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
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Washington, DC. 20433
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Email: secretariat@adaptation-fund.org

ADAPTATION FUND

DATE OF RECEIPT:
ADAPTATION FUND PROJECT ID:
(For Adaptation Fund Board Secretariat Use Only)

PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

PROJECT/PROGRAMME CATEGORY:	REGULAR SIZE PROJECT
COUNTRY/IES:	URUGUAY
TITLE OF PROJECT/PROGRAMME:	**BUILDING RESILIENCE TO CLIMATE CHANGE AND VARIABILTY IN VULNERABLE SMALLHOLDERS**
TYPE OF IMPLEMENTING ENTITY:	
IMPLEMENTING ENTITY:	**ANII**
EXECUTING ENTITY/IES:	**MINISTRY OF AGRICULTURE, LIVESTOCK AND FISHERIES**
AMOUNT OF FINANCING REQUESTED:	**10 MILLION** (IN U.S DOLLARS EQUIVALENT)

PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

The agricultural sector

1. The agricultural sector is regarded as the backbone of the Uruguayan economy: it has represented around 14% of GDP in the past years but represents two thirds of exports including primary and processed products. Livestock, crops and forestry have presented average annual growth rates of 4% in the past decade, slightly over the overall GDP growth, leading the upturn of the economy after the devastating crisis of 2002-2003 (caused by financial turmoil and aggravated by a foot-and-mouth disease outbreak). Agriculture could benefit from the boost in commodity prices of the past few years and experienced a remarkable modernization, led by large and medium farmers that are developing business oriented-smart-agriculture systems that enhanced the specialization of the country as a net exporter of agricultural products, either natural or primary processed.

2. Smallholders[1] according to the last Census were estimated at 32.700, representing nearly two thirds of all farmers, and occupying 15% of total agricultural land. The sector contribution to total output in relatively labour-intensive farming activities –yielding higher land productivity levels- is significant (slightly over 50% for vegetables and nearly 40% for fruits). Nonetheless, more than half of smallholders are engaged in extensive livestock production with low productivity levels. These small livestock farmers are mainly engaged in cattle and sheep (rearing or complete closed

[1] The Ministry of Livestock, Agriculture and Fisheries defines Smallholder as a farmer that complies with the following: a) having no more than 2 permanent workers or its temporary equivalent; b) farming no more than 500 ha CONEAT Index 100 (average soil productivity) regardless of the type of land tenure; c) being the farm the main source of income and being the farm the main workplace for the farmer; and, d) dwelling in the farm or in a village no further than 50 km from the farm.

cycle), representing 22% of total output and directly competing with large and medium farmers, lagging behind in productivity and with no prospects to develop smart-agriculture systems without support from the public sector.

3. High investments in the crop and forestry sector and their processing industry contributed to a sharp increase in production and exports that caused a strong upward pressure on land prices and leases. The livestock sector has also increased productivity but at a slower pace. Smallholders without support are more and more unable to achieve the productivity levels required to remain in business and adopt subsistence strategies that increase stocking rate as a means to raise income. The result is an increased pressure on natural resources and higher vulnerability to Climate Change (CC).

Climate Change and Vulnerable Groups

4. Total land area of the country is 17 million ha, 77% is pasture and grassland suitable for livestock. The Uruguayan climate is warm temperate and sub-humid rainfall pattern characterized by strong variability and hydro deficits mainly in the summer caused by increased evapotranspiration. The average annual rainfall is 1200 mm, though there is evidence that the rainfall patterns have changed, increasing average annual rainfall, particularly in spring.[2] Regarding CC, the main threat is the increase in variability of rainfall, including extreme events[3] [4] [5].There is evidence that the already high variability of Uruguayan rainfall pattern has increased in the last years[6] resulting in more uncertainty and inadequacy of past experience and adopted practices to respond to the new scenarios. Farmers have perceived this process, expressing concern in the consultation conducted for the design of the project, providing simple examples that have affected their production management, habits and income.[7]

5. Rainfed natural grasslands ecosystems are the basis of livestock production, particularly for smallholders where rainfall water management infrastructure (e.g. reservoirs) is deficient and scarce. The most disruptive events for cattle and sheep

[2] The Fourth Report of the IPCC has concluded that projections for the XXIst century based on IE-EE scenarios are the following: almost certain (99% likely) that days and nights will be warmer and less cold in most surfaces; almost certain occurrence of hot periods or heat waves; quite likely increase in frequency of intense rains in total rainfall; likely increase in drought affected areas; likely increase in the probability of intense tropical cyclons; likely increase in the incidence of higher sea level.

[3] Giménez, A. AIACC LA 27 Final Report. Climate change/variability in the mixed crop/livestock production system of the Argentinean, Brazilian and Uruguayan Pampas: climate scenarios, impacts and adaptive measures. 2006

[4] Barros, V; Clarke, R; Silva, P. El Cambio climático en la Cuenca del Plata. CONICET. Argentina. 2006.

[5] Cruz, G; Bettolli, ML; Rudorff, F; Altamirano, MA; Martinez Ortiz, A; Arroyo, J; Armoa, J. Evaluación de la vulnerabilidad actual y futura de los sistemas pastoriles frente a la variabilidad y al cambio climático: caso Uruguay. In Semana de reflexión sobre cambio y variabilidad climática, Facultad de Agronomía, UdelaR. Montevideo, 2007

[6] Caffera, RM, Doctoral Thesis and Caffera, Cuello and Salaberry, Variabilidad en las precipitaciones, 2007, Caffera, Munka and Cruz, Erosion induced by CC, 2008, and Caffera RM, and Oyhantcabal W, Algunos cambios en la variabilidad de la precipitación sobre territorio uruguayo, 2009

[7] Equipos Mori, Technical Assistance to MGAP for the AF Project: "Estudio de percepción sobre la problemática del Cambio Climático y el manejo de opciones de adaptación", ANNI/MGAP, September 2011

farmers are agro-meteorological droughts; in addition less severe and very frequent water stress periods also cause significant economic damage. Overcoming the impact takes one complete biological cycle and the effects are usually widespread throughout the country and the region. The record of severe droughts (1916-17, 1942-43, 1964-65, 1988-89, 2008-2009 and 2010-2011) and moderate droughts (2000 and 2006) show an increase in frequency of this extreme climate event that has devastating effects. As regards the uncertainties, General Circulation Models (GCM) have shown reasonable capacity to forecast long term trends, particularly in temperature, whereas variability models have not been able to represent interannual trends in an adequate manner[8]. Historic data analysis is useful but the ability to forecast future trends is limited in CC scenarios. Nevertheless according to the AR4 of the IPCC, the likelihood of more frequent droughts is established between 66 and 90 per cent.

6. Extreme meteorological events affecting agriculture have devastating effects on the Uruguayan economy. For example, the direct losses of the livestock sector caused by the 2008-2009 drought were estimated at USD 342 million and the induced impact on the economy as a whole at over USD 1 billion, having a higher negative multiplying effect than a crisis in any other economic sector and negative effects over time as a result of the production cycle (e.g. in 2008 the pregnancy rate at national level decreased from 78% to 53% meaning 700.000 less calves in the following year and the mortality rate increased 33%).

7. Assessments of Impacts and Adaptations to Climate Change (AIACC) initiative has confirmed key vulnerabilities of Uruguay to Climate Change in coastal areas and fisheries, but has not focused on the risks for agriculture. There is an AIACC study "LA 27" dated 2005 that focused on mixed crop/livestock production systems, including sown pastures. This study relates only to the intensive livestock production systems in rotation with crops, in the deep and fertile soils of the southwest area of Uruguay. The study did not include the assessment of impacts on extensive livestock systems based on natural grasslands. Information on exposure to CC in intensive livestock areas can be extrapolated to extensive systems, but the sensitivity and adaptive capacity cannot and was not assessed. In fact, the country lacks an in-depth assessment of the vulnerability of the livestock extensive systems to CC at a national level, which is currently starting in the Ministry of Livestock, Agriculture and Fisheries (MGAP) under the FAO TCP/URU/3302 (2011-2012), and whose results would provide valuable data for this project.[9]

8. The increased average level of precipitation over 1200 mm is not expected to represent a major threat for natural grasslands and its ability to promote successions of woody vegetation or savannahs as the grasslands are grazed by cattle and sheep (in the absence of grazing natural successions would evolve to a higher cover with woody vegetation). The Biome Pampa configuration took some 11.000 years combining climatic and harvesting processes (grazing) and is in stable condition. Frosts have an

[8] Barros, V; Clarke, R; Silva, P. El Cambio climático en la Cuenca del Plata. CONICET, Argentina. 2006.
[9] The TCP is ongoing and has had some delays in start-up, which means that the key outputs will be available at the end of 2011 and in 2012.

impact on production in autumn and winter. Normally first frosts occur by the end of April or in May, and late frosts occur in August. There are evidences of shortening of the frost period in Uruguay, as a consequence of the observed increase in minimum temperatures, which could bring about a positive impact on grassland productivity.

9. The likely climatic scenarios for the country as a whole were analyzed in 2005 through downscaling using the PRECIS model to 50x50 km resolution (Providing Regional Climates for Impacts Studies), developed at the Hadley Centre, UK Met Office. The results indicate that it is quite likely to expect that highest temperatures would rise by 2º and lowest temperatures by 4º by 2050. Average monthly rainfall would increase between 10 and 20 mm, meaning a total increase of annual precipitation between 120 and 240 mm. Long term projections also point out that there would be a slight decrease in the average number of days with frost, a significant increase in the number of hot nights, an increase in the length of heat waves, and a significant raise in the intensity of precipitations. Regarding variability and extreme events the model could not provide information on future scenarios. The climatic scenarios for the livestock sector are more uncertain since the models cannot provide adequate forecasts on extreme events. The performance of extensive rainfed livestock systems is highly dependent on the interaction between climate and soil water storage capacity and farm infrastructure for water management. The Fourth Report of IPCC indicates that the likelihood of increase of droughts at global level is almost certain. Furthermore, since Uruguay is highly influenced by El Niño/La Niña, an increase in frequency of such events may increase variability and occurrence of extreme events. In Uruguay El Niño is usually associated to wet weather and La Niña to dry weather and lack of rainfall. To establish medium term (2020 or 2030) trends and variability, the usual approach is to study the past variability. The available studies on past variability in Uruguay are scarce and this is one of the shortcomings that the TCP FAO-MGAP/3302 will address. Major outputs will be available by the end of 2011 and used for this project.

10. Figure 1 presents maps of the country showing the water content in soil in January over the period 2000-2012, being in red the areas with severe water shortages. These maps present evidence of four droughts in the past twelve years. Map 1 shows the water storage capacity of Uruguayan soils, being the greener areas the ones with deeper soils and high absorption and storage capacity and the white and light green areas the ones with the lowest storage capacity.

Basaltic Cuesta and East Hills Eco-Regions

11. A broader perspective of the risks involved is given by the eco-region approach, which integrates territorial and environmental dynamics to identify land (or water) units with functional and environmental significance for strategic planning and environmental management. A study hired by the MGAP in 2011 has identified seven eco-regions for environmental management[10]. The eco-region is a relatively large portion of land (or water) that contains a distinctive ensemble of natural communities, characterized by

[10] Convenio MGAP/PPR – CIEDUR: "Mapa de ambientes de Uruguay y distribución potencial de especies", Montevideo, Marzo 2011

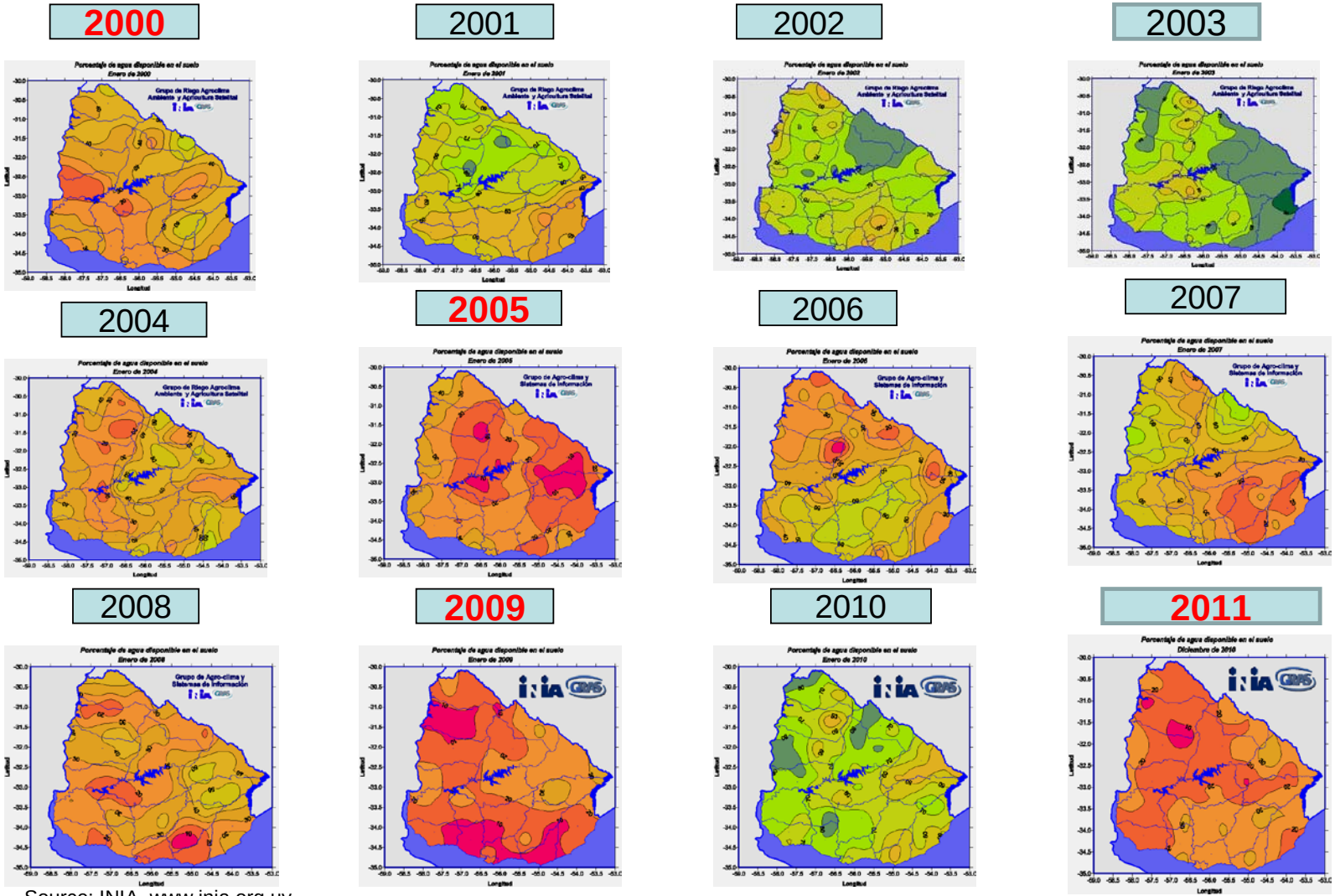
sharing most of the species, in a similar framework of environmental conditions and dynamics.

12. The study gathered information regarding physical characteristics of the environment (soil, climate, relief and geology, among others), biodiversity (wooded species and vertebrates), socio-economic data (agriculture, livestock, forestry, urbanization and population) and systematized them in a GIS. This data base led to a hierarchical classification of the country's environments, including 8 large districts defined by relief, 95 environments defined by their edaphological and geomorphological attributes, which in turn comprise 125 sites according to their land use and vegetation. Subsequently, these ecosystems were assessed in order to identify the eco-regions suitable for environmental management and territorial planning. These eco-regions are defined by their ecological attributes, environmental conditions and dynamics. Seven regions were identified: West Sedimentary Basin, Gondwanic Sedimentary Basin, Basaltic Cuesta, Crystalline Shield, Merin Lagoon Graben, Santa Lucia Graben and East Hills. Figure 2 presents the main characteristics affecting soil sensitivity to droughts and Map 2 presents the eco-regions. Figures 3 and 4 present the relationship between the different levels of landscape classification for the Basaltic Cuesta and the East Hills eco-regions. Each eco-region has its districts and, in turn, each district is composed of nested sites, whose pattern is detailed in the right bottom corner (see Figures 2, 3 and 4 and Map 2).

13. The most vulnerable eco-regions to droughts and hydric stress correspond to the Basaltic Cuesta eco-region[11] in the North / North-West of the country, with most of its area in the departments of Artigas, Salto, Paysandú and Tacuarembó and the East Hills eco-region[12], South East / East of the country, mostly located in the departments of Treinta y Tres, Lavalleja, Maldonado and Rocha (see Map 2). The Basaltic Cuesta covers 4.1 million ha and the East Hills 2.4 million ha, both regions together representing 39% of national territory.

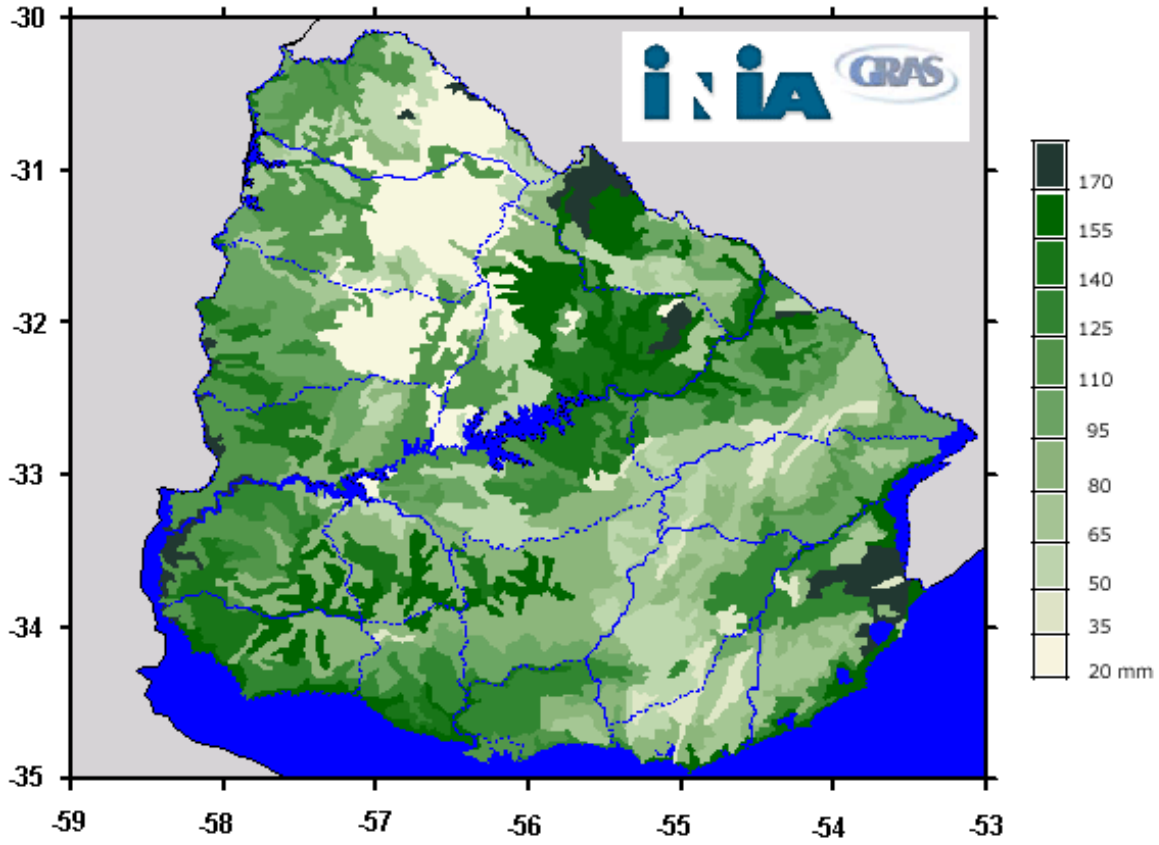
[11] The Basalto Region of superficial soils comprises the Soil Units Cuchilla de Haedo, Curtina, Masoller and Queguay Chico.
[12] The East Hill Region comprises the Soil Units Sierra de Polanco, Jose Pedro Varela and Santa Clara.

