718, and an Internal Rate of Return of 71%.**

Incremental Benefits from Implementing Land Restoration Activities

One of the measures to improve climate resilience of agricultural land in the SWBA that the Project will implement is closure of degraded grasslands to promote reintroduction of native grass species either naturally or by sowing. Recovery of native vegetation has impact not only on soil stabilization, water catchment and biodiversity, but also in beef

[79] Module 2.1.1.3 also includes restoration of degraded land that is included in the following analysis.
[80] See: Baca Urbina, Gabriel. Evaluation of Projects. Mc Graw Hill
[81] This rate corresponds to the reference used according to the readiness of the Ministry of Economy and Finance.

productivity. Iurmann & Larreguy (2012)[82] have estimated that implementation of grassland closures and restoration increases beef production from 45 kg/ha/year to 75 kg/ha/year. Further, the study estimates that production costs are reduced once the system is established. Not even considering this cost reduction, at the current market prices the referred productivity gain represents an additional benefit of 58.7 US$/ha/year.

It is expected that at the end of the Project this kind of measures will be implemented on 15,000 ha of degraded grasslands. Assuming all of them will be fully implemented at the end of the Project (no intermediate results), the total incremental benefit of grassland restoration at year 4 and 5 will be of 880,435 US$.

Additionally, the Project aims to restore degraded lands affected by erosion. This implies plowing systems and pasture sowing that stabilize dunes and fragile soil susceptible to wind erosion to avoid damage caused by mobile dunes and dust storms. However, this assessment only considers the increment in beef productivity, which could rise from 10 to 30 kg/ha/year. At current market prices, it represents an additional benefit of 39.1 US$/ha/year.

At the end of the Project, these practices will cover about 20,000 ha of degraded soils. Assuming all of them will be fully implemented (no intermediate results), the total incremental benefit of eroded soil restoration at year 4 and 5 will be of 782,609 US$.

Other benefits of land restoration activities relate to reforestation, silvopastorile management and use of forest curtains. These benefits mainly focus on environmental quality and protection of natural resources related with erosion control, water catchment, biodiversity, and ecosystem resiliency against climate change. In the long term, benefits are also expected in beef and crop productivity, wood products, forest forage, etc. However, these benefits are not considered in the economic assessment.

Costs and investments of land restoration

Intervention costs of these activities are included in the detailed Project budget through output 2.1.1.3. Half of the referred output budget is considered in this assessment with a total of US$ 392,205. This figure includes intervention costs not only on degraded or eroded grasslands, but also on other restoration activities related with forests. It also covers consultation, training, professional services, and dissemination besides direct on-farm interventions. The intervention costs were all computed for year zero of Project implementation.

[82] Iurmann and Larreguy, 2012, *Experiencia de productores y técnicos en cría bovina intensiva sobre pasturas nativas*. III Congreso Provincial sobre Desertificación, Algarrobo – Villa Iris, Provincia de Buenos Aires, julio de 2012.

Cost-benefit analysis of land restoration

Considering costs and benefits of the described land restoration activities in a 10-year horizon and with a 12% of discount rate, the **Net Present Value of this single intervention is of US$ 4,473,226, and the Internal Rate of Return of 76%.**

Incremental Benefits from Improved Water Management

A productivity increase can be obtained by improving water efficiency in irrigation systems and controlling salinization processes. There are several crops that can be improved through better irrigation management and water availability, each of them with different productivity gains. To illustrate the economic impact of irrigation efficiency, estimations are provided based on the two main crops in the Irrigation Valley of the Colorado River: 15,000 ha of onion production and 75,000 ha of pastures under irrigation. An increment of 300 onion bags (25 kg) per ha can be obtained due to micro irrigation systems, representing 978.3 US$/ha/year of benefit at current prices. In pastures, the impact can be traduced into beef production as 60 additional kg/ha/year, representing 117.4 US$/ha/year at current prices.

Assuming a moderate scenario, if the Project reaches only a 5% of the respective crop surface at the end, the economic impact would be of 1,173,913 US$/year at year 4 and 5 (733,696 US$/year on onion production and 440,217 US$/year on beef production).