Figure 1
Water content in soils in January (red = very low, green = high)



Source: INIA, www.inia.org.uy

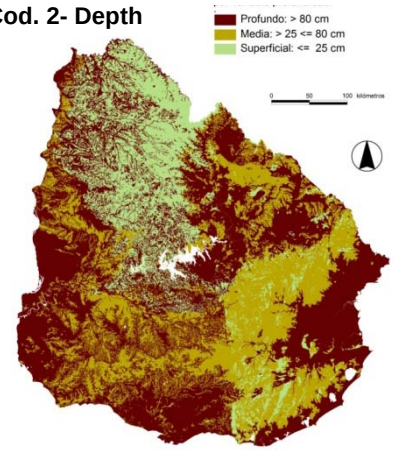
Map 1
Water storage capacity of soils



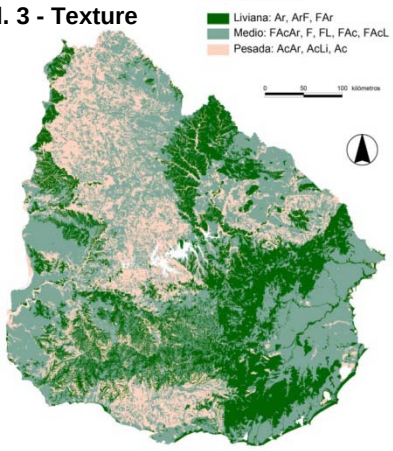
Source: INIA www.inia.org.uy

Figure 2
Main characteristics affecting soil sensitivity to droughts

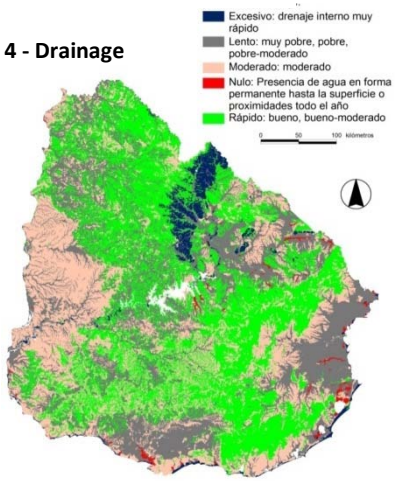
Cod. 2- Depth



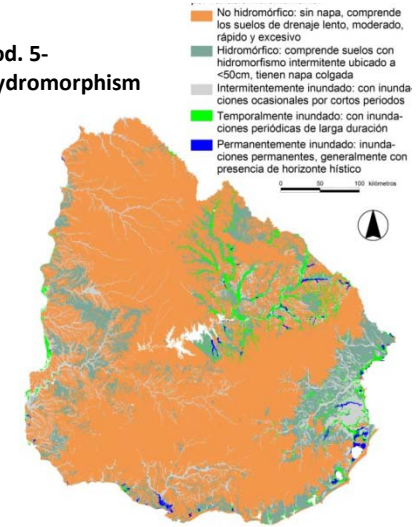
Cod. 3 - Texture



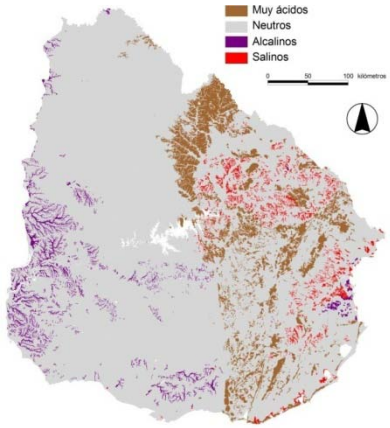
Cod. 4 - Drainage



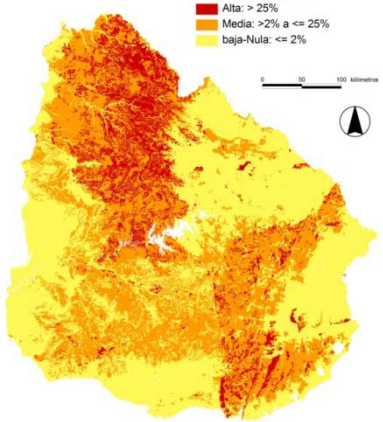
Cod. 5- Hydromorphism



Cod. 6 - pH / alkalinity

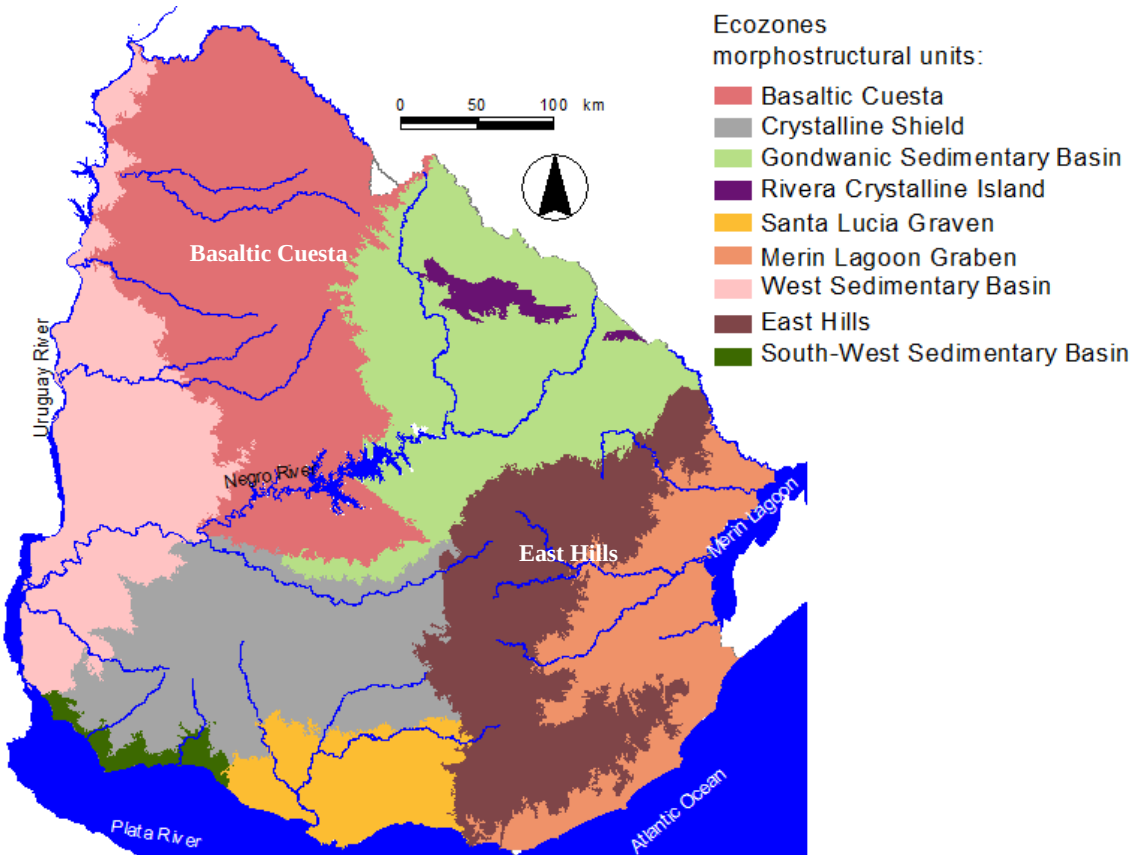


Cod. 7- Stoneniness



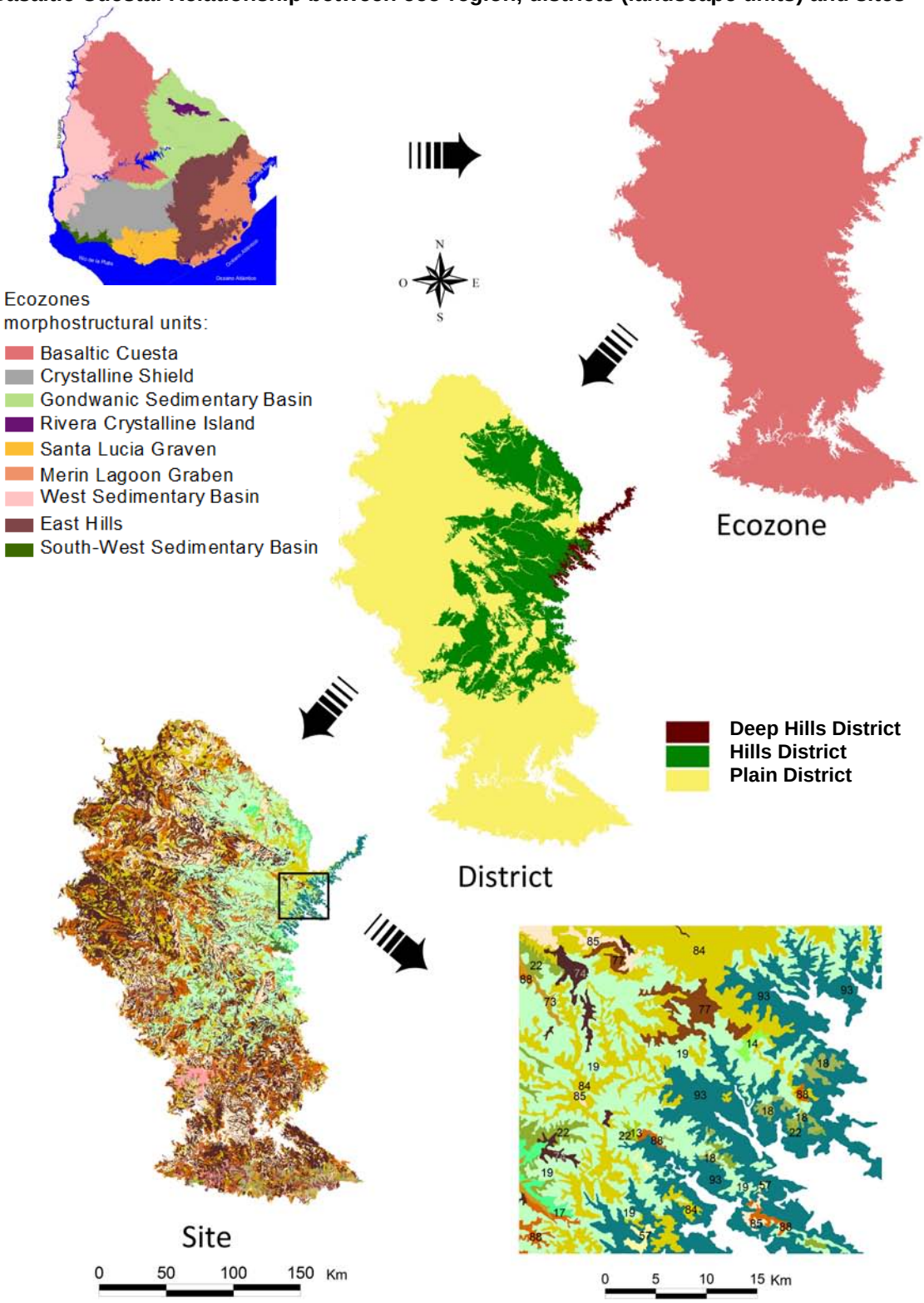
Source: Convenio MGAP/PPR – CIEDUR: “Mapa de ambientes de Uruguay y distribución potencial de especies”, Montevideo, Marzo 2011

Map 2
Basaltic Cuesta and East Hills eco-regions



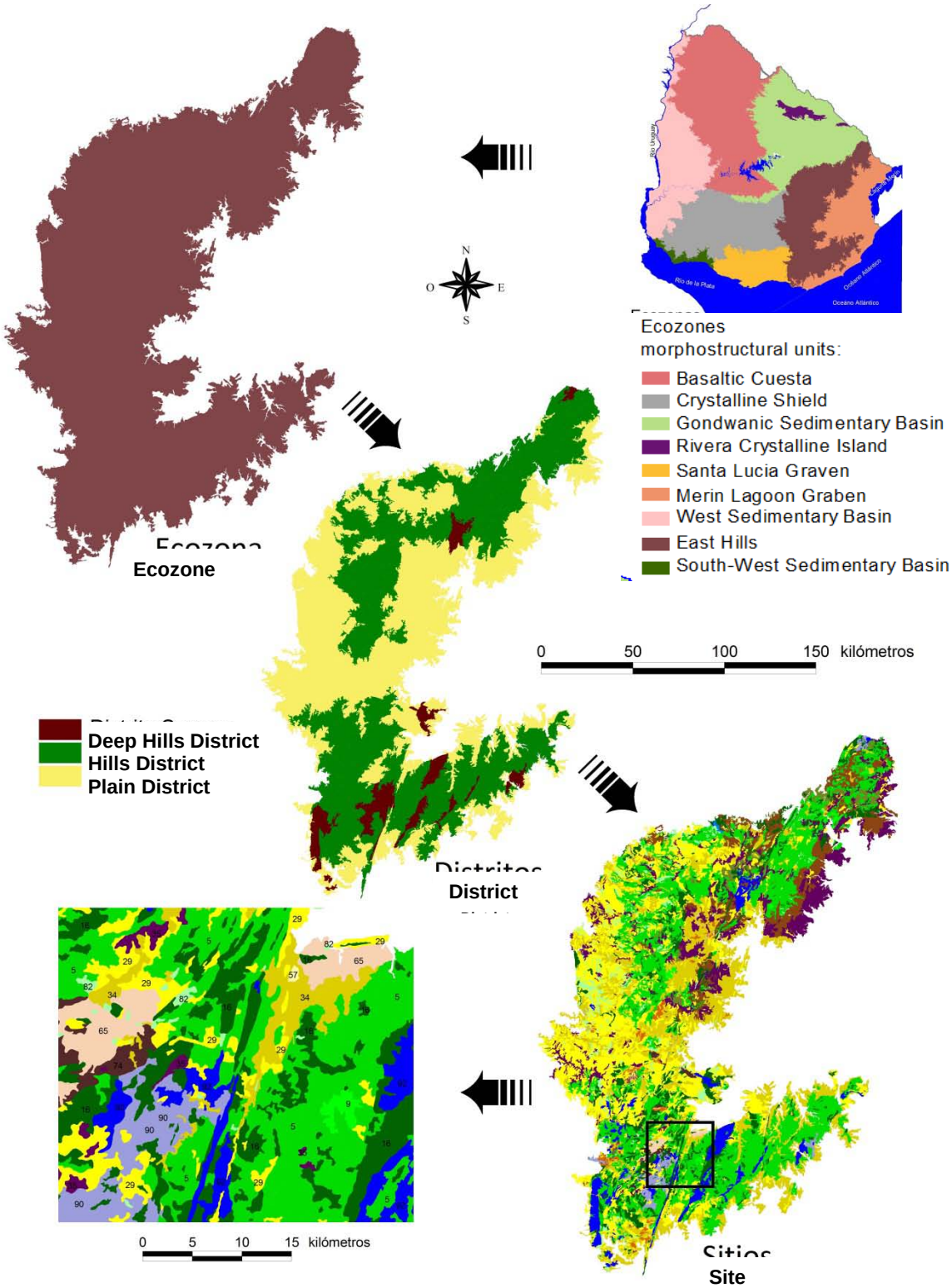
Source: Convenio MGAP/PPR – CIEDUR: "Mapa de ambientes de Uruguay y distribución potencial de especies", Montevideo, Marzo 2011

Figure 3
Basaltic Cuesta: Relationship between eco-region, districts (landscape units) and sites



Source: Convenio MGAP/PPR – CIEDUR: "Mapa de ambientes de Uruguay y distribución potencial de especies", Montevideo, Marzo 2011

Figure 4
East Hills: Relationship between eco-region, districts (landscape units) and sites



Source: Convenio MGAP/PPR – CIEDUR: "Mapa de ambientes de Uruguay y distribución potencial de especies", Montevideo, Marzo 2011

14. The soils of the Basaltic Cuesta are developed on basic effusive rocks (basalts) of the Arapey Formation from the cretaceous period. Main relief is plain with ridges linked to the drainage channels and the presence of hills and steep hills, to a lesser extent in the W-SW area of the ecozone. Main soils are superficial and extremely superficial (between 5 and 15 cm), even on flat relief, and with important rockiness. It comprises the MGAP soil groups Masoller, Cuchilla de Haedo, Curtina and Queguay Chico.[13] These soils present significant spatial variability and important differences in botanic composition, requiring specific management practices. Number and location of subdivisions are critical for sustainable management, but they have been done regardless of prevailing grasslands conditions, prioritizing access of livestock to natural sources of water.[14]

15. Deep soils are associated to valleys and alluvial plains, as well as small surfaces distributed as a complex mosaic in a gently rolling plain. Superficial soils present medium and heavy textures (Litosols) and the deep and moderately deep present heavy textures (vertisols or vertic molisols). Predominant vegetation is winter cycle grassland in heavy soils or mixed grassland (C3 and C4 species) in medium texture soils. It is important to underline that comprises the main species of high forage value still present in the Pampa Biome, such as *Stipa setigera, Paspalum pumilum, Paspalun notatun and Poa lanigera*. The drought risk is extremely high in the superficial soils and medium to high in the other areas.

16. The relief of the East Hills eco-region is hilly, with stony soils. The stoniness could be as high as 50% of the area in the steepest hills. The geological material is composed of acid igneous intrusive and metamorphic rocks, constituting the Don Feliciano Belt. Main soils are superficial, with sand texture, acid to very acid. It comprises the soil groups Santa Clara and José Pedro Varela.[15]

17. Main vegetation is summer cycle wooded grassland and steep valley forests. Drought risks are high. The Northern part of the eco-region presents the greatest diversity of wood species and vertebrates, with a high proportion of native species, currently endangered by the afforestation with eucalyptus. This area represents the source of the drainage channels used for irrigation and water consumption and therefore are of great importance for maintaining the water discharge of main rivers used for this end. The importance of this eco-region lays on its capacity to retain water in the rock diaclasis (crevices), maintaining the stability of the river discharge that it serves.

18. Livestock sector in Uruguay is mainly concentrated in these two eco-regions and based on grazing by cattle and sheep of temperate native

[13] Dirección de Suelos. 1979. Carta de Reconocimiento de Suelos del Uruguay. Tomo III. Descripción de las
Unidades de Suelos. Montevideo, Dirección de Suelos - Ministerio de Agricultura y Pesca. 452 p.

[14] This is consistent with the main concern expressed by farmers in the consultation conducted for project design: lack of water for animal consumption.

[15] Dirección de Suelos. 1979. Carta de Reconocimiento de Suelos del Uruguay. Tomo III. Descripción de las
Unidades de Suelos. Montevideo, Dirección de Suelos - Ministerio de Agricultura y Pesca. 452 p.

grasslands, part of the Pampa Biome with great biodiversity. Natural dry matter production of these grasslands is not only the basis for the international competitiveness of the sector, but also provides a highly valuable source of resilience to the impacts of CC.

19. The grasslands ecosystems of the Basaltic Cuesta are characterized by an average annual dry matter production of 3,300 kg/ha, with high inter-annual variability explained by rainfall. According to the National Agricultural Research Institute (INIA), the annual dry matter production could be reduced up to one third (1,300 kg/ha/yr) in drought periods. Dominant species in superficial soils of Basaltic Cuesta are C4 summer grasses: *Schizachyrium spicatum, Chloris grandiflora, Eragrostis neessii, Eustachys bahiensis, Microchloa indica, Bouteloua megapotamica, Aristida venustula and Aristida uruguayensis*. These eight species explain more than 70% of the total net primary productivity.

20. Grass production in the East Hills may range from 2,300 to 3,800 kg DM/ha[16]. Typical grasses of this region are *Paspalulm pumilum, Paspalum notatun, Aristida sp., Danthonia sp., Microchloa indica, Bothriochloa laguroides, Axonopus compressus, Stipa charruana and Andropogon lateralis*.

21. Droughts usually occur in spring and summer as a combination of lack of rainfall and high evapotranspiration, affecting dramatically the forage availability for cattle: roughly two thirds of the grass is produced in these two seasons in years with a normal rainfall pattern. In Uruguayan climate, cows are nursing calves in spring, raising nutritional requirements, and breeding takes place in summer. Any CC trend meaning an increase in variability and frequency of extreme events may bring significant negative impacts for the production systems, farmers and the national economy, whose performance is based on the use of natural resources.

22. Table 1 shows the number of livestock farmers, area and number of cattle and sheep per land size in the Basaltic Cuesta and East Hills eco-regions (see Annex 1). Around 15.500 livestock farmers[17] are located in these two regions, out of which 85% would fall under the category of smallholder (under 750 ha, corresponding to approximately 500 ha CONEAT Index 100). There are three main categories of smallholders[18]: consolidated smallholders, earning enough income to sustain the family and invest in the plot; transition smallholders, earning sufficient income for family consumption but not enough for investing in the farm and with limited access to financing sources, being therefore highly dependent on public programmes to sustain their livelihood; and, subsistence smallholders, mainly producing for own consumption and whose agricultural income is not enough for family consumption, meaning that these farmers and their families require additional income sources (temporary jobs, pensions and transfers from social programmes). A proxy to the transition group in Table 1 would be livestock farmers between 51 and 750 ha of land: their farm is large enough for the family to rely on farm income and it is below 500 ha CONEAT Index 100.

[16] IPA, Marcos Martínez, personal communication.
[17] Statistical data is based on the 2010 DICOSE Declaration.
[18] World Bank, "Uruguay, El Desarrollo de la Agricultura Familiar", Report Nr. 55220 UY, July 2010

Table 1
Livestock farmers, land and animal heads per farm size per Eco-region [a/]

Eco-region / land size	Nr of farmers	%	Total Land (ha)	%	Sheep (heads)	%	Cattle (heads)	%
Basaltic Cuesta								
0 – 50 ha	1.847	27	32.466	1	40.852	2	71.638	2
51 – 750 ha	3.412	50	1.026.436	25	666.813	26	1.066.397	30
+ 750 ha	1.570	23	3.000.329	74	1.873.350	73	2.384.292	68
Subtotal Basaltic Cuesta	6.829	100	4.059.231	100	2.581.015	100	3,522.327	100
East Hills								
0 – 50 ha	2.780	32	59.412	2	56.388	3	63.783	5
51 – 750 ha	5.234	60	1.192.646	50	869.608	52	744.414	62
+ 750 ha	737	8	1.142.285	48	760.757	45	396.885	33
Subtotal East Hills	8.751	100	2.394.343	100	1.686.753	100	1.205.082	100
Basaltic Cuesta + East Hills	15.580	30	6.453.574	42	4.267.768	55	4.727.409	43
Uruguay (DICOSE 2010)	51.675	100	15.403.628	100	7.709.527	100	11.092.285	100

a/ Information presented in this table is based on the 2010 declaration to DICOSE by livestock farmers, thus corresponding to the situation at June 30, 2010.

Source: CIEDUR, Technical Assistance to MGAP for the AF Project: "Selección de áreas vulnerables para la gestión de riesgo a la variabilidad y el cambio climático en agro-eco sistemas ganaderos de las ecoregiones Cuesta Basáltica y Sierras del Este", ANNI/MGAP, September 2011

23. Both eco-regions concentrate 30% of national livestock farmers, 42% of total land, 55% of sheep and 43% of total cattle. Smallholders (0 to 750 ha) account for 85% of livestock farmers, 35% of land, 38% of sheep and 41% of cattle. The importance of these regions for the livestock sector and for the economy as a whole lays on their specialization in rearing, meaning that any negative impact of droughts or water stress has multiplier effects in other areas specialized in fattening and affects the industrial sector as well.

24. Livestock smallholders are more vulnerable to agro-meteorological droughts. They are mostly located in superficial soils with low water storage capacity, lacking the aptitude to bear long hydro-stress periods. In the Basaltic Cuesta, 72% of total area is covered by superficial soils, while this percentage for the area under control of smallholders increases to 77%. In the East Hills, the superficial soils cover 69% of total area whereas the soils of smallholders' farms have 74% of superficial or moderately superficial and light soils.

25. Sensitivity of smallholders to hydric stress is increased by inadequate management of stocking rates in areas with a high proportion of superficial soils. Small farmers manage stocking rates over the carrying capacity. Actual average socking rate is about 0.75-0.80 Livestock Units/ha. Considering a production of 3,200 kg DM/yr, a harvesting rate of 55%, and livestock unit requirements of 2,700 kg DM/yr, the stocking rate should not exceed 0.6 in normal years. These high stocking rates decrease individual animal performance and degrade native grasslands and, through overgrazing, undermine the resilience of their own productive systems in the long run. As grass growth is not evenly distributed along the year, farmers should adjust the stocking rates regularly, rotate paddocks and introduce early weaning, but these have not become a widespread practice among smallholders as yet. In addition, the variability in annual grass production is very high, with variability coefficients ranging from 33 to 51 per cent. As a result, overstocking and overgrazing are

usual and become a major source of risk as animals rapidly exhaust the forage capacity leading to critical situations. Overgrazing modifies the structure of grasslands, decreasing aboveground biomass, grass height, canopy cover and proportion of winter grasses. The nutritional deficit triggers a sequence of losses caused by low market prices due to saturation of sales, a downfall in reproductive performance, an increase in mortality rates and a decrease in assets and income that lasts for at least three years.

26. Larger farmers are able to introduce adaptation strategies such as providing supplementary feeding or leasing greener areas to move their stock. These strategies are not efficient as an overall response to the event and smallholders lack the financial capacity to adopt them due to the scarcity of small plots for lease and the increase in land lease prices. As a result, in face of a drought the vast majority of small livestock farmers end up poorer and in risk of not being able to sustain their livelihoods, compelled to sell their land and migrate to the shanty towns in sub-urban belts. In the past decades smallholders used to respond to climate (and forage) variability adjusting the stocking rate via paying for grazing in other farmer's lands with stock below their carrying capacity. But this adaptation mechanism is no longer available due to the dramatic changes in land prices and in land leases, caused mainly by the explosive expansion of soybeans areas (850,000 ha) and planted forests (almost one million ha), and, to a lesser extent, by foreign investments in land as a value reservoir[19]. As a consequence, the vulnerabilivity of smallholders to climate variability and extremes has grown dramatically. The only alternative at hand is to increase the carrying capacity to hold their stock at the farm to avoid selling their animals at the downfall price levels. Their main constraint for increasing the carrying capacity stems from the lack of resources to make investments and lack of knowledge on technological options to maintain the income levels with adequate stocking rates.

27. A study on rural poverty conducted in 2010[20] indicates that low educational levels and isolation due to deficiencies in communications infrastructure and distance to urban centres to access basic services is more acute in livestock smallholders. The North-East of the country –basically the Basaltic Cuesta- is the one with higher poverty incidence in disperse rural areas, being the only region with higher concentration of rural poor than villages with less than 5.000 inhabitants in all national territory. Poverty levels increase among rearing farmers in comparison to other activities within livestock farming.

28. Economic indicators calculated by the national extension services (Instituto Plan Agropecuario - IPA) based on actual farm records monitored on regular basis, show that net income levels earned by smallholders engaged in cattle rearing are reduced and present strong variability. Per hectare calculations for the past decade indicate that net income fluctuated between a negative value of -7 USD (2009/09, drought year) and a maximum of +36 USD (2005/06). As an example, a smallholder farming 250 hectares, would have an average net income around USD 3,500 per year, which falls under the poverty

[19] Prices of land and rents have multiplied times 6 in the last 7 years in Uruguay according to DIEA-MGAP

[20] Paolino, C y Perera, M. "La pobreza rural en Uruguay", FIDA, 2008

line. These figures indicate that most smallholders belong to the “transition” group and do not have the financial resources for adopting adaptation measures, as well as for paying grazing out of their farm to adjust the stocking rate in times of forage crises. Additionally, commercial credit is not an option for most smallholders, which lack collaterals and are not familiar with the banking procedures and requirements.

29. There is no recent data on the number of female headed-households among the smallholder sector, although a survey conducted in 1999 provided an estimate of 12%.[21]. Nonetheless, available estimates from 2007 indicate that poverty incidence in rural areas is higher among women (28%) than men (24%), except for groups over 65 years old. Extensive production systems in small plots and reduced income levels create very little employment opportunities for youth and women in small farms. Teen-agers and young men and women migrate in search of employment to small villages and large urban areas, forced to drastically change their livelihood and leaving behind an aging smallholder community.

Institutional Framework

30. The current policies of the Ministry of Livestock, Agriculture and Fisheries (MGAP) grant priority to promoting sustainable competitiveness with social inclusion, to adaptation to climate change and to strengthening the capacity of the agricultural and agro-industrial sector to compete in the international market. The Government of Uruguay (GOU) is highly committed to reduce social inequalities in the urban as well as in the rural sectors. An important part of these efforts focuses on supporting smallholders to improve their asset base and increase their human and social capital to improve and expand the opportunities to sustain their livelihoods. The policies of the MGAP recognize that smallholders require specific support to become competitive, being scale one dimension but not the only one that determines competitiveness. Organization and technology adoption have proven successful in the dairy industry where smallholders compete with large farmers based on intensification at the farm level and on the particular organization of the industrial sector where the leading enterprise (at both domestic and export markets) is a cooperative that has had a long lasting partnership with the public sector on behalf of the smallholder sector.

31. The main differentiated strategy for smallholders has been financing investments on non-reimbursable basis to promote technology adoption, increasing the infrastructure required to reduce vulnerability in face of external shocks and attaining higher productivity levels. Subsidies for smallholders finance a higher share of investment costs than medium farmers[22]. Support for strengthening grass-root organizations is now recognized as a key factor and will be supported through different programmes to enable smallholders to reach

[21] Encuesta Equipos Mori. Encuesta de actitudes y comportamientos tecnológicos de los ganaderos uruguayos. Serie FPTA-INIA, Agosto de 2003.

[22] Current MGAP PPR and PG projects provide grant financing up to 80% for smallholders and 40% for medium size farmers.

economies of scale and compete. This strategy is consistent with the findings of the WB study on the smallholder sector that characterized the “transition smallholders” as lacking capacity to finance investments and being highly dependent on public sector support for technology adoption. Strategic support to these farmers could ensure their long-term survival through technology adoption and strengthened organization capacities.

32. Grants for investments on sustainable management of natural resources are regarded by the MGAP as a means of promoting long term sustainability: soil erosion losses are significant in crops due to expansion of cultivated area (particularly soybean) and in livestock due to the reduction of land available, particularly for grazing, supporting the same stock. Providing partial subsidies as an incentive to adopt investments and technologies that avoid erosion and use soils according to their capacity is a key factor in long term sustainability of agriculture and conservation of natural resources. Overgrazing is more acute in small livestock farms at drought periods, so that investments and adequate management practices in this sector are crucial to ensure a sustainable carrying capacity without decreasing income levels.

33. Another milestone in this line of action is the strengthening of the Rural Development Directorate (DGDR) of MGAP as the permanent institution responsible for rural development and responsible for executing all projects with external financing. The MGAP created the DGDR in 2005 with the role of promoting rural development with the specific thrust of ensuring equitable access of smallholders and rural workers to development opportunities. This division did not exist before and another important step was taken in 2007 by creating a decentralized structure for operations although with a reduced structure at the beginning.

34. The Directorate started operations in 2008 focusing on promoting local governing bodies in all departments as a means to include local organizations in the policy dialogue and enforcing participatory approaches and decentralization at the field level. The main instrument has been the promotion of development boards at department level (Agricultural Development Councils-CDA) and at local level (Rural Development Boards-MDR) as an innovative and participatory mechanism introduced since 2007: CDA and MDR are the forum where grass-root organizations and public institutions work together to translate national policies into meaningful actions at local level ensuring participation of all stakeholders. There are CDAs established in all 19 departments of the country and 36 MDRs operating at present. These local networks are involving 315 groups and organizations that meet together to address developmental issues, promoting local empowerment and sustainability. These groups are gaining awareness of the risks stemming from CC but most of the agenda is devoted to solve emergencies and short term issues. The consultation conducted for this project design with the support of the AF confirmed their concern on CC processes and their acknowledgement that massive support is required to address these issues.

35. Even though capacity building has been explored by the PUR project focusing on rural poor, the participation of smallholders in these networks is still limited and actions plans to increase resilience to CC are not in place. Lower educational attainment determine reduced management capacity; limited access to support services due to isolation and limited capacity –including time constraints and lack of information- to demand for support services have led to weaker organizations with restricted access to opportunities for capacity building. The programmes for the enhancement of communications infrastructure –Internet access in all public schools, including rural areas, electricity and mobile connection in remote areas- have dramatically improved the potential to create and sustain networks in isolated areas. These technological options were not available before two or three years ago and small rural organizations with adult membership are still not familiar with their capabilities and have not been able to benefit from these opportunities for increasing interaction with their membership and linking with other organizations, institutions and market opportunities. The promotion of networks with innovative organizational schemes and the involvement of youth proposed in this project may explore an additional factor contributing to increase competitiveness in the livestock sector.

36. The present administration has expanded and strengthened the DGDR placing all projects financed by external loans under its responsibility, significantly increasing staff at headquarters as well as at the field level in all departments to 49 staff. The MGAP is regarding the DGDR as a permanent institution responsible for rural development and has increased its budget significantly using national budget resources to maintain and expand successful projects initially financed by external loans. This is the case of the Uruguay Rural Project (PUR) financed by the International Fund for Agricultural Development (IFAD), the Livestock Programme (PG) financed by the Inter American Development Bank (IADB) and the Responsible Production Project (PPR) financed by the World Bank (WB), all of them reaching completion by the end of 2011.

37. The main thrust of the DGDR is to identify and adopt best practices and successful experiences from projects and mainstream them into regular programmes. It is expected that the innovative approach adopted by this project would be financed with the regular budget after project completion. The MGAP has further committed to rural development by creating a Fund for Rural Development (FDR) financed with the national budget and administered by the DGDR to implement actions and activities that have proved successful in previous projects. At present, the DGDR is announcing its first open call for proposals for the FDR financed by national resources to tackle the effects of the current water shortage applying the lessons learned from the PPR. The appointment of the DGDR as responsible for all rural development actions aims at avoiding the segregation between permanent institutions and projects, making standard the incorporation of lessons learned and best practices into regular programmes.

38. A key action started by the DGDR is the Registry of Smallholders: around 19,000 smallholders (nearly 60%) have already registered before the

DGDR providing information that allows the screening of criteria established by the MGAP to qualify as a smallholder and access specific programmes and plans targeting rural poor. The Registry is open, managed with transparency and in consultation with local stakeholders and is used as a targeting strategy for rural development projects.

39. The MGAP is also granting first priority to sustainable management of natural resources as a key factor in the country's development strategy. The institutional assessment of the Natural Resources Directorate (RENARE) indicated the need to update basic cartographic information, strengthen the areas related to water and grassland policy framework on conservation and management and modernize the operational routines providing web based services. The Sustainable Management of Natural Resources and CC Project financed by the World Bank and scheduled to start in 2012 is investing nearly USD 8 million in equipment, training and technical assistance in the following five years. It is expected that RENARE will establish guidelines on best practices regarding land and water use and management and grassland management, in an integrated effort in which research and academic institutions will participate to make the most efficient use of resources.

40. CC is also among the highest priorities of the GOU. In 2009, the National Climate Change Response System was created aimed at coordinating and planning the required public and private actions and initiatives related to risk prevention, mitigation and adaptation to CC. As part of this system, a Coordinating Group was established consisting of various line ministries including the MGAP and the Ministry of Housing, Land Planning and Environment (MVOTMA). In addition, an Advisory Commission comprising experts from academic, technical and research institutions has also been established. In this framework, Uruguay is exploring strategies that would enable the country to better face the effects of CC generating benefits to both the local and global environment. Amongst these is the National Action Plan for Climate Change, which through inter institutional and multidisciplinary working groups proposed a set of mitigation and adaptation measures including those in the agricultural sector.

41. As a party to the UNFCCC and the Kyoto Protocol, Uruguay is carrying out a series of activities to fulfil its commitments. Through the MVOTMA, Uruguay has submitted the following National Communications: Initial National Communication in 1997, Second National Communication in 2004 and Third National Communication in 2010. In all three cases Uruguay was amongst the first developing countries to comply with the statute.

42. As a summary, uncertainty, increased variability and more frequent and intense extreme events is the most likely future scenario in Uruguay due to CC. The smallholder sector will be particularly affected, being small livestock farmers located in superficial soils highly vulnerable to agro-meteorological droughts and water shortages. Social inclusion efforts in rural areas need to promote a climate smart agriculture as a key factor to face the challenge of

increased variability. The GOU is committed to take action and the present proposal is a crucial step towards promoting a sustainable climate-smart agriculture that addresses adaptation to CC and variability and competitiveness, sustainability, food security and stability of production at the same time.

PROJECT / PROGRAMME OBJECTIVES:

43. The overall objective of the project is to contribute to building national capacity to adapt to CC and variability focusing on critical sectors for the national economy, employment and exports.

44. The specific objectives include:

a) Reducing vulnerability and building resilience to climate change and variability in small farms engaged in livestock production (mainly rearing and complete closed cycle) located in extremely drought-sensitive Landscape Units of the Basaltic Cuesta and East Hills eco-regions.
b) Strengthening local institutional networks at the selected LU level targeting climate change adaptation (prevention) and response to extreme events (emergency) in highly drought-sensitive areas.
c) Developing mechanisms for a better understanding and monitoring of the impacts and variability of CC, anticipating and assessing negative events and eliciting lessons learned and identifying and validating best practices and toolkits for adapting to increasing variability of CC.

45. The project would focus on supporting livestock smallholders in two selected Landscape Units (LU) of the Basaltic Cuesta and the East Hills eco-regions to build resilience to CC and variability. The definition of landscape unit follows the definition adopted by the European Convention on Landscape: "Landscape" is defined as a zone or area as perceived by local people or visitors, whose visual features and character are the result of the action of natural and/or cultural (that is, human) factors. This definition reflects the idea that landscapes evolve through time, as a result of being acted upon by natural forces and human beings. It also underlines that a landscape constitutes a whole unit with natural and cultural components with its ecosystem services, all factors are taken together, not separately.

46. The LUs would be selected according to a set of criteria that would include the following: a) high proportion of livestock smallholders; b) predominance of native grassland ecosystems on superficial soils, with lack of infrastructure to store and use water, highly vulnerable to drought and hydric stress; and, c) relatively low social capital at the grass-root level but with potential to build institutional networks and promote the flow of information and knowledge. Thus, the project would focus on disadvantaged territories with similar characteristics that constitute an identity in terms of resource endowment, ecosystem and social development.

47. Approaching the intervention through LU for adaptation to CC and variability, the project adopts an innovative methodology that integrates social, economic, technological and ecological perspectives, considering its interactions in a spatially explicit way. The explicit consideration and prioritization of ecosystem services in the adaptation strategy is another innovative feature of the project. This approach that envisages and focuses on the problem as a whole and not on solving each component at a time is innovative in Uruguay. This new approach derives from lessons learned with previous projects that focused on one issue meaning that the farmer would receive support from different projects for solving each particular constraint, sometimes receiving technical assistance from different sources which made it difficult to envisage the system as a whole to find the most suitable development strategy[23].

48. The concept of resilience is key to this project, and is defined as the level of CC that systems can bear without altering their basic configuration and stability; the organization capacity of stakeholders and the ability to learn, transform and adapt to sustain their livelihood.[24] Given the uncertainties in the forecasts of future variability and frequency of extreme events it is difficult to base an adaptation strategy on conventional decision making processes. The rationale for this project proposal is based on an alternative approach that seeks to reinforce systems resilience, maximizing the supply of local ecosystem services (water, NPP, etc.), to cope with future impacts of climate change. Smallholders and organizations are key players in identifying both, threats and resilient management practices at the landscape scale, allowing combination of traditional knowledge with scientific knowledge. The three components of this project, described below, are closely linked to these three facets of the resilience concept.

Strategies and expected results

49. The main strategies and approaches of the project consist of the following:

- The project would focus on the smallholder sector as the most vulnerable population to allocate subsidies and build capacities but would involve all stakeholders in the LU and would develop and assess and validate technologies, methodologies and toolkits that may apply to other smallholders, regions and sectors, as a means to reduce overall vulnerability and increase resilience in the medium and long term.

[23] Previous projects financed by external donors focused on one particular aspect, such as water management, technical assistance to improve animal husbandry and nutrition, forestation, etc. These include the Uruguay Rural financed by IFAD, that had a comprehensive approach to reduce rural poverty; Programa Ganadero financed by Inter American Develoment Bank focusing on improving productivity and linkages to value chains; and Proyecto de Producción Responsable financed by the World Bank focusing on sustainable use of natural resources.

[24] Aguiar, M. Biodiversity in Grasslands: Current changes and future scenarios, FAO.