Costs and investments of water management

Intervention costs of these activities are included in the detailed Project budget through output 2.1.1.1, for a total of US$ 729,399. This figure includes not only on-farm intervention costs but also consultation, training, professional services and dissemination. The intervention costs were all computed for year zero of Project implementation.

Cost-benefit analysis of water management and irrigation

Considering costs and benefits described for water management and irrigation activities in a 10-year horizon and with a 12% of discount rate, the **Net Present Value of this single intervention is of US$ 2,753,509, and the Internal Rate of Return of 47%.**

Incremental benefits from introducing alternative productions

Several options of alternative production approaches will be assessed during the Project execution, and their final implementation will be agreed upon with local stakeholders. The Project intervention will consist mainly on conducting related market assessments and feasibility studies, as well as facilitating establishment of value chains for new products. The main benefit will be in risk diversification not only in terms of climatic, but also market risks. Further benefits will include introduction of more valuable products and value added in the local economy. To illustrate these potential benefits of introducing alternative products, the case of berries and sweet corn is presented

below[83]. Table 8 provides the gross margin of different crops under irrigation at the Río Colorado Valley. Both strawberry and sweet corn produces a gross margin comparable to that of onion, which is one of the most profitable crops in the region, and more significant than other traditional crops.

Table 8: Gross margin of different crops under irrigation at the Río Colorado Valley

Crop	Gross margin (US$/ha/year)
Strawberries	3478
Sweet corn	2174
Wheat	265
Sunflower	67
Onion	2629

However, as the final alternative crop/s will be defined later and there is no certainty on the original and the alternative crop or the surface to be covered, this data is only presented as illustrative; it does not form a part of the economic assessment.

Incremental benefits from the institutional strengthening and the early warning system

As mentioned above, the Project includes strong support to institutional strengthening, training, and awareness raising at different levels and among a number of stakeholders (officials, teachers, journalists, producers, and local population). The related benefits are hard to quantify. However, they will increase local capacity to face adversity and generate new opportunities both individually and collectively.

Consequently, it is important to highlight the expected positive impacts of strengthened institutions that are able to respond more effectively and timely to climatic events on the society, including an increase in social capital. These impacts facilitate better use of development opportunities particularly for the most vulnerable segment of the population. Further, they contribute to increase the impact and profitability of future investments in the region, while also attracting and encouraging new investments in a virtuous circle.

The aforementioned intangible benefits will also be gain from the establishment of the IEWS for climate change and desertification and the Observatory of Public Policies. The effectiveness of these instruments will in turn be enhanced by the increased local capacities, since the information provided by the IEWS could be effectively exploited to reduce the negative impacts of climate variability and change.

The climate may damage production both due to drought or excessive rains. However, to estimate the benefits of the IEWS, we only analyzed the economic losses caused by drought: The recurrent drought events generate significant losses in farmers' production and income. The IEWS, together with strengthened local actors and institutions, will allow stakeholders to make informed decisions based on climate predictions to mitigate negative impacts of dry years.

There are many strategies that can be followed from the production side to reduce the economic impacts of drought. Decisions taken at the farm level, for example shifts of

[83] Cultivation of both crops is only feasible at the irrigation valley.

sowing dates or selling or purchasing animals, are taken in light of the referred area and specific sowing plots.

Similarly, design of public policies may become more efficient and have a greater impact when fed with adequate information on climate projections and their expected impacts on production.

To quantify the impact of an effective implementation of 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 southwestern Buenos Aires are described below. Additionally, the potential to reduce these losses in each scenario was estimated after the set up 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

In the twelve SWBA counties, an average of about 1,191,589 ha of wheat are sown every year with an average yield of 1.8 tons/ha. Tables 9 and 10 present the related costs, prices and gross margin in normal years.