- The intervention would focus in a small number of LU (initially two) in order to have a significant impact on the territory and be able to address the demands, needs and actions identified in the LU strategic plan.
- The intervention methodology would foster an integrated and sustainable management of available resources (soil, water and native grasslands biodiversity) within an adaptation approach that seeks a climate-smart agriculture that enhances the use of ecosystem services and is capable of promoting innovation and knowledge management to learn from experience and guide the transformation process. The project is building on the experience of previous projects and would promote a comprehensive approach to investments that ensure the full impact of the intervention at the farm level, avoiding focusing on one problem area only (water management, shadow forestry, fencing, animal husbandry, training, CC awareness).
- The menu of technologies would promote when possible "no-regret" transformations of the production agro-ecosystem, that is, would seek the co-benetis of productivity gains and income increase as an essential part of sustainable adaptation to CC, regardless of climatic hazard.
- Training and capacity building would focus on the strategic needs of the LU for building resilience to CC and variability, including adaptation measures and best practices, management and organizational skills and innovative ways of networking to communicate and address climatic risks.
- The project would promote the participation of the most vulnerable groups and specific activities to involve children and young men and women aiming at creating awareness and capacities for addressing CC and variability using IT options made available by the platform of the CEIBAL Plan, identifying new opportunities and revitalizing the smallholder farming communities and establishing sound grounds for the sustainability of the intervention in the long run.
- The project would be an integral part of the National Action Plan for CC adopted in 2009 and would be guided by its general principles that enhance sustainable development, decentralization and subsidiary action, awareness and prevention, equity and solidarity, participation and consultation, coordination and cooperation.

50. The expected results of the intervention are: a) beneficiary smallholders have increased resilience to climate variability and moderate and severe droughts measured by the increased availability of water and forage, native grasslands biodiversity conservation, better animal performance indicators, low mortality rate by animal category and stability of stock composition over time; b) local institutional networks at the LU level are in place and managing climate risk, involving youth and managing operational instruments that respond in case of emergency in close coordination with the Rural Development Boards, the Climate Early Warning Systems developed by the MGAP[25] and the National Emergency System; and, c) the capacities and methodologies are in place for a systematic monitoring of CC and variability and their impact on agriculture, as well as a catalogue of best practices to reduce vulnerability and enhance

[25] The MGAP will establish Climate Early Warning Systems as part of an Information and Decision Support System within the "Sustainable Management of Natural Resources and Climate Change" Project financed by the World Bank recently negotiated and expected to start implementation in 2012.

resilience, innovative instruments and lessons learned from systematized experiences endorsed by all stakeholders regarding adaptation to CC with particular reference to droughts.

51. Through achieving these outcomes, the present proposal would develop and validate a methodological approach that could be scaled up for other areas and vulnerable groups to CC and variability impacts. The international community is designing financing schemes to support such efforts in developing countries through the UNFCCC and Uruguay would be prepared to present sound proposals based on the experience of this project.

PROJECT / PROGRAMME COMPONENTS AND FINANCING:

52. Taking into account the proposed strategic and methodological framework, the project components are: a) Adaptation Investments, including financing for individual or group investments to increase resilience to droughts and climate variability in livestock smallholders; b) Strengthening of Local Networks, promoting capacity building at local level to address CC issues in the short, medium and long term; and, c) Knowledge Management, as a regular exercise of learning from project experience and a systematic exchange of knowledge and experience between research and extension institutions, policy makers and producers organizations to be better prepared to address CC and variability in the agricultural sector. Total cost of the project has been estimated at USD 9.97 million. Annex 2 presents the summary of estimated costs per component and per expenditure account, annual base and total costs per component and per expenditure account and the detailed cost tables per component, including execution costs. Annex 3 presents the detailed budget of the management fee use by ANII, the implementing entity. The estimated budget has increased in USD 3 million regarding the initial estimate presented in the project concept note. The main justification for this increase lies in the size of the identified Landscape Units, with a total area more than 12 times larger than originally proposed. Testing the methodology for identifying Landscape Units, accomplished through the AF support, significantly improved the project design. Along this process the most relevant finding was that, given the homogeneity of national landscape, natural and perceived boundaries define large territorial units. Identifying smaller areas would be regarded as artificial by local population, could reduce equity and become a source of conflicts. The expansion of the targeted area led to an increase in expected beneficiaries and in project estimated costs.

PROJECT COMPONENTS	EXPECTED CONCRETE OUTPUTS	EXPECTED OUTCOMES	AMOUNT (US$)

1. Resilience increase at the farm level in smallholders located in extremely drought-sensitive Landscape Units	Comprehensive investments in water supply, best practices for native grasslands management shadow trees and animal management improvements benefitting approximately 700 farmers in the LU of the Basaltic Cuesta, 25% women household-heads.	Overall increase in productivity and decrease in variability (direct negative impacts) due to moderate and severe droughts in the supported farms measured by the availability of forage, animal performance indicators (mortality rate by animal category, fertility rate) and the stability of stock composition over time	7.26 million
	Comprehensive investments in water supply, best practices for native grasslands management,shadow trees and animal management improvements and agro-forestry schemes benefitting approximately 640 farmers in the LU of the East Hills Region, 25% women household-heads.		
2. Development of a local network for climate change monitoring, awareness and response	In depth diagnosis of the landscape units and development of a local network of grass-root organizations and public institutions that conducts a participatory assessment of local capacities and prepares and implements a strategic plan to address CC and variability	The selected vulnerable landscape units have a local institutional network that manages climate risk, involving youth and managing operational instruments that respond in case of emergency in close coordination with the Rural Development Boards and the National Emergency System	0.95 million

	A training plan is formulated and implemented at local level responding to the weaknesses identified and focusing on CC and variability issues		
	Demonstration plots in schools and organizations on adaptation measures and youth communication projects are implemented making use of the CEIBAL Plan internet platform to the extent possible, to involve children and youth		
	Action Plans identified in the Strategic Plan are developed and implemented at the LU level with technical support and coordinated with the training programme		
3. Knowledge Management on CC and variability	The UACC of the MGAP is strengthened to monitor and evaluate CC with reference to the agricultural sector	There is systematic monitoring on CC and its impact on agriculture, new knowledge, a catalogue of best practices, innovative instruments and lessons learned from systematized experiences endorsed by all stakeholders regarding adaptation to CC with particular reference to droughts.	0.78 million
	Indicators and methodologies to monitor and evaluate CC and variability are identified and applied		

	Research projects provide a better understanding and/or technical recommendations to face climate variability with particular reference to droughts (water supply, fencing, shadow trees, stocking rate)		
	Systematic review and exchange of experiences regarding CC adaptation involving research and extension institutions and participatory systematization of project experience to elicit lessons learned for future projects and for the region		
4. Project Execution cost			0.48 million
5. Total Project/Programme Cost			9.47 million
6. Project Cycle Management Fee charged by the Implementing Entity			0.50 million
Amount of Financing Requested			9.97 million

PROJECTED CALENDAR:

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

MILESTONES	EXPECTED DATES
Start of Project/Programme Implementation	July 1, 2012
Mid-term Review	November 30, 2014
Project/Programme Closing	June 30, 2017
Terminal Evaluation	September 30, 2017

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Project components

53. **Adaptation Investments.** This component is providing comprehensive support to the most vulnerable producers within drought-sensitive LUs in the Basaltic Cuesta and East Hills eco-regions, to facilitate the adoption of the adaptation measures identified with the extension and research services. The support would consist of partial subsidies for investments and technical assistance and training in line with current policies of the MGAP.

54. The potential beneficiaries are all livestock smallholders located in the selected LUs complying with the smallholder definition adopted by the MGAP, either registered or non-registered: a) having no more than 2 permanent workers or its temporary equivalent; b) farming no more than 500 ha CONEAT Index 100 (average soil productivity) regardless of the type of land tenure; c) being the farm the main source of income and being the farm the main workplace for the farmer; and d) dwelling in the farm or in a village no further than 50 km from the farm.[26] All these conditions may be screened objectively guaranteeing transparency and equitable access to project opportunities.

55. The project would reduce the vulnerability to climate change facilitating the adoption of the following three types of adaptation measures:

a) Increasing efficiency in water harvest and use. There is a huge potential to improve the efficiency in management of ecosystem services related to water harvest and storage in small reservoirs, as surface runoff in the LU is well above 50% of the average total precipitation in Uruguay (1,200 mm). These water storage reservoirs are one of the cornerstones of the strategy to decrease sensitivity to droughts. As the public consultation clearly shows (see Annex 4), increasing water availability is the main concern of smallholders regarding climate vulnerability.

b) Protection and restoration of natural grasslands biodiversity could represent a major increase in their net primary production and quality, increasing the proportion of high quality winter grasses. In addition, many smallholders have small areas of deep soils in the relief's low areas, with a high potential to contribute to stabilize dry matter supply, in particular in dry periods. Well managed natural grasslands, together with increased water availability, are the main strategy for increasing resilience in Uruguayan livestock systems based on native grasslands. At the same time superficial soils are extremely vulnerable to high stocking rates and signs of erosion are frequently observed. Avoiding overgrazing and adjusting the stocking rates are among the most important measures to be promoted in the LU. To facilitate this, the project will promote on-farm practices (sustainable pasture management and forage administration) and, in particular, will promote group initiatives such as forage banks and cattle breeding fields leaded by farmers' organizations in the LU.

[26] This definition is highly consistent with the transition smallholder sector that requires public support to transform their production system and sustain their livelihood.

c) Provision of shadow and shelter by planting trees (native species, when possible) and promoting silvopastoral systems. The Basaltic Cuesta, in particular, requires more shadow since temperatures in summer are higher compared to the East. The public consultation showed that the effects of high temperatures and radiation are causing significant problems, so there is as demand for this type of investments. At the same time a rational distribution of shadow and water would minimize the energy consumption for activity, reducing the sensitivity to stress during droughts.

56. These measures aim to reduce the sensitivity to climate change and variability. As the public consultation shows, smallholders do not regard them as a way to increase production or income but as a tool of climatic risk management. Increase in productivity would be in most cases a co-benefit of the adaptation process.

57. The project has selected two LUs within the targeted eco-regions through a specific study conducted by CIEDUR with support from the Grant of the AF for project design. CIEDUR is an NGO with vast experience in development studies that participated in the eco-region study for the MGAP. The technical team built by CIEDUR for supporting this project design included researchers from the Faculty of Science of Universidad de la República (UDELAR) in geography, geomorphology, ecology, social sciences and GIS.

58. The approach for identifying these LUs is based on the assumption that Risk is a function of Threats and Vulnerability (Risk = *f* [Threats, Vulnerability]) and that the threats are evenly distributed across the regions, which seems reasonable since there are no major geographical features which could cause spatial variations. Hence, risk will vary across areas mainly according to their intrinsic vulnerability.

59. Vulnerability to CC and variability depends on exposure, sensitivity and adaptation capacity. Within livestock agro-eco-systems, sensitivity was assessed through edaphic conditions (soil superficiality, texture, stoneniness, fertility, etc.), geomorphological conditions (e.g. slope) and land use (e.g. vegetation). Adaptation capacity was assessed through socio-economic factors (e.g. farm size, relationship with public institutions, stocking rate, communications, etc.)

60. The data base already available for the eco-regions was completed with detailed information on livestock farmers provided by DICOSE corresponding to Declaration 2010[27]. The target population was estimated as the livestock farmers (cattle and/or sheep, rearing and complete closed cycle systems) with farm size between 51 and 750 ha. This would be a proxy to the number of

[27] DICOSE is the Directorate for Livestock Control. Every June 30th all livestock farmers must declare number of heads per category and farm size, as well as other information such as land tenure and technical coefficients (mortality and calving rate). The system has been running for decades and the information is extremely reliable. The country has recently implemented a traceability system for cattle that has been recognized by the most demanding external markets.

smallholders, since the soils in these LUs present on average a CONEAT Index[28] under 70 (IC 70), meaning that a farm of 750 ha would correspond to approximately 500 ha IC 100 as established in the MGAP definition of smallholder. Only for calculation purposes, the farms under 50 ha were not considered since available studies indicate that this group is heavily dependent on off-farm income and social compensation schemes.

Selected Landscape Units

61. The selected LUs correspond to the North-East area of the Basaltic Cuesta and the South area of the East Hills and were identified as micro-basins where the proportion of livestock smallholders is high and taking into consideration other socio-economic data such as the communications infrastructure and the presence of grass-root organizations. The boundaries were identified taking into account the water divide of the micro basin and using administrative divisions and roads as a means to establish a clear and objective geographical limit (see Maps 3, 4 and 5 and Annex 1 for detailed information on the methodology and additional maps). The specific boundaries of the LUs would be reviewed and adjusted at the beginning of project implementation through participatory consultations with the local stakeholders.

62. **North LU (Basaltic Cuesta)**. This LU comprises an area of 1.97 million ha taking part of the departments of Artigas, Tacuarembó, Salto, Rivera and Paysandú. It embraces 16 police sections[29], has six villages and the capital city of Artigas (approximately 44.000 inhabitants) within its limits and three other villages within a range of 5 km (see Maps 3 and 4 and Annex 1).

63. According to available statistics, there are 3.507 livestock farmers[30] in this LU, being 80% of them potential smallholders (see Table 2).[31] Most of farmers are located in the departments of Artigas (1.341) and Salto (1.339), followed by Tacuarembó (602) and with small groups in Rivera (147) and Paysandú (78). There is one MDR (Cuchilla de Haedo) that was promoted and created to address the specific needs of farmers in superficial soils and gathers the most important organizations of the area. There are 5 organizations in Salto, 5 in Tacuarembó, 3 in Rivera and 1 in Paysandú, most of them consolidated or close to consolidation. In spite of the number of organizations, a small fraction has already registered as a smallholder before the MGAP (710) representing only 26% of potential candidates, which is less than half of the share at national level (58%). The main hypothesis for this low proportion is the isolation and lack of communication infrastructure for smallholders located in distant areas, the lack of interest in plans and programmes implemented by the MGAP and the fact that the smallest farms depend on off-farm income (mainly transfers) and

[28] CONEAT Index 100 (IC 100) means the average productivity of soils. Each land plot has associated an IC that allows converting the actual ha surface into its equivalent to IC 100, thus providing an indicator of production potential.
[29] Smallest administrative unit in rural areas.
[30] Farmers presenting declaration to DICOSE
[31] MGAP definition of smallholder establishes that farm size should be under 500 ha CONEAT Index 100. Since these soils are extremely poor, most of their CONEAT Index is under 100. Farms with up to 750 ha would have less than 500 CONEAT Index 100 ha when the conversion factor is applied.

hence do not comply with one of the requirements for registration. This LU has 72% of area covered with superficial soils (see Annex 1).

Table 2 North LU (Basaltic Cuesta)

Land size	Nr Farmers	Total Nr Ha	Stocking rate
0 - 50 ha	1.035	18.776	
51 – 750 ha	1.737	515.742	
+ 750 ha	735	1.405.756	
Total	3.507	1.940.274	

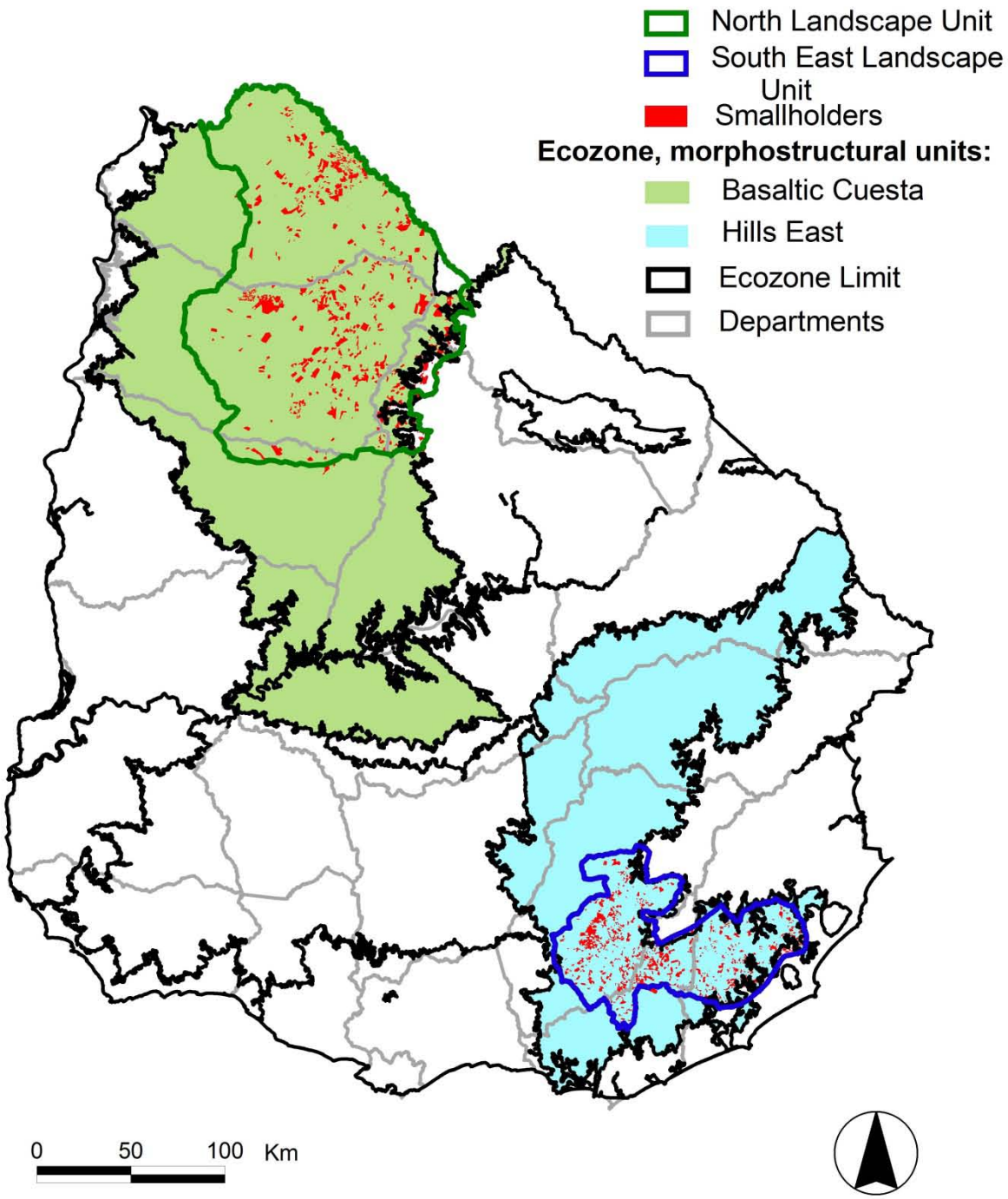
64. **South East LU (East Hills)**. This LU comprises an area of 588 thousand ha taking part of the departments of Rocha, Lavalleja and Maldonado. It embraces 7 police sections, has seven villages and the capital city of Rocha (approximately 26.000 inhabitants) and Lavalleja (nearly 38.000 inhabitants) within its limits and no other villages within a range of 5 to 10 km (see Maps 3 and 5 and Annex 1).

65. According to available statistics, there are 2.530 livestock farmers in this LU, being 94% of them potential smallholders (see Table 3). Most of farmers are located in the departments of Lavalleja (1.236), followed by Rocha (767) and Maldonado (527). There are three MDRs involved (South-East Rocha, Lavalleja and North Maldonado). There are 6 organizations in Rocha, 4 in Maldonado and 4 in Lavalleja, being only 3 of them considered consolidated. There are 776 farmers registered as smallholders before the MGAP, which is almost half of the national proportion but slightly higher than in the other LU (33%), probably as the end result of an area with better communication infrastructure and less isolated. This LU has 73% of area covered with superficial and moderately superficial and light soils (see Annex 1).