Table 9: Costs and prices of wheat production in the Southwest of Buenos Aires

Seeding cost	114	US$/ha
Cost of harvest	57	US$/ha
Price [84]	135	US$/t
Trading expenses	12%	

Table 10: Yield and gross margin of wheat in the SWBA in normal years

Seeded area	1191589	ha
Yield	1,8	t/ha
Gross income/ha	214	US$/ha
Gross margin/ha	43	US$/ha
Total Gross Margin	51,697.639	US$

Based on data presented by Campo et al.[85], it is estimated that between 10 and 15 of the last 38 years showed moderate drought conditions in the region (probability of 33%). Further, under a moderate drought event the average yield in the region decreased to 1.4 t/ha, causing an economic loss of US$ 4,926,680 in gross margin for producers.

Table 11: Expected yield and gross margin of wheat in SWBA in moderate drought years (without IEWS)

Seeded area	1191589	ha
Average yield	1,4	t/ha

[84] *Precio FOB puertos argentinos del trigo promedio entre 1997 y 2011*. Fuente: MAGyP - Dirección de Mercados Agroalimentarios - Granos

[85] *Análisis de las variaciones anuales de precipitación en el suroeste bonaerense, Argentina*. Campo, Alicia M.; Ramos, María B.; Zapperi, Paula A.

Gross income /ha	166	US$/ha
Gross Margin /ha	-4	US$/ha
Total Gross Margin	-4,926.680	US$

The set up of the IEWS will allow the producers to adjust their sowing decisions, favoring the best plots and avoiding planting in riskier places where losses would be larger. In this case, the sown area would be 25% lower, yields would be just under the average for a normal year, but higher compared to the situation of not having the information to make productive decisions consistent with climate perspectives.

Table 12: Expected yield and gross margin of wheat in moderate drought years (with IEWS)

Seeded area	893692	ha
Average yield	1,6	t/ha
Gross income/ha	190	US$/ha
Gross margin/ha	20	US$/ha
Total Gross Margin	17,539.110	US$

Ultimately, the IEWS could present a profit of US$ 22,465,789 (difference in the gross margin with and without an IEWS), in the case of moderate droughts occurring on average once in three years.

Similarly, in the case of a severe drought, the impact would occur not only due to a more pronounced decrease in yield (0.8 t/ha), but also because of the total loss of up to 40% in the sown area.

Table 13: Expected yield and gross margin of wheat in severe drought years (without IEWS)

Seeded area	**1191589**	**ha**
Harvested area	**714954**	**ha**
Average yield	**0,8**	**t/ha**
Gross income/ha harvested	**95**	**US$/ha**
Gross Margin/ha harvested	**-75**	**US$/ha**
Total Gross Margin	**-62,781.585**	**US$**

In this case, the forecasts would allow the producers to adjust their sowing decisions, reducing the sown area by 50%, preventing the total crop loss in most cases, and raising the average performance compared to the situation without forecast information. The overall gross margin in this situation would still be negative, but the economic losses would be substantially lower. The economic benefit compared to the situation without Project come then to US$ 46,162,165 during the years of severe drought, which occur on average 15.8% of the years (six of the last 38 years).

Table 14: Expected yield and gross margin of wheat in severe drought years (with IEWS)

Seeded area	595795	ha
Harvested area	595795	ha
Average yield	1,2	t/ha
Gross income/ha harvested	143	US$/ha
Gross Margin/ha harvested	-28	US$/ha
Total Gross Margin	-16,619.419	US$

Finally, an extreme drought scenario was analyzed. In this scenario, at the time of sowing the producers perceive the possibility of a bad year, given these drought events are long-standing. They would decide to sow only half of the usual area they would have sown in a normal year, but anyway there would be a total loss of 50% of the sown area, and yields would fall to extremely low levels.

Table 15: Expected yield and gross margin of wheat in extreme drought years (without IEWS)

Seeded area	595795	ha
Harvested area	297897	ha
Average yield	0,5	t/ha
Gross income/ha harvested	59	US$/ha
Gross Margin/ha harvested	-111	US$/ha
Total Gross Margin	-65,689.062	US$

Under this scenario and counting with predictions of the IEWS, it would be advisable not to sow wheat that year to avoid any losses. That would mean a saving of US$ 65,689,062 in the case of extreme drought, which has a probability of occurrence of 9.2% (every 3 to 4 years during the last 38).

Weighting the economic losses of each kind of drought event by its probability of occurrence, it is concluded that the IEWS has the potential to prevent economic losses in wheat production at a regional scale, worth US$ 20,729,134 each year.

This potential is obviously affected by the degree of adoption of the information generated by the IEWS, and the capacities of local people to make wise decisions based on the climate predictions. These conditions will be promoted by the different components of the Project throughout its implementation, and the related costs correspond to the total costs of the Project. Assuming a conservative approach, it is estimated that by the end of the Project the local population will be able to effectively prevent 10% of that potential, i.e. US$ 2,072,913/year.

However, it should be noted that this value is calculated only on the basis of wheat production, and is thus undervalued. Similar analysis should be addressed on other crops, as well as livestock production. In the case of livestock, adaptation strategies can be more versatile, as it is possible to bring forward the sale of animals and thus save the cost of a supplement to the lack of fodder, considering that the price of the packs usually increase substantially in dry years. Moreover, death losses in breeding animals, which can take years to get over, might be prevented. For example, it is estimated that in the last extreme drought event, the death of animals reached 40% of the stock in the region.

Lastly, in a more comprehensive and complex cost-benefit calculation, further avoided costs of public assistance to the recurrent drought events, and the efficiency of public spending in this area, could also be considered.

Cost-benefit analysis of the IEWS implementation

As stated earlier, the effectiveness of the IEWS on reducing risks requires implementation of all the Project components. Thus, the cost of this single intervention must consider the total of the Project costs. For the purpose of this assessment, the

Project costs will be computed for year zero of Project implementation. Considering a 10-year horizon and with a 12% of discount rate, the **Net Present Value of the costs avoided by the IEWS is of US$ 2,175,730, and the Internal Rate of Return of 20%.**

Integrating all the partial cost-benefit analysis

Table 16 shows the costs and benefits of all the previously analyzed Project activities and impacts. The chart shows the Project flow of funds for five years. From year 5 to 10, the economic situation would be stabilized.

Table 16: Project Flow of Funds (US$)

	year 0	year 1	year 2	year 3	year 4	year 5
Project costs						
Integrated crop & pasture management	1163281					
Land restoration activities	392205					
Water efficiency and irrigation systems	729399					
IEWS	303585					
All other project costs	1,708,347					
Total costs	**4,296,817**	**0**	**0**	**0**	**0**	**0**
Project benefits						
Increased profits from integrated crop and pasture management	0	0	1057873	1410497	1763122	1939434
Increased profits from land restoration	0	0	0	0	1663044	1663044
Increased profits from water efficiency and irrigation systems	0	0	0	0	1173913	1173913
Costs and damage avoided by IEWS	0	0	0	0	2072913	2072913
Total benefits	**0**	**0**	**1057873**	**1410497**	**6672992**	**6849304**
Cash flow	**-4296817**	**0**	**1057873**	**1410497**	**6672992**	**6849304**

Discount Rate	12%
EIRR	53%
NPV	US$ **17,578,259**

The Economic Valuation results, in terms of the described Project activities, present a positive economic return with a Net Present Value (NPV) of US$ **17,578,259,** and an Economic Internal Rate of Return (EIRR) of 53 percent. This value is above the original Discount Rate of 12 percent. It shows that the Project is economically profitable under existing conditions; producers' situation *with* Project is better than *without* Project.

Sensitivity Analysis

A sensitivity analysis was undertaken to assess the robustness of the results of the economic assessment to hypothetical variations in key parameters. There are diverse variables that might be considered as risk factors for the Project, so it is important to assess how that factor can affect obtained economic results. One of the most serious variability factors in this Project is climate variability and change. It is estimated that in the last 38 years, moderate droughts occurred in every one out of three years. Severe drought has a probability of 16 percent, while extreme drought occurs once in a decade[86]. These events affect crop and pasture yields, as well as livestock weight gain and reproductive efficiency. This current variability was already taken into consideration in the economic assessment using average yields of the last decade for all calculations.