Table 3 South East LU (East Hills)

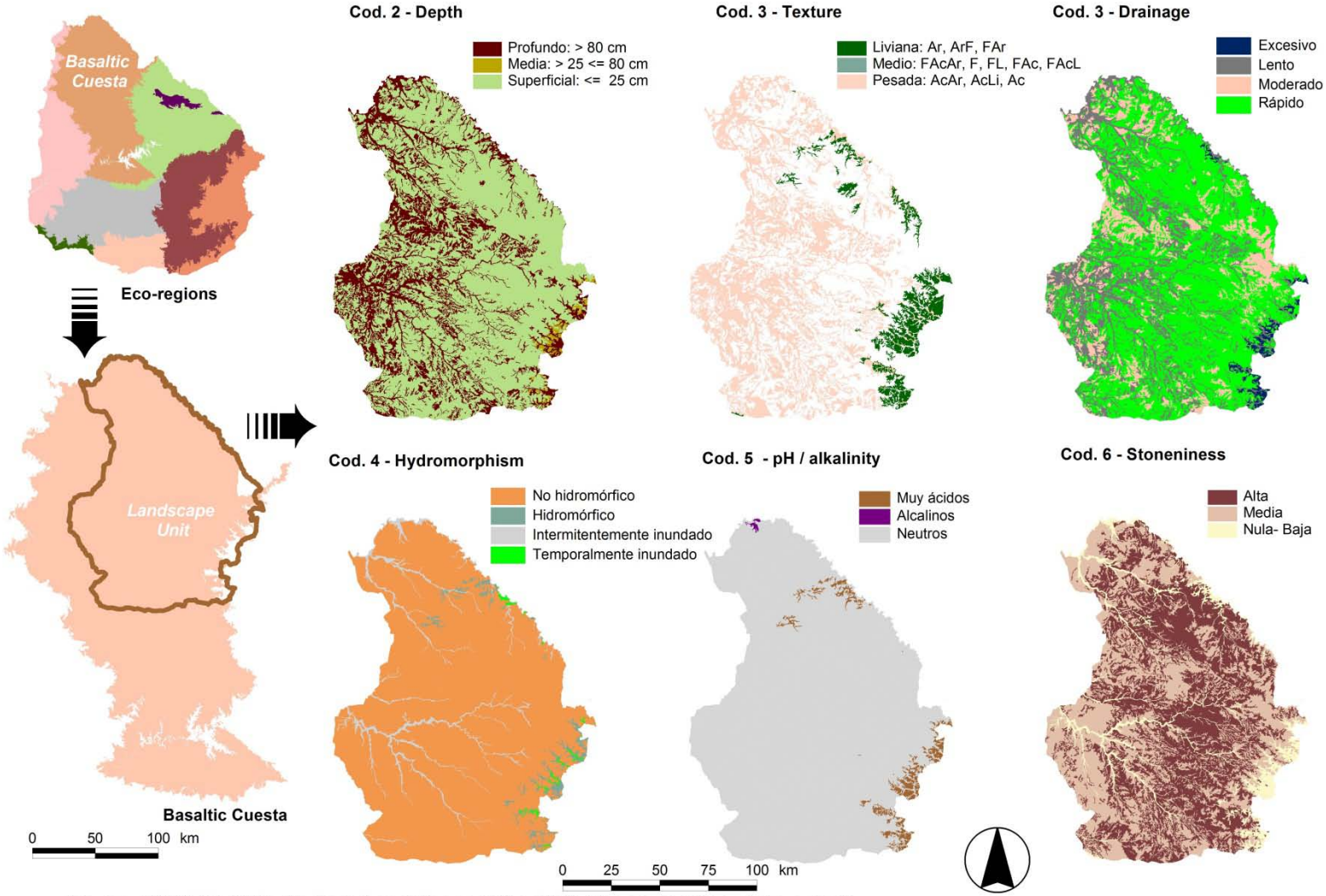
Land size	Nr Farmers	Total Nr Ha	Stocking rate
0 - 50 ha	821	18.221	
51 – 750 ha	1.558	332.794	
+ 750 ha	151	236.760	
Total	2.530	587.775	

Map 3
North and South-East Landscape Units



Map 4 - North Landscape Unit

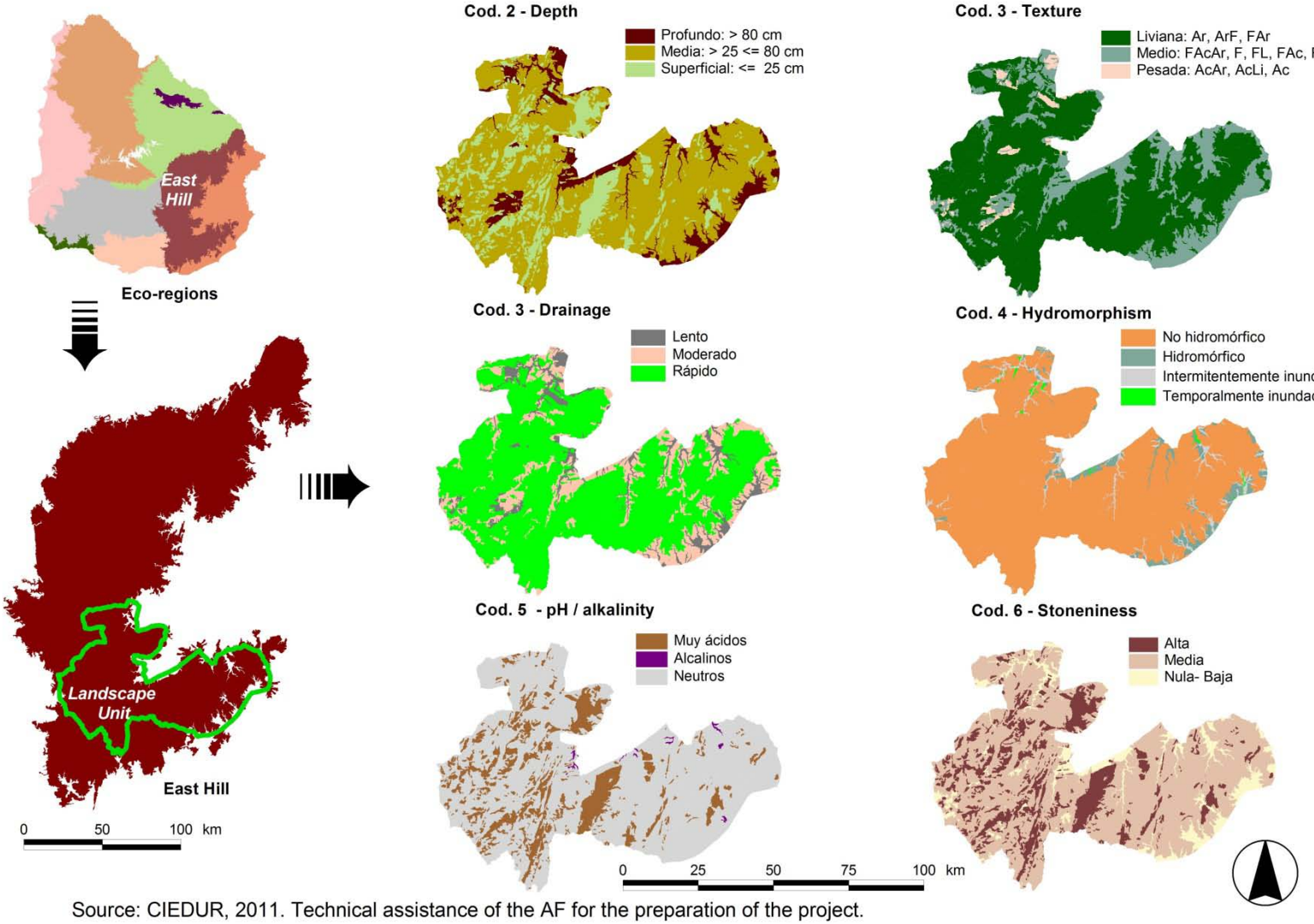
Main characteristics affecting soil sensitivity to droughts in the Landscape Units of the Basaltic Cuesta



Source: CIEDUR, 2011. Technical assistance of the AF for the preparation of the project.

Map 5 – South East Landscape Unit

Main characteristics affecting soil sensitivity to droughts in the Landscape Units of the East Hill



Source: CIEDUR, 2011. Technical assistance of the AF for the preparation of the project.

66. Integrated livestock management measures, including better infrastructure for water and shadow, improved pasture management and biodiversity conservation, are at the core of the technical options to increase resilience to CC and variability in these small farmers. Making the best use of ecosystem services would be the basis for the adaptation strategy. Their main vulnerability stems from the shortage of water, forage and shadow infrastructure, the high stocking rates when compared to a variable forage supply and the lack of proper management to achieve the highest potential forage capacity and preserve biodiversity. The main transformations that could increase income and resilience include: water reservoirs for animal consumption; adjusting the size and number of subdivisions for rotational grazing and for conserving/restoring biodiversity of native grasslands; learning to manage adequate -less risky- stocking rates; small forestation to provide shade in each paddock; selection and breeding based on performance records; and strategic supplementary feeding for specific animal categories (e.g. pregnant cows). The project would support the implementation of part of these or all of these combined, depending on the needs of each farm and responding to the specific characteristics of the LU where it is located.

67. This basic livestock improvement approach could be complemented in the South East LU with the implementation of more complex agro-forestry systems, in specific areas where this option may seem feasible as an option to cope with climate change through diversification. The experience in the Basaltic Cuesta eco-region with agro-forestry systems proved not successful due to the type of soils. Diversification introducing fruit trees or high value timber species could become an option in the South East, but the actual implementation would depend on a case to case analysis and decision of the farmer. Agro-forestry systems are innovative in Uruguay, and are expected to provide a number of benefits regarding diversification of income (risk management), pasture improvement and water availability.

68. The investments costs differ according to the size of the farm and the baseline situation, mainly determined by previous access to MGAP plans and programmes. In order to estimate the cost of the intervention, the requirements were calculated separately: on one hand, for those who already have some type of infrastructure and require complementary investment only to manage them effectively and to focus on adaptation to CC and variability and on the other hand, for those who have not had any previous support and require a more comprehensive investment package. The costs of the proposed investments for these two groups are presented in Table 4[32].

[32] Costs of investments were adjusted taking into consideration smallholders' proposals presented to the MGAP in the 2011 Call of the WB financed PPR Project for water management investments at national level.

Table 4
Proposed investments per farmer group

Item	Estimated investment cost for Smallholders with previous investments (USD)	Grant %	Estimated Project Contribution	Estimated investment cost for Smallholders with no investments (USD)	Grant %	Estimated Project Contribution
Water reserves	500	80	400	2.700	80	2.160
Water distribution	900	80	720	1.200	80	960
Fencing	1.400	80	1.120	1.400	80	1.120
Shadow and shelter forests	900	80	720	900	80	720
Total	3.700	80	2.960	6.200	80	4.960

69. The project would finance 80% of total costs and up to a maximum of USD 8.000 per beneficiary smallholder, in line with grant policies and operational procedures of existing plans and programmes of the MGAP. Raising the grant percentage and other incentives could be used to promote group initiatives or shared services and common schemes run by organizations (common paddocks or breeding fields, forage banks, etc.). Particularly for group initiatives for shared services, the project would promote the establishment of recovery schemes at the local level strengthening grass root organizations. The territorial approach through LU and the local capacity building may allow exploring these more innovative solutions that could require an organizational base to become successful.

70. For example, since the main constraint of a smallholder is the amount of land, a possible solution to reduce the stocking rate is the promotion of “forage banks” as appropriate to local circumstances (e.g. leasing of common grazing paddocks to hold specific animal categories in certain periods of the year, associative silage and grain production, etc.). These could be financed with organization’s own resources or recoveries from projects’ subsidies creating revolving funds at the local level. Another possibility could be group purchase or production of supplementary feeding (e.g. sorghum silage, grains) to reduce costs and make it more accessible to poor small farmers. The promotion of these alternatives could be extended in a sustainable manner as the project promotes a cultural change that opens the range of adaptation options to include group initiatives, locally driven, able to increase scale and ensure access to land with capacity to grow crops for silage.

71. The amount of grants for investments per farmer has been calculated taking into account the lessons learned from previous projects. DGDR has gained experience from different projects and approaches, including smaller grants and loans. The PG and PPR, as well as PRENADER focusing on small irrigation projects and financed by the WB, provided smaller grants which were enough to tackle one problem, either water management, electricity, shadow forestry, fencing, etc. Impact assessment studies showed that smallholders could not realize the benefits of the investment because they lacked the resources to make the complementary investments that would enable to apply the complete technological package and receive the full benefits of the farm

plan. The approach of the project is to provide a comprehensive support for those farmers that have no infrastructure (probably because they have not had any previous support from the MGAP) and financing complementary investments for those smallholders that have some infrastructure that is not being used effectively and efficiently or requires an ad-hoc component to build resilience to CC and variability.

72. Since implementing grants as the only instrument could hinder empowerment and sustainability of the intervention, as well as reduce the scope for scaling up, the DGDR has been adopting and promoting schemes whereas local grass-root organizations involved in the project implement revolving funds using partial recoveries from the grants disbursed to farmers. This scheme has been particularly successful in forage banks, where recoveries are managed in-kind. The terms and conditions for the partial repayment and use of recoveries are set and agreed between beneficiary farmers and the organization, where grant-recipients and non-grant recipients participate, thus providing a transparent means to manage and allocate recoveries. The project could promote and support such schemes to ensure sustainability of the intervention and contribute to organizational strengthening.

73. Beneficiaries would receive technical support for the preparation and implementation of proposals. The DGDR would hire local private technical assistants for this purpose. Current schemes under World Bank and Inter-American Development Bank financed projects provide up to 4 man/days for preparation and up to 12-15 man/days for implementation.

74. The target group of the Adaptation Investments component was estimated at 3.295 farmers in both LUs, being the number of potential beneficiaries in the North LU slightly larger than in the South East LU. Taking into account the production systems in the selected regions and the experience of previous rural development projects -and only for the purpose of the calculation-, farms less than 50 ha were considered residential or depending from other income sources –corresponding to the subsistence sector that heavily depends on non-farm income sources- and were not included for estimating the target population and the costs of the intervention.

75. It is estimated that the project could directly support approximately 1.340 beneficiaries which represent 41% of the estimated target group (see Table 5). The project could be scaled up through two main approaches: at local level, through recovery schemes, particularly for group initiatives, and at a larger scale, through the synergies with other rural development projects, particularly with the Sustainable Management of Natural Resources and CC financed by the WB. Once the strategic plan of the LU is available and local stakeholders are committed and empowered of its priorities, the other projects could provide additional financing to meet the needs.

76. For calculating component costs, the disbursement of investment grants was phased according to regular practices of the MGAP, which include a first tranche of approximately 60% and a second tranche of the remaining funds subject to verification of use of resources. Since the project will finance sub-

projects on demand, the proposed fund for investments and technical assistance was calculated rounding figures. The total and base cost of this component was estimated at USD 7.260.000[33] (see Table 5 and Annex 2).

Table 5
Target group and direct beneficiaries

Beneficiaries per LU	Nr of livestock farmers 50-751 ha	Estimated Direct beneficiaries	%
North	1.737	700	40
South East	1.558	640	41
Total	**3.295**	**1.340**	**40%**

Table 6
Phasing of beneficiaries and estimated annual costs

LU and type of beneficiary	Years					Total
	2012	2013	2014	2015	2016	
Phasing %	15%	22%	33%	30%		
Number of beneficiaries	200	300	440	400		1340
Investments (USD) - First tranche (60%) - Sec.tranche (40%)	522.000	783.000 348.000	1.148.400 522.000	1.044.000 765.600	696.000	3.497.400 2.331.600
Subtotal Invest. Costs	522.000	1.131.000	1.670.000	1.809.600	696.000	5.829.000
Tech.Assistance (USD) - First year (60%) - Second year (40%)	128.160	192.240 85.440	281.952 128.160	256.320 187.968	170.880	858.672 572.448
Total TA Costs (USD)	128.160	277.680	410.112	444.288	170.880	1.431.120
Inv. - TA Costs (USD)	650.160	1.408.680	2.080.512	2.253.888	866.880	7.260.120
Grant Fund (USD)	650.000	1.410.000	2.080.000	2.225.000	870.000	7.260.000

77. Beneficiaries would be selected through open calls to eligible beneficiaries involving the local MDRs and grass-root organizations located in the LU and participating in the project through the Strengthening of Local Networks component. There would be a Project Selection Committee at the LU level composed of a representative of the technical staff working in the LU territory, a representative of the MGAP through the staff of the regional offices of the DGDR and a representative of the involved MDRs (private sector). This Committee would be responsible for selecting and approving sub-project proposals, taking into account the technical feasibility of the proposal and the priorities set forth by the Local Network Strategic Plan. The technical assessment would be conducted by staff of the MGAP (regional and central

[33] Costs were estimated with the Costab software using standard parameters for international inflation and including physical contingencies for operating costs only. Total cost tables include physical and price contingencies, except in the case of the Grant Fund for Adaptation Investments and Technical Assistance, which is calculated without contingencies to reflect the "on-demand" approach of its implementation.

offices of DGDR), assisted by the RENARE and the UACC in the preparation of evaluation protocols to ensure technical standards. The comprehensive approach, the focus on the rearing and closed complete cycle producers and the territorial approach –selecting the most vulnerable LU and planning the investments within the overall framework of the LU strategic needs and opportunities- would ensure an increased resilience at the LU level and at an aggregate level more stability for the whole livestock production system, generating benefits to other farmers in the LU and for the country as a whole.

78. At the beginning of project implementation a Project Operations Manual would be prepared including eligibility criteria for beneficiaries and investments and the main procedures for selecting sub-projects, contracting technical assistance and disbursing funds to beneficiaries. The procedures would be based on regular practices of the DGDR in projects financed with external financing, such as the World Bank and the Inter-American Development Bank.

79. The largest share of the resources provided by the Adaptation Fund would be allocated to tangible components. But the project design is not restricted to on-farm investments as a means to cope with CC: organizational strengthening, empowerment and capacity building are also key components of the overall strategy.

80. **Strengthening of Local Networks.** This second component would strengthen a specific network embedded in the existing local institutional basis (led by the Rural Development Boards promoted by the MGAP) to build local capacity to take appropriate and timely action in face of climate variability and extreme events. The purpose of the network is to stand for the territory and to promote participation, democracy and social responsibility within the territory regarding issues linked to CC and variability. The objectives of the network are: a) to keep its members informed and aware of CC situation and variability and on technical options available to reduce vulnerability and increase resilience; b) to prepare and implement action plans according to warning levels and particularly in face of extreme events; c) to coordinate with research and extension institutions to focus on the technological needs of the territory in face of CC and variability and the knowledge gaps that need to be addressed; and d) to make proposals and negotiate with public and private institutions the implementation of projects and programmes that contribute to increase resilience to CC and to improve natural resource management, with particular reference to water and grassland management.

81. The strengthening of the local network is aiming at providing a sustainable institutional base to monitor CC and variability, establishing the basis for self-governance and cooperation between public sector and grass-root organizations to address the specific issues and threats that face drought-sensitive LUs. The project would call upon all existing grass-root organizations, either located in the Landscape Unit or that include smallholders located in the LU as members, to build a participatory forum where the issues of CC and variability would mainstream the development agenda. At least 14 organizations were identified in each of the selected LUs, many of them requiring institutional strengthening, particularly in the South East.

82. The LU network would be prepared to take action in face of extreme events, would have the capacity to negotiate and make proposals to the relevant authorities and would keep all its members informed and aware of CC variability and technical proposals to increase resilience, at the same time connecting local and national levels of agricultural policies putting into practice a bottom-up approach.

83. At the beginning of the project a technical team would update the data base and conduct additional surveys and collect relevant information in the selected LUs (North and South East) to ratify or modify its specific boundaries and to address information gaps to complete the diagnosis. This study would focus on the specific vulnerabilities and opportunities that each territory presents to face CC variability and extreme events, particularly droughts. This detailed diagnostic would include participatory rural appraisals (PRA) for farmer groups and a comprehensive institutional assessment of the organizations that would participate in the network (including the situation of the economic, human and financial resources).

84. The LU in depth diagnosis and main vulnerabilities and opportunities identified would be validated at local workshops where all stakeholders would be invited. Local grass-root organizations, farmers and support service providers would express their willingness to participate and their commitment to the project proposal, thus establishing the network. The closest operating Rural Development Board would take the lead in this initial stage as the sponsor of the network at the LU level and would support the local organizations along the process of developing the network, either to create a new Board representing the network or to work as a subgroup of the Rural Development Board.

85. Once the Local Network is established, a strategic plan for the LU would be developed, containing the basic guidelines that would rule the development of adaptation measures in the territory. This strategic plan would establish the main strategies to increase resilience in the LU, the priorities in terms of investments and territorial coverage, the specific pro-active action that is required, the role of the different stakeholders and the expected results. The network members will have an active role in the preparation of terms of reference, selection of consultants and monitoring during the execution, coordinating and promoting the involvement of local stakeholders in participatory appraisals.

86. The design of a training programme is the following step, derived from the comparison between the current situation depicted by the institutional assessment and the roles that each organization, group or institution would have to take according to the specific actions identified in the strategic plan. The training programme would foster non-traditional approaches, such as role playing, games and cultural/entertainment activities to encourage youth to participate and integrate in the network. Nonetheless the training would be prepared based on the actual needs of the participating institutions, it is estimated that there would be two basic areas for training, technical issues

relating to CC and variability and organizational/management issues, such as governance, negotiation, record keeping, project preparation and implementation. The network would have simple meteorological equipment to measure local climate variables as part of the training programme. The equipment would be operated by the organizations supported by the project staff and in close coordination with the INIA and the DNN of the MVOTMA.