The sensitivity analysis scenarios were built considering the climate change incidence. The first scenario assumes ten years of continuous conditions of moderate drought. In that case, the effect on yield reduction is 11 percent, even when adaptation measures are adopted[87].

The second scenario was built considering ten years of continuous severe drought. In this case, yield reduction reaches 33 percent.

The third scenario assumes an extreme drought throughout the Project horizon of ten years. In that case, the income reduction is 72 percent.

An increment on Project costs was not included in sensitivity scenarios as they are fixed by the Project budget. However, it is expected that farmers' costs will also be affected by drought conditions, especially related to beef production and increasing costs of forage. As the sensitivity analysis did not consider these incremental costs for producers, net Project benefit reductions in the three scenarios should be taken as a minimum.

Given these assumptions, the sensitivity analysis results in the indicators presented in table 17.

Table 17: Summary of the Sensitivity Analysis

Climate Scenario	Expected Economic Impact	NPV (US$)	EIRR (%)
Moderate drought	11% reduction in Project net benefits	**15,222,642**	49%
Severe drought	33% reduction in Project net benefits	**10,511,407**	41%

[86] Estimations based on Campo, A., M. Ramos, y P. Zapperi. *Análisis de las Variaciones Anuales de Precipitación en el Suroeste Bonaerense, Argentina*. Proyecto SGCyT 24/G043 "La Geografía Física del Sur de la provincia de Buenos Aires. Relaciones entre el hombre y el medio natural" Universidad Nacional del Sur.

[87] Income impacts of moderate, severe and extreme droughts on wheat production were estimated by Daniel Iurman for this analysis.

Extreme drought	72% reduction in Project net benefits	**2,159,673**	21%

In all the scenarios, the Project still exceeds the limits of the minimal profitability requirement, since the EIIR remains above the Discount Rate. This means that producers' situation is better *with* the Project than *without* it, also in presence of continuous moderate, severe, and extreme droughts within the next 10 years.

ANNEX 13

GENDER STRATEGY FOR PROJECT IMPLEMENTATION

Introduction

Based on a recent World Bank analysis on gender issues in Argentina, the country has made great strides in moving towards gender equality over the past three decades, especially in terms of endowments and economic opportunities. The country stands out as one of the leaders of the Latin America and the Caribbean (LAC) region especially in women's political participation, literacy rates, primary school enrollment and completion, contraceptive use, and a number of other indicators. However, women in the country continue to be disadvantaged in respect to several key development areas such as teenage pregnancy, maternal mortality rates and the share of women in upper management. Respect to these areas, Argentina fares worse than would be expected given its income level.

Furthermore, the country has seen backsliding in some indicators over the past few years in births attended by skilled staff, political participation, maternal mortality, and teenage pregnancy. Very notably in Argentina, significant heterogeneity in terms of gender outcomes exists according to geographic area and socio-economic groups. Finally, while the country has a strong national framework of legislation and institutions to promote gender equality, implementation at the local level varies. Provinces with lower capacity lag behind for instance the city of Buenos Aires.

Women Farmers in the Project Area

Despite numerous consultations by the OPDS, it was impossible to find statistical information at the provincial or local level in order to prepare a gender-sensitive baseline on the Project beneficiaries. Thus, at this stage it was not possible to include more specific gender-sensitive targets in the results framework. Based on the local consultations, however, it is estimated that between 10 and 15 percent of the potential beneficiary farms within the Project area are female-headed. The reasons for this are diverse, but in most cases women have taken over the agricultural work of their spouses when men have fallen ill or passed away. In general, in most of the small and medium sized farms, women accompany men in various daily tasks besides taking care of children and housekeeping. It is also pretty common that in farmer families with young children, the mother has moved to a town with the children in order to have better access to basic education and health services, and the husband stays in the countryside to carry on with the farm.