87. A key component of the training programme would be designed to use the Agricultural Information and Decision Support System to be developed by the Sustainable Management of Natural Resources and CC Project financed by the World Bank and expected to start implementation in 2012. This component would include: improving and integrating existing climate and natural resources databases; developing improved seasonal forecasts and establishing Climate Early Warning Systems; improving real time monitoring of climate and vegetation; and, developing simulation models to assess the impact of adopting different adaptation technologies. The technical capacity at local level to understand and use this system should be enhanced by the network training programme. The training could establish different levels according to the needs and expectations of the local users, e.g. technical staff, farmers, local authorities, etc.

88. For a five year period the project would make available basic technical support to the network: the project would finance a technical team composed of two technical assistants to support the Local Network. One of them would have a social science background and would be responsible for promoting the participation of non-organized farmers and for providing technical support and training to organizations, focusing on the weakest ones. The other technical assistant would have an agronomical background and would monitor the sub-projects, linking with technical assistance services. Both would be responsible for supporting the implementation of the development and adaptation agenda identified in the Strategic Plan and support the preparation of action plans according to warning levels. It is expected that this support would speed up and strengthen the capacity building process by producing advances in a shorter period of time and hence demonstrating the benefits of joining and participating in the organizations and in the network.

89. This technical team would have access to specialized technical support upon demand and according to the expressed needs of the network members. As an example, the areas could include climate and CC, grassland management and soil and water management or any other specialized topic identified during the implementation of the strategic plan.

90. The network would also manage a small fund for financing the establishment of demonstrations plots in schools and organizations and for youth adaptation projects. The participation of children and teenagers would be strongly encouraged by involving the computer-based CEIBAL[34] platform

[34] The CEIBAL Plan is a public programme implemented since 2006 that provides a free laptop to every child attending public primary schools and that is now being extended to secondary schools. It also provides the infrastructure for Internet access to all primary school venues and training to teachers and pupils.

available in all rural schools in the training and in the communication activities of the network. The involvement of children and youth is regarded as a key factor for the long term sustainability of the network and for identifying innovative approaches and perspectives to adaptation to CC and variability.

91. Whereas the Adaptation Investments component is mainly composed of tangibles delivered to smallholders to make effective transformations in their farms to increase resilience at the farm level, the Strengthening of Local Networks component is ensuring the social and institutional sustainability of the intervention by making possible that local organizations would build capacity to assess the situation, prepare effective action plans and implement them in close coordination with the local and national government. The intervention would provide tangible investments to the most vulnerable sector that lacks the capacity and resources to transform their production systems and would promote better practices among all producers in the LU mainstreaming adaptation to CC and variability through the strengthening of the local network. Base costs of this component were estimated at USD 873.436 and total costs (including physical and price contingencies) at USD 952.361 (see detailed base and total cost tables in Annex 2).

92. **Knowledge Management.** This component contributes to differentiate this project from other initiatives under implementation or under design. The KM component is supporting the whole intervention by involving relevant policy making, research and extension and education institutions in a systematic and participatory assessment of results and in their dissemination to the rural population. This component has two main areas: one is the systematization of experiences at local level and the evaluation of project outcomes and the other is the support to improve the knowledge base on CC and variability through studies, research projects and a systematic effort to exchange knowledge and experience among all public and private institutions that are currently working on CC and variability to create an open forum where all institutions may share advances and coordinate actions. The systematic thinking of experiences is not restricted to review and assess project activities: the project would promote coordination and an efficient use of existing resources by sharing information, knowledge and experience to avoid duplication.

93. KM is a key component of the design because it is intended to ensure the focus of the project is in adaptation to CC and variability and to promote the learning process where technological and policy options would be explored and validated before scaling up. The project is planned since the onset to provide valuable input to other projects and regular programmes as well as to benefit from synergies with them. In such a way, the KM component ensures the spill-over to many other farmers which will be indirect beneficiaries of the project during or after its completion.

94. The project would promote and finance new studies and research projects linked to CC and variability, responding to the needs of the selected LU or other vulnerable territories. The methodology for selecting projects would involve the local networks to ensure relevance at the production level and would

promote building up of knowledge and experience, avoiding duplication or isolated experiences that cannot yield validated results.

95. The component would also provide institutional strengthening to the Agricultural Unit for CC (UACC) of the MGAP. This Unit is responsible for mainstreaming CC issues in the different policies and programmes of the Ministry and will be responsible for the overall technical guidance of the project. It participated in the design of the National Plan in Response to CC and participates representing the MGAP in the different fora at the national and international level on CC and liaises with the Ministry of Housing, Land Planning and Environment (MVOTMA) for communicating the risks linked to CC and variability from the agricultural sector perspective in the national communication to the UNFCC. The project will finance a technical assistant and a communication assistant, small equipment for communications and the development of a project web site and advertisement in local radios to disseminate the experience to other areas in the eco-region sharing similar risks. All these activities will be implemented in close coordination with the Local Networks.

96. The component will finance studies and consultancies identified by the MVOTMA on systematization of existing information, selection of indicators and methodologies to monitor and evaluate adaptation to CC and variability and its application to specific projects and programmes and preparation of studies and reports on adaptation measures in the agricultural sector and their inclusion in the national communication to the UNFCC.

97. This component, led by the UACC and in close consultation with RENARE, will call upon the UDELAR, national public university with various faculties and research projects linked to CC and variability, the line ministries involved, particularly the MVOTMA, the projects financed by external donors and financial agencies, the agricultural research and extension institutions, such as INIA and IPA in the public sector and FUCREA in the private sector, the national agrarian settlement institute, INC, etc. All of them would be invited to share knowledge and experiences to nourish the project as well as to reach a consensus on a catalogue of best practices, useful toolkits and priority areas for research and studies. It is estimated that the component would organize at least four seminars for this purpose.

98. The MVOTMA would design and implement an awareness and communication strategy on the risks posed by CC to the local assets of farmers, in close coordination with the UACC. The implementation would include specialized publications and brochures, advertisements, organizations of science or art competitions for children and youth, etc.

99. At the local level the component would organize annual workshops in each LU to promote critical thinking on the intervention ensuring ample participation of direct beneficiaries. These events would allow eliciting lessons learned from project intervention, identification of best practices and assessment of the effectiveness of different toolkits to address specific problems.

100. The direct intervention with tangible support to smallholders in the LU and the strengthening of local networks would be therefore supported by this systematic review and assessment of the technical options and experiences of different institutions and initiatives, leading to an improvement in the knowledge base of the country in the topic and its preparedness to address CC and variability, providing valuable lessons learned and best practices for other countries in the region. The base cost of the KM component was estimated at USD 723.340 and total cost at USD 784.424 (see detailed base and total cost tables in Annex 2).

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

101. The project will provide significant economic, social and environmental benefits. The focus on financing water management investments will increase efficiency in water harvest increasing availability of water for production and consumption, stabilizing the access to water resources. The decrease in stocking rates will bring about major gains in the long run, since reducing overgrazing allows restoring the botanic composition of natural grassland, increasing biodiversity and the associated resilience. Furthermore, increasing the canopy cover protects against erosion, which in a scenario of increased heavy rainfall reduces soil loss.

102. The focus on smallholders producing in highly climate-vulnerable lands, improving their production systems using a no-regret approach would contribute to increase their productivity and stabilize their income and capital base. The direct benefits to farmers would stem from the increase in productivity and through the stability in production in face of droughts and climate variability. Productivity of the livestock sector was stagnated around 70 meat equivalent kg per ha until the beginning of the present decade and increased by 35% reaching 94 kg in 2009. Smallholders have not participated from this productivity gain and their high stocking rates determine that the losses in face of droughts are dramatic and enduring over time due to the biological cycle. Direct economic benefits induced by the project could be estimated at a minimum of nearly USD 6 million per year only by increasing productivity to the national average levels in the direct beneficiaries.

103. The prevention of losses in face of a moderate or severe drought would bring at least two types of benefits for beneficiary smallholders: the decrease in the mortality rate and the decrease in weight losses. The reduction of the mortality rate implies benefits for the year of the event and the subsequent years until completing the biological cycle. The weight decrease and deterioration of body condition, particularly for cows, implicate a series of losses for the farmer: a reduction in the pregnancy and calving rate and a reduction in total sales in volume and in prices, since animals with lower weight are less priced in the market. The negative effects persist over time until completing the biological cycle (between 3 to 4 years). The losses avoided for these two concepts were estimated at 32% of annual gross income.

104. Data from on-going development projects focusing on sustainable management of natural resources indicate that approximately 19% of investment grants beneficiaries are women household-heads. Projects under design are establishing higher targets as a means to promote gender equity as well as adequate recording of the M&E systems. The access of women to project beneficiaries is usually underestimated by M&E systems through recording the man as the sole beneficiary of the intervention when the household head is a man, whereas women participate in production activities, in decision making and in training programmes. Additionally, the improvement in water management and water availability for animal consumption has a direct positive impact on activities under control of women, such as backyard vegetables, chicken, pigs and small ruminants, all of them contributing to food security.

105. The project will also contribute to build social capital at local level by strengthening the local institutional base, develop innovative organizational schemes and provide training to all stakeholders.

106. Finally it is important to remark the significant synergies that could be expected between adaptation and mitigation of CC. In fact, the whole set of measures proposed to improve the management of natural grasslands of the LU have a high potential in terms of carbon sequestration in soils. Afforestation and agro-forestry systems would also increase CO_2 sequestration in tree biomass. The ex-ante estimate of project-induced-potential net removals in the soil organic carbon pool of grasslands and in living biomass of trees (using tools such as the Exact spreadsheet developed by FAO, IPCC methods, A/R CDM approved methodologies and VCS methodologies) would be ex-post compared to the actual removals measured through an ad-hoc monitoring plan, thus ensuring that mitigation benefits are taken into account and properly quantified. In this regard, the knowledge on mitigation potential generated by the project could provide sound basis to develop mitigation policies aiming at the use and scaling up of project experience through the implementation of NAMAs, Programmatic CDM and/or other equivalent mitigation strategies.

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

107. The project actions will increase resilience of livestock farmers to CC and variability. The smallholders in the selected LU rely for their subsistence on the extensive use of the ecosystem services provided by nature. Climate change threatens the ecosystem services supply (mainly water availability and net primary production of grasslands). The project would reduce vulnerability through a comprehensive set of measures implemented at farm and multi-farm level. These measures will be implemented after a strategic plan has been established at local level. Roughly, vulnerability would be reduced via: (1) investments in runoff water collection and use capacity in the LU; (2) investments and technical assistance to improve the sustainable management of grasslands; (3) investments to protect the animals from heat and storms (windbreaks, groups of trees, silvopastoral schemes); (4) provision of

information, early warning systems and capacity building; and (5) strengthening the networks and the institutional capacity. These measures would protect the animals, the key assets of smallholders.

108. The cost-effectiveness of the proposal is also based on the relevance of the problem that tackles, on the highly focused nature of the intervention and by building on past experience and lessons learned from rural development projects. The project is aiming at addressing CC variability by focusing on droughts, the most destructive intense event for the agricultural sector and that is showing higher frequency and intensity in the past decade. The specific consultation process conducted for the design of the final project proposal confirmed that farmers perceive CC processes, identify droughts as the main threat and express the “lack of water for animal consumption” as the most devastating effect. Additionally the project will also be very effective beyond the impacts of severe droughts: it will also reduce the damages of less intense but very frequent seasonal water stresses. It will also reduce soil erosion caused by heavy rainfall events via the decrease in erodability produced by denser swards that minimise naked soils. In addition the reduction of stresses to animals (lack of water, hunger, heat waves) would improve their resistance to a potential increase in diseases pressure.

109. An important lesson learned from previous projects is the need to provide grants for investments as an incentive to induce transformations that the farmer does not consider relevant or profitable in the short term and that are required for the long term sustainability of natural resources, the cornerstone of competitiveness for Uruguayan agriculture. Previous projects have implemented ad-hoc interventions targeting one investment component and the impact assessments indicate that this approach has not reached the expected results in terms of transformation of the system. Smallholders still consider that their best option to face droughts is demanding subsidies from the Government to withhold their stock, with a short term perspective that means increasing carrying capacity, overgrazing and further eroding the soil. The sustainable alternative is a comprehensive approach targeting investments, awareness, knowledge and organizational strengthening allowing an efficient and sustainable management of available resources, reducing carrying capacity without reducing income.

110. Being diversification a widely accepted alternative to reduce impacts of CC, the selected superficial soils of the Basaltic Cuesta and East Hills eco-regions, covered with native grass, do not have the capacity for growing crops, orchards or other similar activities. In fact the alternatives for production are quite limited except for grazing, or, in the case of the East Region, afforestation. Industrial monoculture afforestation is not an option for smallholders due to the long term returns and delayed cash flow. Grazing is the most suitable alternative for these soils. Additionally, there are cultural values and local knowledge and traditions associated to this livelihood which are recognized as a cultural identity. Nonetheless, the project could explore other potential options for diversification at the LU level, making use of local resources and traditional skills, e.g. local handicrafts with natural wool or leather and eco-tourism. However, the strategic principle underlying this project concept is that any

specific activity should be identified with the participation of local stakeholders, in a bottom-up approach, in order to be sustainable. The establishment of micro-credit schemes in the local community based organizations with revolving funds could promote and finance these activities.

111. The project is allocating 76% of total budget in direct investments to livestock smallholders. The intervention is highly focused by selecting two drought-sensitive LUs (North and South East) within vulnerable eco-regions and by focusing subsidies to investments in livestock smallholders with a technical approach that improves productivity, food security, stability, sustainability and resilience (climate-smart agriculture). Consequently, the project is providing tangible support to the most vulnerable group in identified highly sensitive to droughts and water shortages territories making a significant contribution to resilience by supporting a sector that lacks the resources and capacity to transform by themselves and that require immediate action to increase productivity and resilience to be sustainable and remain in business.

112. As mentioned before, the project is building on the experience of previous projects that have implemented partial solutions. Loan schemes have also been explored. The DGDR, as the responsible entity for implementing all projects relating to rural development, has no legal capacity to on-lend and would have to partner with a formal financial institution to implement a loan facility. This option has been explored and was not successful: loans were adopted by the predecessor to PUR, the PRONAPPA, also financed by IFAD, and found that the access to banking services is hampered by the lack of mortgage collateral and the Central Bank rulings to assess portfolio at risk, that impose higher provisions to uncollateralized loans.

113. Moreover, it was demonstrated that long term loans are not adequate for smallholders because their margins are too narrow to absorb financial costs for longer periods, since their vulnerability to external shocks (variability in market prices, sanitary hazards, CC and variability) may significantly reduce their incomes and payment capacity in some years during the repayment period, creating bad financial records and further reducing access to financial services. Based on these lessons, the PUR promoted micro-credit schemes which were successful for working capital needs (seeds, fertilizers, chemicals and sanitation) but they require high revolving rates to ensure sustainability, which is not consistent with disbursing investment loans. Building on all these experiences the MGAP policy has adopted grants for investments as a strategic instrument to promote technological change and sustainable use of natural resources with different terms according to the socio-economic condition of the grant-recipient. The WB project design under preparation is considering similar grants demanding a greater counterpart contribution for medium and large farmers. The design of this new project is increasing the amount of incentive due to cost increases in US dollars.

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,

national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

114. The project is identified in the framework of an active policy towards climate-smart agriculture promoted by the Government that has recently formulated and adopted a National Action Plan for CC. The Plan was formulated with participatory approaches and obtained the consensus and support of all stakeholders in the private and public sector. The Ministry of Livestock, Agriculture and Fisheries (MGAP) has established competitiveness with social inclusion and environmental sustainability as its top priorities. The present proposal is part of a comprehensive action plan that includes a proposal for a Sustainable Management of Natural Resources and Climate Change Project and the Rural Production Development Project –already negotiated with the World Bank and IADB respectively and scheduled to start implementation in 2012- and several studies on Index-Based Insurance Schemes financed by several external institutions (see Section F).

115. The country is committed to social inclusion and the efforts of the MGAP to support smallholders are part of a more comprehensive Government social policy that gives priority to education and capacity building. As already mentioned, these give a key role to the DGDR and to its permanent rural development programmes. Social programmes have reached rural areas, having some difficulties to ensure the link between programmes that create opportunities to increase income to the rural poor to those that improve education, health, housing and participation. The present proposal is strengthening the local institutional network to improve participation and empowerment, hence contributing to raise the quality of public policies and programmes' implementation at the local level.

E. Describe how the project / programme meets relevant national technical standards, where applicable.

116. The project M&E would monitor and record relevant data on all field activities and through the knowledge management component would open this data to the screening of the major research institutions (INIA and UDELAR) to ensure that technical standards will be achieved.

117. The MGAP has a vast experience in the implementation of agricultural projects, either using its own technical services or coordinating the execution with other public or private institutions. The most relevant technical directorate and units of the Ministry related to the core objectives of the project will be involved in implementation: the DGDR ensuring expertise in project implementation and territorial development; the UACC providing specialized technical leadership on CC and variability; and the RENARE providing the guidelines on sustainable natural resource management, particularly water and grasslands. The project would involve qualified public or private technical service providers according to specific terms of reference and following the experience of successful projects implemented in the rural areas.

118. It is not expected that the small investments financed by the project will require impact assessments. Nonetheless, the proposed investments of the Adaptation Investments component would comply with the Decree 435/94 of MVOTMA that regulates Law 16.466 (Environmental Impact Law) from 1994. Those projects qualified as “B” or “C” would be analyzed by DINAMA / MVOTMA.

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

119. There is no duplication with other funding agencies nonetheless there will be significant opportunities for building synergies with other projects. The MGAP has prepared two rural development project proposals that are scheduled to start implementation in 2012: the Sustainable Management of Natural Resources and CC Project financed by a USD 49 million loan from the WB and the Rural Production Development Project financed by a USD 33 million loan from the IADB. Both projects have already been technically approved by the funding agencies, including a draft operations manual, and have been successfully negotiated, pending from Board approval. The implementation period is for five years and it is expected that the loan will be declared effective before the end of 2011. The IADB funded project focuses on value chains, increasing production and productivity and on strengthening the DGDR on territorial planning, which will contribute to the success of the AF project that is proposing a territorial approach through the LU intervention.

120. The WB funded project, Sustainable Management of Natural Resources and CC, shares similar objectives but the proposal to the Adaptation Fund differs in various aspects: the target audience of the AF is much more focused, the approach has a territorial perspective given by the LU framework intervention that is not considered in the other proposal and the investments will be selected for financing according to technical feasibility and the priorities set forth at the LU Strategic Plan. The WB project would finance investments aiming at sustainable management of natural resources on the basis of open calls at national level and based on technical feasibility only. The present proposal recognizes that this type of approach leaves the most vulnerable groups in a disadvantaged position, since their capacity to link with public programmes and to access support services is not equivalent to that of the better-off farmers.

121. Specific focus on territories identified by vulnerability and concentration of smallholders and pro-active action towards the involvement of these groups constitute a significant difference. The strategic planning provides a framework to prioritize the actions and sub-projects in order to achieve the expected outcomes towards adaptation to CC that is not available or ensured in an open call approach. Such approach provides the grounds to identify innovative solutions that could require an organizational base to become successful (such as lease of common grazing paddocks or group purchase/production of supplementary feeding), which are less likely to address and be successful with an open call methodology. The strategic plan provides a clear perspective of the complete list of adaptation measures required in the LU to increase resilience,

establishing the priority of such actions to ensure adaptation to CC and variability, and allows focusing and selecting the most relevant and effective investments and actions.

122. Both projects will be implemented by the DGDR and it has been agreed that grans for investments will have similar conditions in all projects to ensure that there will be no interference with the legitimate expression of needs and demands of potential beneficiaries. Each project will state its objectives and methodologies and there will be no special incentive to present proposals to one or other except for the specific objective that each one sets forth. It is expected that the WB project might build projects for medium-size livestock farmers and thus contributing to the implementation of the LU Strategic Plan and from a general perspective, this project is proposing a new methodological approach that could be adopted and scaled up by the WB project to the national level.

123. The possibility of duplication with other projects is also prevented by the controls established at the MGAP. The DGDR has a Monitoring & Evaluation System that identifies the beneficiary farmer and its farm, which allows detecting when a beneficiary has already received support for an investment. In most cases, the new application is rejected, except in cases where the new investment is complementary to previous support. Since beneficiaries have to contribute with at least 20% of total costs, it is usual that smallholders make small investments step by step. The DGDR technical staff at the regional level makes visits to the farm and verifies the rationale, the technical relevance and the cost structure of the new application. MDRs are involved in this process to ensure accountability and transparency at the local level.