A qualitative gender study of rural geography of the Southern National University in the horticultural belt of the city of Bahía Blanca states that women's work in farms is fundamental and highly significant for the operation and permanence of the farm[88].

[88] Lic. Belén Nieto, María; Lic. Ferrera, Lida María (2010): *Trabajo, Identidad y Género en el Cinturón Hortícola de Bahía Blanca (Argentina). ¿Problemas de Desarrollo Rural?* A paper presented at the VIII Latin American Conference on Rural Sociology, Porto de Galinhas, 2010.

However, as women work simultaneously on housekeeping and farming, their productive work oftentimes remains invisible. Thus, the paper emphasizes the importance of a gender focus in rural development: it is critical to "diversify" and "specify" capacities, roles, and needs of men and women, giving each person a decisive role in development, based on equal conditions and securing benefits to all in an adequate manner.

The women interviewed for the paper were themselves undervaluing their own work as "family support" rather than actual work. Work was observed to have a heterogeneous meaning and value among the interviewed women respect to the role it has in shaping their identities and individual and collective empowerment. For the majority of the women, rural work has first and foremost an economic value in supporting the family; perceived more like a further reproductive task instead of productive work.

In the Project area, oftentimes men take production-related decisions while women are in full charge of housekeeping and health and education of the children. However, the paper states that in many cases especially women are key motors to guide families away from different crisis by diversifying families' livelihoods. This they do by expanding their activities to sewing, knitting, crafts, production of edible regional and artisanal products, and domestic service. This can create tensions within families as the men find their traditional role of protector and provider of the family questioned.

The paper concludes by stressing the importance to revert the existing inequalities through interventions of rural development that include processes of empowering women. To do so, it is necessary to promote women's self-esteem and aim at searching for equitable benefits for men and women based on the principles of democracy and human rights.

Focusing on Strengthening Women's Agency

Following the World Development Report 2012 on Gender Equality and Development, "agency" represents one's ability to make choices to achieve desired outcomes. Based on recent findings of analytical work of the Poverty, Gender and Equity Group of the World Bank LAC region, the Project will promote strengthening of farmer women's agency/empowerment through the Project activities such as the gender-sensitive program on appreciation of the local culture and products, the role of farmers and their family in society.

Strengthening women's agency seems to be a catalyst that makes women able to make use of endowments and take up economic opportunities. In Nicaragua, a pilot initiative called Attention to Crises (*Atención a Crisis*), as well as evidence from analytical work in Peru and Brazil show that agency-enhancing interventions have a positive impact on other development outcomes, particularly on promoting and sustaining economic opportunities. In concrete terms, this can mean for instance pairing vocational training with life skills training or promotion of social interaction of women's groups with women leaders.

The referenced project combined a traditional Conditional Cash Transfer (CCT) aimed at improving health, education and nutrition with additional interventions to increase the asset base and risk management capacity of rural poor households exposed to droughts. While all beneficiary women received the cash transfers, one-third of them received an additional scholarship to send one household member to a vocational training course, and another third received a business grant and technical assistance for productive investments in livestock or non-agricultural activities. An evaluation of this pilot provides evidence on the role of social interactions in enhancing productive investments.

In particular, social interactions with female leaders of those women who randomly received the productive transfer substantially increased program impacts on both human capital investments and income diversification, as well as affected women's attitudes towards the future. In fact, women who received the productive grant and worked in non-agricultural self-employment increased their incomes by an additional 100 percent (in addition to the overall program impact). This related to situations where all the leaders around the women had also received the productive grant.[89]

Action Plan to Facilitate Equal Access to Project Benefits

The Project will support women within the Project area to take a champion role in facilitating socio-cultural change needed for building climate resilience of farmer families. Women are thus expected to contribute to the Project results in a substantive manner, and gender aspects will be integrated into relevant Project activities in a cross-cutting manner. This will get started by including a specific gender approach in the terms of reference of the Project staff, and providing them gender training as needed. During Project implementation, the steps to follow are outlined below to ensure gender-sensitive planning, implementation and monitoring.