124. Other relevant actions under implementation that could create synergies with the project are: i) Low Carbon Development Options for Uruguay (2011-2012), a study financed by the WB to identify low-cost options and feasible mechanisms for reducing the country's net GHG emissions intensity; ii) Feasibility Study for the Introduction of Index Insurance for grassland areas (2011-2013) financed by the WB; and, iii) Innovations in Index Insurance Schemes for the Smallholder Sector (2011-2013), financed by the IADB.

125. The MGAP has received the support of FAO to implement another interesting initiative, closely related to this proposal: TCP/URU/3302 to develop New Policies for Agricultural Adaptation to CC. This project has a budget of USD 325.000 to finance studies, consultancies and research proposals that would address the questions on what are the climatic risks that the agricultural sector is facing and what are the options to reduce risks and building resilience. This TCP is already under operation, though has experienced delays in start-up and its outputs are expected to be available in 2012. This project is implemented by the UACC, which ensures that the findings and outputs will be shared with other institutions through the KM component.

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

126. The project would include a specific component to improve the country's knowledge base on CC and variability and to systematize the project experience to elicit lessons learned. This component is described in Section A and would involve all relevant institutions in policy making, research, extension and tertiary education to make a comprehensive survey on the state of the arts of research projects, studies and initiatives to promote an efficient allocation of resources, by avoiding duplication, assessing results and mainstreaming of best practices.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation.

127. With the support of the AF, the ANII and MGAP contracted a specific consultation process for the design of this project proposal conducted by an independent well-known consulting firm with vast experience in applied social sciences studies (see Annex 4). The consultation process included the MDRs of Salto, Lavalleja, Maldonado and Treinta y Tres and farmers, grass-root organizations, leaders and technical resource persons at the local level, covering the organized population in both LUs. The methodology included general meetings or workshops with the MDRs and specific interviews and participant observation and exchange with the different segments of the audience during or after the main event. The response of the stakeholders was extremely positive: the attendance was very high and with active participation across the different groups.

128. The main objective of the consultation was to gather information on the existing sensitization and knowledge regarding CC and variability, adaptation measures, barriers to adopt them, demands to institutions and willingness to participate in local participatory processes to manage climate risk. As a result, the consultation would ratify or reject the main hypothesis that supported the concept note design, without suggesting any specific activity or project component.

129. The results indicate that the perception of an increased climatic risk is widespread, as well as concern regarding present and future impacts. Notions such as CC, global warming and pollution are mentioned, though the concept, scope and impact of each one is not clear. The main problem perceived by farmers is increase in droughts, water stress periods and heat waves in the summer season, being the main impact the "scarcity of water for animal consumption", seconded by lack of forage (main problem mentioned by technical staff) and, subsequently, lack of reliable climate forecasts and specific problems related to a perceived stronger sun radiation. The narratives of participants present practical indicators of CC: need to change working hours to avoid heat waves and changes in animal behaviour. Their perception indicates that these problems have increased in the past 10 to 15 years and that the climate variability has increased, becoming increasingly unpredictable.

130. Consistent with the drought risk as the main problem, adaptation measures mentioned are building and maintaining small water reserves (water harvest) and protecting springs and headwaters. Some farmers indicate that

they have already started taking on-farm adaptation measures, mainly through water reserves. Technical staff has a different perspective and give priority to adaptation measures linked to nutrition, such as forage reserves.

131. Main barriers for adopting such measures are own financial capacity, delays in support plans of the public sector and high prices of well-built water sheds. Demands to the public sector to remove those barriers include more efficiency in the implementation of support plans and programmes, training in natural resource management and control over illegal irrigation (in the Eastern area of the country). The organizations also mentioned barriers that lie in their own lack of commitment to maintaining water reserves and protecting rivers and water resources. Farmers in these areas also acknowledge that the stocking rates are too high, which makes them extremely vulnerable to water stress, yet they do not regard decreasing as an alternative and demand support to make forage banks or other group actions that may assist them to hold their animals.

132. Past experiences linked to organization and networking have been successful but not a regular practice. Most of the difficulties lie in lack of management skills and poor coordination. Local stakeholders could be willing to participate though such processes should be strongly promoted and supported.

133. The results of the consultation confirm the main hypothesis of the project design: droughts and water stress as the main problem linked to CC; increased climate variability; need for massive training and support to adopt adaptation measures; and, willingness to participate in local networking processes that may contribute to improve their level of preparedness to understand the process of CC and enhance their adaptation capacity to build resilience.

134. The project concept is also consistent with the national consultation conducted as part of the preparation of the National Action Plan for CC. This consultation involved the Rural Development Boards and the results gave top priority to droughts as the most disruptive event in agricultural production.

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

135. The project proposal includes the financing of a wide range of adaptation measures within the selected LUs. The corresponding investment costs have been identified and the intervention would focus on the selected LU to increase resilience. The project has adopted the strategy to cover a small number of LUs in order to have a significant impact in the territory. The KM component would coordinate and liaise with other initiatives addressing CC and variability as an added value. The participation or co-financing of other projects and programmes may contribute to expand scale but is not required to achieve the expected results.

136. The project promotes a “no-regret” strategy, yet the design is specifically addressing CC and variability in the selection of the target audience and project area: a livestock development project would not focus on the same sites and same target group if it was aiming at increasing production and would not focus

on livestock smallholders if there was no CC scenario. The CC scenario is increasing uncertainty and posing additional restrictions on a group that is increasingly at risk and with reduced options to cope with rainfall variability. The PPR focused on smallholders with a national coverage and had a strong intervention in the Basaltic region based on open calls to present proposals. The results at the individual level were satisfactory but the project had to promote collective action to ensure sustainability and had limited impact on a territorial perspective. The present proposal is based on this lesson by promoting a territorial approach that would tackle development constraints at the farm level with a landscape perspective that reinforces the local capacities to sustain livelihoods and build resilience at the LU level in a sustainable manner.

137. The project focus on droughts and water stress since this is the main threat perceived by farmers. Nonetheless, strengthening of local networks to be able to better understand and communicate climate information and CC, to implement early warning systems and to liaise with local and national authorities will contribute to adapt and build resilience to other extreme events. All these actions were demanded by farmers and organizations in the consultation conducted to support project design.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

138. The National Innovation and Research Agency (ANII) has been certified before the AF as an execution entity. The ANII would be responsible for the management of the AF grant and the MGAP would lead the technical execution of the project. The MGAP would involve all the specialized technical directorates and units relevant to the project, the Rural Development Directorate (DGDR), the Agricultural Unit for CC (UACC) and the Natural Resources Directorate (RENARE). The ANII would sign a Letter of Agreement (LoA) or Memorandum of Understanding (MoU) with the MGAP for the implementation of the project, where the objectives, activities and budget would be elicited and all the responsibilities of the parties would be listed and agreed. The Project Operations Manual would be prepared in advance, agreed between the parties and included as part of the LoA or MoU.

139. The DGDR of the MGAP would be responsible for executing two main components of the project (Adaptation Investments and Strengthening of Local Networks) through its headquarters and regional offices in the Basaltic and East Hills regions. This Directorate is responsible for the implementation of all rural development projects with external financing and has a vast experience in project implementation. It has shared administrative and management services for all projects, including Monitoring & Evaluation (M&E) and procurement, thus creating synergies and reducing operating costs. The DGDR has a Projects Coordinator responsible for all projects with external financing and would hire a Technical Assistant (TA) to support this Coordinator, specifically allocated to the AF financed project for the five year period of implementation. The implementation team would be completed by a Monitoring and Evaluation

assistant and supported by an administrative clerk (see detailed base and total cost table in Annex 2). The Technical Assistant would be responsible for supporting the Projects Coordinator for the overall implementation of annual work plans, in close coordination with the regional offices and all project stakeholders. The M&E assistant would coordinate the flow of information from the LUs to the M&E system.

140. The sub-project cycle will be described in detail in the project Operations Manual and procedures would take into account best practices of WB and IADB projects and the suggestions of local stakeholders participating in the Local Network. The DGDR will be responsible for the technical evaluation of proposals, in close consultation with the UACC and RENARE to prepare the evaluation protocols to ensure focus on CC and variability and the application of RENARE's guidelines regarding sustainable management of natural resources.

141. The DGDR has a software for M&E of its rural development projects that includes information on beneficiaries, sub-projects and allows monitoring the project cycle, integrating financial information. This software will be enhanced with the new WB financed project coming on board in 2012. The design of the new software will take into account the ANII's financial management and accounting software in order to capture information from both sides and be able to prepare integrated progress reports. The MGAP will be responsible for the physical progress report and for the preparation of the Annual Work Plan and Budget.

142. The MGAP through its specialized technical directorates and units will ensure focus and technical standards. The UACC would lead technical strategies to ensure that CC and variability will remain at the core of project thrust. It would be responsible for the implementation of case studies and evaluation studies required by the M&E system as a specialized and external body to the DGDR, ensuring independence and specific technical expertise to assess the quality of the studies according to the core objectives of the project. The RENARE would provide the technical guidelines for natural resource management, particularly for water, soil and grassland management.

143. The day-to-day operations of the Adaptation Investment and Strengthening of Local Networks components would be carried out by the DGDR. The UACC would lead the implementation of the Knowledge Management component. Both would work in close coordination with the ANII for the procurement procedures and timely disbursement of project funds. All project activities would follow the procedures of the Project Operations Manual to be prepared and approved in the first three months of implementation. The DGDR and UACC would be responsible for all the technical steps required before the disbursement of funds, e.g. the selection of sub-projects, letters of agreement and contracts with beneficiaries, terms of reference of procurement and contracting, etc.

144. In order to put into practice an integrated and coordinated approach supported by all technical divisions of the MGAP, the Projects Coordinator will

promote regular meetings with the UACC and RENARE to assess progress and coordinate activities and requirements of specific technical support.

145. The project would set up a Consultative Group with representatives of the MGAP, MVOTMA, the INIA, IPA and the UDELAR. The purpose of the Consultative Group would be to ensure coordination and information at the institutional level. The MGAP would participate through the DGDR, UACC and RENARE.

146. The MGAP would work in partnership with the MVOTMA for the implementation of specific actions in the Knowledge Management component.

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

147. The following table presents the risk identified and the mitigation measures adopted in design.

Table 7
Project risks

Type of Risk	Impact	Probability	Rationale / Mitigation Strategy
There is no demand for adaptation investments	High	Low	Smallholders expressed in the consultation the need for investments to address adaptation to CC, particularly regarding water for animal consumption. The last Call organized by the MGAP-PPR for water management investments at national level had 2.082 applications, showing remarkable interest from farmers.
The organizations are not interested in participating in the Local Networks	High	Low	Local grass-root organizations are already participating in the MDRs and expressed their interest in participating in the project in the ad-hoc consultation
The project changes focus from adaptation to CC and variability to production and productivity	High	Low	The UACC will be involved in the M&E System, the MVOTMA will participate in the Consultative Committee and CC and variability are top priorities of the MGAP
Targeted smallholders are unable to compete and sustain their livelihoods	High	Low	The project will focus on transition-smallholders which have the capacity to compete with investments and technology adoption. The project aims at no-regret investments and the sustainable use of natural resources will contribute to increase resilience and

			production simultaneously by having adequate water supply, adequate management of grassland and adequate stocking rates.
Delays in disbursement of funds discourage farmers from participating in the project	Medium	Low	The ANII will be responsible for financial management and has efficient and prompt procedures.
Lack of transparency or political interference in allocation of resources	High	Low	Local grass-root organizations will be involved in the selection of projects and screening of eligibility. The MGAP has an outstanding record of transparency and high technical standards in the allocation of grants to smallholders, verified by external funding agencies as the World Bank and Inter-American Development Bank.
Lack of coordination between different components	High	Low	The MGAP will implement the three components and there is experience in team-working between different technical units. The MVOTMA will participate in the Consultative Committee and has participated in similar Committees for other projects.

C. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

148. Technical M&E would be conducted by the MGAP, while fiduciary and financial management and monitoring would be conducted by the ANII. The ANII would prepare financial reports and would compile the technical progress reports prepared by the MGAP and send them to the AF on regular basis according to the requirements set by the Fund. The MGAP would be responsible for the preparation of the Annual Work Plans and Budgets (AWPB) and submit them to the ANII in due time. The MGAP would liaise with the MVOTMA for ensuring the adequate integration of the activities to be implemented in coordination with the MVOTMA in the AWPB.

149. The DGDR has an M&E software that allows a clear identification of beneficiaries, the type of investment financed and the amounts disbursed per project. This M&E software will be updated and improved for the use of the whole MGAP structure through the Sustainable Management of Natural Resources and CC Project, allowing decentralized and real-time capture of information, integrating physical progress of the project with financial management and accounting and including all projects in the same data base. Current system allows integrating physical progress with financial records, but

there is no remote access for the input of information and the databases are not fully integrated, meaning that the cross-check between projects is not automatic. All these features will be ensured in the improved software, including the capture of historical data (support provided by on-going and completed projects of the MGAP by beneficiary, types of investments, location, etc.).

150. The technical M&E would include semi-annual reports on the progress of project activities and full annual reports where the progress would be compared to proposed targets and the financial information would be checked and reconciled with the ANII records. The technical reports would involve the LU networks to contribute to building management skills: the networks would keep records and input the information in the M&E system. The Project Coordinator would organize workshops to discuss the progress reports and identify corrective measures or ways for better achieving project objectives. The DGDR project staff, UACC, RENARE, representatives of the MDRs and organizations, the ANII and any other institution involved in implementation would be invited and encouraged to participate.

151. Additionally, at the local level the project would conduct participatory case studies where direct beneficiaries would express their views and their assessment of the intervention. The LU network would identify case studies and/or would select case studies proposed by the UACC or the M&E system, based on the relevance of the case for the LU and on the capacity to elicit valuable lessons learned from the experience to be described, systematized/analyzed and assessed in detail. The case studies could contribute significantly to improve the description of gender related benefits and the participation of women, eliciting lessons learned for collecting and recording information and project activities. It is expected that there would be three case studies per LU over the implementation period. These case studies would complement and provide inputs for the annual workshops conducted by the KM component to elicit lessons learned and assess the progress, quality and relevance of the intervention.

152. The UACC would prepare the terms of reference and supervise the external impact studies at mid term and at the end of project implementation. The initial study for the in depth diagnosis of the LUs would constitute the baseline for project implementation with a thorough characterization of the situation before project intervention.

153. The following table provides a budgeted M&E plan.

Table 8
M&E Plan

Activity	Number/Frequency	Responsible	Budget
Study for the diagnosis of the LUs (baseline study)	- at the beginning of implementation (2012)	- MGAP / DGDR - Project Coordinator and staff	- USD 30.000
Semi-annual reports and annual reports	- every year throughout project implementation	- ANII and MGAP / DGDR - Project Coordinator and staff	- USD 148.520[a/]
Case studies at the LU level	- 3 in each LU throughout project	- UACC / LU network	- USD 12.000[b/]

	implementation		
Annual KM workshops at the LU level	- every year throughout project implementation	- UACC / LU network	- USD 16.000 c/
Mid term external evaluation	- year 2014	- ANII and MGAP / UACC	- USD 25.000
Final external evaluation	- year 2016	- ANII and MGAP/UACC	- USD 25.000

a/ Total budget allocated for the M&E assistant of the DGDR.
b/ Total number: 6 case studies.
c/ Total number: 8 workshops (one per year per LU since year 2).

D. Include a results framework for the project proposal, including milestones, targets and indicators.

Result	**Targets**	**Indicator**	**Source of verification**	**Risks and assumptions**
1. Vulnerable smallholders have increased resilience through implementing adaptation investments.	- 640 smallholders in the South East LU with adaptation investments before 2016, 25% being women household heads. - 10% of South East LU smallholders implement agro-forestry systems before 2016 - 700 smallholders in the North LU with adaptation investments before 2016, 25% being women household heads. - 1.340 livestock farmers receiving technical assistance for implementation of investments, being 25% women - adequate stocking rates according to carrying capacity in beneficiary farmers - 10 % increase	- Farm plans implemented per LU - Investments implemented per LU per type - Water for animal consumption source and availability - Forage source and availability at the farm level - Green Index - Stocking rate - Fertility rate per year - Estimated animal weight gains per year by category - Annual stock composition declared to DICOSE	- Semi annual and annual reports - INIA - IPA records - INM data - SNIG - surveys	- Sanitary situation of the country remains stable (particularly no FMD outbreak)

	in productivity of livestock smallholders by 2016 - Mortality rate increase below 20% and calving rate decrease below 20% in face of moderate and severe drought			
2. There is a local institutional network that manages climate risk at the LU level, involving youth and managing operational instruments that respond in case of emergency in close coordination with the Rural Development Boards (MDR) and the National Emergency System (SNE)	- 2 Local Network established before the end of 2012 comprising at least 28 organizations - Diagnostic and strategic plan prepared for each LU before the end of 2012 - 2 networks fully operational by 2013 - training programme of the 2 networks in CC started by 2013 - 140 local leaders and members of MDRs and organization's boards trained, 40% being women. - at least 4.500 farmers and technical staff trained, 33% being women - meteorological equipment installed in 6 organizations / schools or local institutions since 2013 and data collected regularly - action plans and operating manuals according to warning level by year 2015 - 8 demonstration	- Networks having regular meetings as a sub-group or as an independent MDR - Networks implementing communication on CC, variability and adaptation - Networks presenting proposals to the sponsoring MDR, the MGAP and to the SNE - Networks seeking and obtaining financing from other programmes for implementing their development and CC agenda - Youth members and youth organizations participating in the network - Proposals and initiatives presented by youth implemented	- Network records - Studies and plans - Semi-annual and annual reports - MGAP reports - Brochures and leaflets produced by the networks - Climatic data - Web specific pages and references	- There are local organizations capable of and willing to develop skills on CC and variability - Young men and women are willing to participate in the network together with adult population

	plots in rural schools and organizations established per LU by 2016 - technical team supporting the organizations and the network's strategic plan implementation selected and working since 2013 with at least 33% of female staff - 30% of actions identified in the strategic plan of each LU under implementation or completed by 2014 and 70% by 2016 - at least 14 youth projects implemented with gender equity - at least 3 actions per network identified and implemented with funding sources outside MGAP			
3. There is systematic monitoring on CC and its impact on agriculture, a catalogue of best practices, innovative instruments and lessons learned from systematized experiences endorsed by all stakeholders regarding adaptation to CC with particular reference to droughts and water stress	- at least 1 annual meeting at the local level and 1 at the national level identify best practices, lessons learned and reach consensus on research priorities that are incorporated to public policies - at least 120 stakeholders participating at local meetings per year - at least 50 people from academic, research and policy institutions	- Studies, regular reports on climate data and early warnings on adverse events available at the LU level through the web site - Participation of key institutions and recognition attained by the national seminars as milestones on CC and variability through participant's evaluation - Published catalogue of best practices and	- Semi annual and annual reports - Network records - Published documents - External assessment studies and case studies - Surveys and consultations on rural population - Web site	- Key institutions are willing to coordinate and share knowledge, best practices and toolkits, information on their own projects and studies and openly discuss priorities with other entities

	attending national seminars per year - 8 innovative and original studies and research projects following the agreed priorities are financed - national dissemination and communication campaigns implemented annually by the MVOTMA increase the awareness of rural population on CC and variability - web site for the project available disseminating information and promoting exchange of experiences and lessons learned - 6 case studies and 2 evaluation studies carried out	toolkits for diagnostics, training, etc. - Positive peer and stakeholders review of financed studies and research project - Awareness of rural population on CC and variability increases according to specific surveys		

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

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT[35]

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:

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.