To get started with a robust gender-sensitive approach, the Project will need to collect a respective baseline of the potential Project beneficiaries. This will be done by the end of 2012 by carrying out a specific survey that the Council of the Development Plan of the SWBA Province contracts with the Southern National University, specifically under the auspices of Mr. Guillermo Lucanera, Administrative Secretary of the UNS. The survey is planned to start in mid October, and the data collection and processing will be conducted within two months. The survey will be rooted in the results of the last agricultural survey/Agricultural Campaign of 2010 to provide information on female farm owners as well as the role and activities of women within farmer families. Further, women will be asked whether they perform other productive work.

During the initial stage of Project implementation, a specific gender analysis will be conducted among farmer families in the counties of direct Project intervention. This analysis will as well be supported by the UNS, focusing on the planned activities to make sure that women's and men's needs and interests are sufficiently differentiated to be able to provide gender-sensitive support for their aspirations. This could also mean

[89] From an English version of *Una Revolucion de Genero en Marcha?* – WB 2011 (Renos Vakis et al).

that women were not the main target group, as one potential outcome could be a need to focus on boys and their economic opportunities.

The analysis will build upon the results of the baseline survey and a desk review of existing research. Importantly, it will include a qualitative assessment based on consultations with women and men farmers and/or producer groups in the target area, as well as an agency component. The analysis will aim at ensuring that women's participation in productive activities and promotion of more sustainable approach to land will be described and analyzed and their voice heard at the local level, respecting their participation in communities and access to relevant services. It will facilitate the final design of the Project activities so that both women and men participate in and benefit equally of the planned activities.

Further ideas on how to get started and move forward with a robust gender strategy include:

- Identifying and engaging/directly hiring women involved in extension services and/or women leaders from the local to the national level.
- Preparing a gender-sensitive communication and knowledge management strategy on local adaptation approaches as described in annex 8 to secure that women become aware of the Project and can get engaged in its final design stage and along implementation.
- When identifying the direct beneficiaries with whom the Project will work on the ground, women will be specifically invited.
- Consultations and other meetings will be organized at times when women are not tied up with childcare, and/or childcare will be provided in cooperation with interested people/by providing small income to youth in order to facilitate women's participation.
- When reporting on the Project results at different levels and through different means, special focus will be placed on successful participation of women to promote visibility and valuing of their work.

It is worthwhile to mention that most of the referred activities won't depend on specific budgetary support, but rather on questions of approach and leadership.

In order to measure progress, the Project incorporates various gender-sensitive indicators. Gender-sensitive monitoring will be further applied beyond the specific indicators when recording Project participants as initially reflected in the results framework. After having completed the beneficiary baseline and gender analysis at the beginning of Project implementation, the gender-specific targets as well as indicators will be revised as needed.

Depending on the baseline and the gender analysis results, the Project could apply for additional grant funding to conduct a gender impact evaluation. Regional WB gender specialists are currently leading a 'Regional Initiative on Impact Evaluation to Bridge Knowledge Gaps on Gender Issues'. The overall objective of this initiative is to fill a critical constraint to gender mainstreaming by generating innovative evidence of what works (and for whom) to promote women and girl's economic empowerment in LAC.

Another important objective is to build knowledge and capacity of local partner agencies on the generation, use, and promotion of evidence-based policy-making on gender. Finally, the initiative will support the development of best practices in measurement of female economic empowerment.

As part of this initiative, the Project can benefit from technical support in respect to its impact evaluation design and implementation. Additionally, as part of the on-going gender-mainstreaming within the WB, additional resources will be available for task teams to apply in order to pilot innovative work on gender. Within the Argentinean country context, a specific consultation platform on gender and the WB portfolio is being created to promote discussion with gender specialists and other interested external stakeholders. The Project will be able to tap into these new initiatives to search for synergies and benefit of technical support by dedicated professionals within the region. Cooperation has already been initiated to carry out the initial gender survey. Furthermore, specialized support will be available for writing funding proposals in case there is a strong need and demand for further gender work within the Project context.