Arq. Graciela Muslera, *Minister,* *Ministerio de Vivienda Ordenamiento Territorial y Medio Ambiente*	Date*: (October,5,2011)*

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 (National Action Plan in Response to Climate Change approved in 2009, prevailing guidelines of the Ministry of Livestock, Agriculture and Fisheries regarding rural development and environmental sustainability, as well as project proposals under preparation aimed at reinforcing previous actions and mainstreaming key strategic principles in agricultural sector policies and programmes, including adaptation to climate change) 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.	
Dr. Fernando Amestoy – Executive Secretary of ANII *Agencia Nacional de Investigación e Innovación* (Implementing Entity Coordinator)	
Tel. and email: +598 2 916 69 16 Ext 201 famestoy@anii.org.uy	Date*: (October,5,2011)*
Project Contact Person: Miguel Helou	
Tel. And Email: + (598) 2 916 69 16 Ext 214 - mhelou@anii.org.uy	

URUGUAY

BUILDING RESILIENCE TO CC AND VARIABILITY IN VULNERABLE SMALLHOLDERS

ANNEX 1

TECHNICAL ASSISTANCE OF THE AF FOR THE PREPARATION OF THE PROJECT: SELECTION OF VULNERABLE AREAS FOR CLIMATE CHANGE AND VARIABILITY RISK MANAGEMENT IN LIVESTOCK ECO-SYSTEMS IN THE BASALTIC CUESTA AND EAST HILLS REGIONS

CIEDUR - MGAP[*] Technical Assistance Agreement within the framework of preparation of the Adaptation Fund Project

I. TECHNICAL PROPOSAL
Selection of Vulnerable Areas for Climate Change and Variability Management in Livestock Eco-Systems in the Basaltic Cuesta and East Hills Regions

1. PRESENTATION

This Technical Assistance Agreement is oriented to support the process of development of the Project for adaptation to Climate Change of the MGAP, which shall be submitted to the Adaptation Fund of the Kyoto Protocol. In particular, it intends to lay the conceptual and methodological foundations for the identification of the agro-ecosystems which are highly vulnerable to the climate change and variability within the Basaltic Cuesta and East Hills ecoregions, with the purpose of defining the Territorial Units (TU) where the future interventions of said project shall be focused on.

The technical team which shall carry out the studies shall be composed as follows:

Agronomy (Family Production)	Ecology	Geography and SIG[**]	Geomorphology
J.P. Aicardi, Agronomist Alfredo Blum, Agronomist	Alejandro Brazeiro, Dr. Carolina Toranza, Dr.	Marcel Achkar, Dr. Ofelia Gutiérrez, MSc.	Daniel Panario, Professor

2. INTRODUCTION

Adaptation to Climate Change

Climate Change (CC) represents one of the main environmental challenges to which humanity is confronted nowadays. By CC it is understood the systematic variation in the averages and / or variability of the variables which characterize climate on Earth in the long term, in general on several decades (IPCC 2007). The United Nations Framework Convention on Climate Change (FCCC), in its Article 1, defines "climate change" as: "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". Related to CC, the FCCC distinguishes CC, attributed to human activities that alter the composition of the global atmosphere, from "climate variability" (CV) attributed to natural causes.

[*] N. de T.: **CIEDUR**_ *Centro Interdisciplinario de Estudios sobre el Desarrollo, Uruguay*_ Interdisciplinary Center for Development Studies (CIEDUR) in Uruguay / **MGAP**_*Ministerio de Ganadería, Agricultura y Pesca*_ Ministry of Livestock, Agriculture and Fisheries

** Idem: **SIG**_ *Servicio de Información Geográfica*_ Geographic Information System

Beyond this distinction, it is acknowledged that CC as well as CV may generate drastic alterations in the natural and social systems. The IPCC expects increases in temperature and modifications in the precipitation patterns during the XXI century, which shall vary in intensity according to the region, affecting a great part of the worldwide population. Within the alterations expected the following can be mentioned: a decrease in the ice and glacial layers in the mountain areas, acidification of oceans, increases in the sea level, retraction of tropical forests, decrease in availability of water and desertification of big extensions of land, particularly in areas currently used for agriculture. In fact, several regions are already experiencing adverse effects related to CC.

Reducing and mitigating the negative impacts of CC and CV implies a series of modifications related to our relationship with the environment and to the means of production. In this sense, it is urgent to promote mitigation actions which tend to reduce the emissions of Greenhouse Gases (GG) as well as adaptation actions in order to minimize potential damages.

In Uruguay, the balance of emissions of greenhouse gases would indicate that the country is behaving as a sink, taking away 10.348,83 gigatonnes of CO2 (Third National Communication, 2010) per annum, without considering the potential losses related to the intensification of the use of the soil. In this sense, although generation of mitigation policies should not be put aside, adaptation should be the most relevant plan of action for Uruguay, such as it has been defined by the National Plan to Respond to Climate Change (NPRCC).

Adaptation to CC and CV in the livestock sector

The NPRCC defines, for the production sector, strategic plans oriented to the horizontal integration of producers related to water management, sustainable management of soils, genetic improvement and use of adapted species.

Within agricultural sector, family livestock subsector may be considered as one of the most fragile ones. Among other reasons, this occurs due to low availability of resources and access to services, as well as to the displacement they have suffered towards poor soils, as a consequence of the expansion of more profitable sectors (e.g. soy bean, forestation). Susceptibility within this sector is intensified in environmental conditions adverse to CC and CV, such as the case of the Basaltic Cuesta and East Hills ecoregions, characterized by superficial and not so fertile soils, as happens in East Hills.

3. OBJECTIVES

General Objective

To lay the conceptual and methodological foundations for the identification of livestock landscapes units which are highly vulnerable to climate change and variability within the Basaltic Cuesta and East Hills ecoregions.

Specific Objectives

(1) To develop a methodology in order to evaluate vulnerability of livestock landscapes units to climate change and variability from the analysis of environmental, productive and socioeconomic information available at public databases of the country.

(2) To evaluate vulnerability of livestock landscapes units form the Basaltic Cuesta and East Hills ecoregions to climate change and variability in order to identify the priority areas within each ecoregion where to focus the future adaptation measures.

(3) To characterize in a sociological and environmental way the livestock landscapes units identified as a priority for investment regarding adaptation measures within each ecoregion.

4. METHODOLOGICAL APPROACH

General approach of theory regarding risk management (Lavell, 2001) shall be applied. Within this context, CC and CV constitute **threats**, as they imply the chance that adverse phenomena occur (e.g., floods, droughts, etc.) to society and environment. The impact such threats may have in a particular system are referred to as **risk**. The risk shall depend on the nature and degree of the threats in question, obviously, but also on the conditions specific to the receptive system, which shall make it more or less susceptible to eventual damage. Susceptibility towards damage of the system is referred to as **vulnerability**.

In this way, the relationship between the concepts of Risk, Threat and Vulnerability may be represented through the following equation:

RISK = function (THREAT, VULNERABILITY)

As it has been mentioned, vulnerability depends on the degree of susceptibility but also on the capacity of the system to face adverse effects of CC and CV, this is, on its **capacity of adaptation**. In this sense, vulnerability of a system comes from its high sensitivity or from its low capacity of adaptation (IPCC, 2001). In connection with CC and CV, the capacity of adaptation is the potentiality of a system to adjust its characteristics or behaviour, in such a way that it expands its range of response or tolerance under the CV existing or the future climate conditions. Adaptive capacity inherent to a system represents the group of available resources for adaptation, as well as the capacity of this system to use these resources effectively in the search for adaptation (Burton et al. 2004).

In this work it is assumed that the threat related to CC and CV is distributed in a homogeneous way within each evaluated ecoregion (Basalto and East Hills), which is reasonable as the climate in Uruguay, lacking important geographical accidents

(mountains), has a scarce spatial variability. As from this premise, it may be deduced that the risk shall change, especially within each ecoregion, based on vulnerability.

Therefore, this work is focused on evaluating the dimensions which determine vulnerability, susceptibility and capacity of adaptation. Within livestock agro - ecosystems, susceptibility shall be evaluated basically based on edaphic conditions (soil depth, stoniness, fertility, etc.), geomorphologic conditions (e.g. slope) and land use (e.g. forestation). In turn, capacity of adaptation shall be evaluated based on attributes of the socioeconomic system (e.g. farm size, stocking rate, access to services and available technology, educational level) (Figure 1).

In Table 1, the logic which relates the indicators selected at the outset for the analysis with the susceptibility and capacity of adaptation concepts is briefly developed.

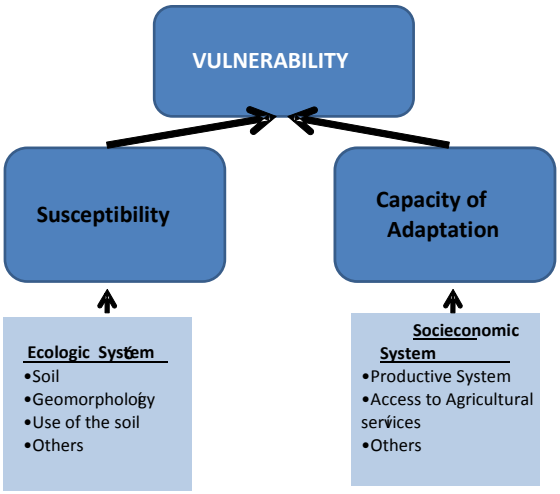


Figure 1. Diagram showing the logical construction of vulnerability index based on indicators of susceptibility linked to the ecologic system and on the capacity of adaptation to the socioeconomic system.

Table 1. Explanation of the logic which relates the indicators selected in order to create a vulnerability index.

Dimension	Indicator	Logic
Susceptibility	Water natural reserves	Link with capacity of primary production in periods of low rainfall. Depends on stoniness, shallowness and texture of the soil and on the presence of shallow bodies of water (rivers, streams and small lakes). The presence of forestations in high basin may affect the availability of water.
	Fertility	Link with primary production.
	Primary production: average and variability (VC)	Direct link with livestock productivity. Main determinant of susceptibility.
	Shelter for cattle	Link with hydric stress. The native forests or woodlands provide shelter and shade thus reducing hydric stress in times of droughts or physiological one due to very high or very low temperatures, in addition to giving nourishment, in the case of the native forests, when the pastures are in poor productive conditions.
Capacity of Adaptation	Holding of sheep	Link with capacity to face drought events. Sheep have more chance of surviving to droughts, which represents an “insurance” in order to cover the

		basic needs of producer before mortality events or bad pasture conditions for sheep.
	Access to agricultural services	Link with productive capacity. Normally the family producers lack machinery and services needed to secure its productivity, so they depend on the access to such services, for instance through agricultural cooperatives.
	Surface of the property	It is reasonable to expect that smallholders shall have fewer options and fewer resources in order to respond to new conditions.
	Organizational capacity	Organized producers have a greater management capacity in order to channel resources for adaptation.
	Infrastructures for retention of water	Wetlands and water reserves are very valuable tools in order to face droughts.
	Road connectivity	Producers who are more connected (access to routes and rural roads) may get help in an easier way in the event of droughts.
	Educational level	In general, highest educational levels shall provide more tools in order to face the challenges of adaptation.

5. METHODOLOGY

Evaluation of vulnerability shall be carried out taking census units as spatial units for analysis, as the greater part of socioeconomic and productive information of the country is summarized on this scale. On the other hand, the units are relatively small and numerous, therefore, it may be considered that this represents an adequate spatial resolution in order to apprehend the geographic variability within each region.

In the first place, taking into account the guidelines set up by the Ministry of Livestock, Agriculture and Fisheries, all the census units which do not comply with the following criteria shall be taken away: (a) number of family livestock producers > 100-150[1] and (b) surface >60.000 hectares. What is understood by Livestock producers are those producers who own properties of less than 500 hectares or equal to that amount, who dwell there and who get the greater part or the family income from the livestock activity.

In the second place, the information corresponding to a series of variables linked to susceptibility and response capacity shall be systematized for each one of the census units taken into account (Table 2).

[1] Based on the particular characteristics of both ecoregions taken into account, two different levels were considered for each case: 100 in Basaltic Cuesta and 150 in East Hill ecoregion. With these numbers, in both cases a density of family livestock producers close to 123 producers / hectares is achieved.

Integration of indicators of vulnerability in order to create a vulnerability index (VI) shall be carried out by means of multlicriteria analysis techniques (Anselin et al. 1989). Basically, the VI is a weighted summation, where the terms of the sum correspond to the indicators previously transformed through a utility function and weighted according to the relative weight thereof, defined by the opinion of experts. The utility function sets the functional relationship between an indicator and that sought to be evaluated in the analysis, in this case, vulnerability. For instance, it sets the connection between deep of soil (continuous variable) and vulnerability (variable between 0 and 1). In accordance with edaphic knowledge, the greater the depth the lesser the risk of erosion, therefore, a decreasing function shall describe such relationship adequately. But this negative relationship may be lineal, exponential or not - lineal. In order to set up utility functions, existing knowledge regarding the respective area shall be used in the first place, and then, failing that, they shall be set up based on theoretical predictions or opinion of experts. After determining the utility functions for each indicator, the measurement (or weight) of each indicator shall be set up based on the opinion of exports.

Table 2. Indicators taken into account to evaluate census units and source of information or methodology of obtaining.

Dimension	Indicator	Source of information
Susceptibility	Shallowness of the soil	CONEAT* (SIG** generated for PPR***)
	Slope	CONEAT (SIG generated for PPR)
	Forested surface	Remote Perception (SIG generated for PPR)
	Surface of native forests	Remote perception
	Woodlands providing shelter and shade	Remote perception
	Primary productivity: variability coefficient	NDVI obtained through satellite images
Capacity of Adaptation	Holding of sheep	DIEA****, DICOSE*****
	Access to agricultural services	DIEA, DICOSE
	Surface of the property	DIEA, DICOSE
	Socioeconomic and educational data	INE******

6. PRODUCTS

Product (1): Report with methodological proposal in order to evaluate vulnerability of units of livestock landscapes (proxy: census units) to climate change and variability from the analysis of environmental, productive and socioeconomic information available at the public databases of the country.

Product (2): Report with evaluation of vulnerability of livestock landscapes units (proxy: census units) of Basaltic Cuesta and East Hills ecoregions to climate change and

*N. de T.: **CONEAT**_ *Comisión Nacional de Estudios Agronómicos de la Tierra*_National Commission for Agronomy and Soil Studies.
** Idem: **SIG**_ *Servicio de Información Geográfica*_ Geographic Information System
*** Idem: **PPR**_*Proyecto de Producción Responsable*_Responsible Production Project
**** Idem: **DIEA**_ *Dirección de Estadísticas Agropecuarias* _Department of Agricultural Statistics
***** Idem: **DICOSE**_ *Dirección de Contralor de Semovientes*_ Directorate for Livestock Control
****** Idem: **INE**_ *Insituto Nacional de Estadistica*_National Statistics Institute

variability. The report shall include: (a) a list and related digital map (SIG) of census units prioritized in terms of its vulnerability (b) values of vulnerability indicators used by census unit (c) proposal of three priority census units per ecoregion where to focus the future adaptation measures.

Product (3): A report with sociological characterization of livestock landscapes units identified as an investment priority regarding adaptation measures within each ecoregion.

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II. RESULTS

Two areas of Landscape Units were selected: one at the East Hills ecoregion and the other one at the Basaltic Cuesta. The general criteria for its demarcation were the definition of the hydrographic basins, the integration of police sections and the use of physical limits which allow a clear identification in the territory, mainly of roads and highways.

North Landscape Unit (Basaltic Cuesta)

- North Area (North Landscape Unit), has a total surface of 1.997.507 hectares distributed in the department of Artigas (805.981 hectares), Paysandú (72.746 hectares), Rivera (50.340 hectares), Salto (922.515 hectares) and Tacuarembó (145.923 hectares).
- The area is composed of 16 police sections and a total of 3.507 livestock producers according to DICOSE Affidavit in year 2010.
- The proportion of shallowness of soils is the following:

North Landscape Unit				
Texture and depth	**Depth**	**Texture**	**SUM_HECTARES**	**PERCENT**
SM	Superficial: <= 25 cm	Mean: FAcAr, Fr, FL, FAc, FAcL	1138730	**57,7**
DH	Deep: > 80 cm	Heavy: AcAr, AcLi, Ac	489883	**24,8**
SH	Superficial: <= 25 cm	Heavy: AcAr, AcLi, Ac	199717	**10,1**
SL	Superficial: <= 25 cm	Light: Ar, ArF, FAr	77898	**3,9**
DL	Deep: > 80 cm	Light: Ar, ArF, FAr	28738	**1,5**
DM	Deep: > 80 cm	Mean: FAcAr, Fr, FL, FAc, FAcL	18992	**1**
ML	Mean: > 25 <= 80 cm	Light: Ar, ArF, FAr	18599	**0,9**
MM	Mean: > 25 <= 80 cm	Mean: FAcAr, Fr, FL, FAc, FAcL	158	**0**
			1.972.714,1	
		average of shallow soils in landscape unit	**71,7**	**%**
		average of deep soils in landscape unit	**27,3**	**%**

- Livestock producers are distributed as follows:

North Landscape Units / *DICOSE* data (Affidavit)		
Stratum	Producers	Surface (ha)
0 - 50 ha	1,035	18,776
51 - 750 ha	1737	515,742
more than 751 ha	735	1,405,756
TOTAL	**3,507**	**1,940,274**

The difference in the surface is due to the urban areas, wetlands, rivers and hills not declared by the produced.

- There is a total of 710 family producers registered in the MGAP Registry of Small Producers
- The following urban towns are located within the landscape unit:

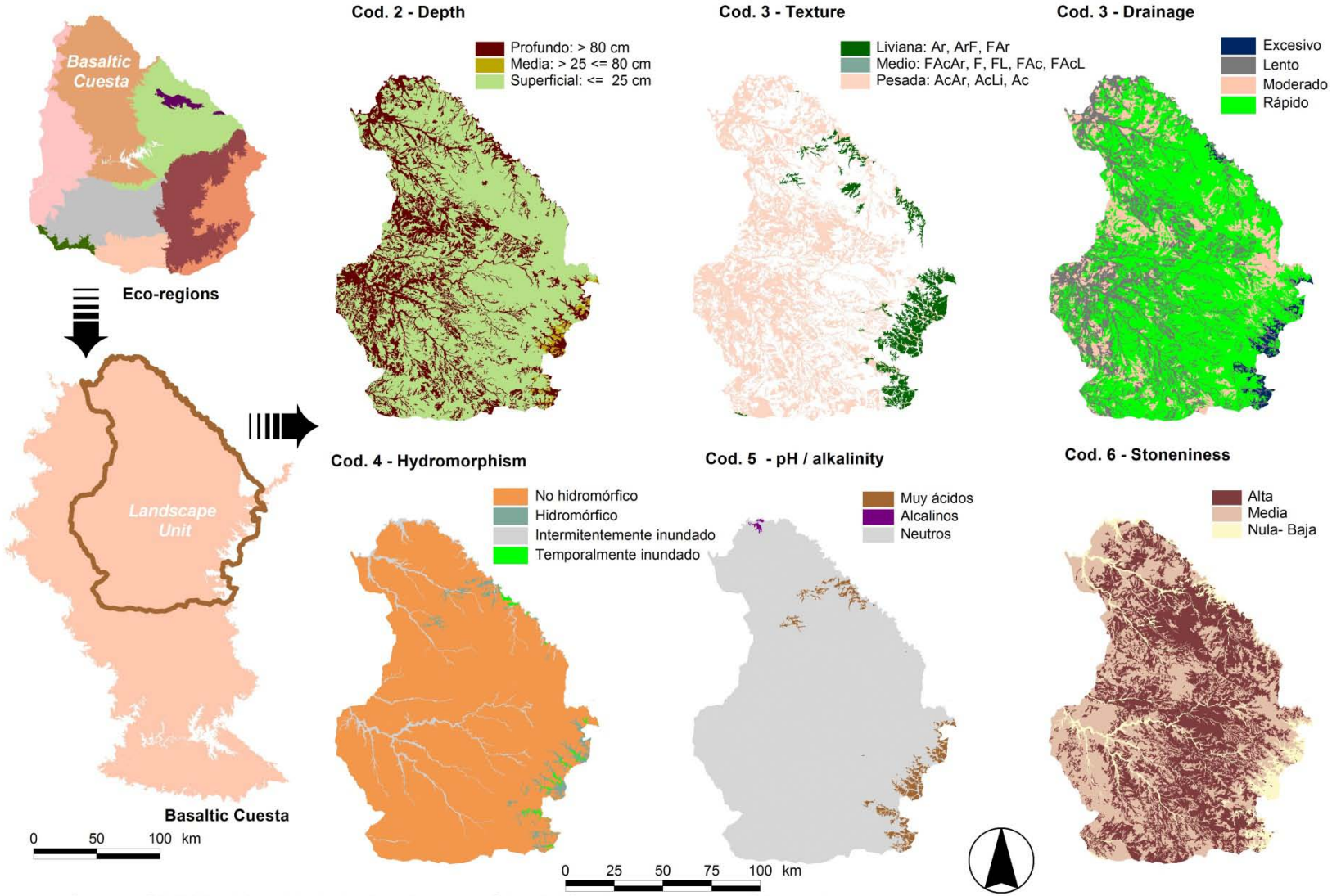
Bernabé Rivera
Javier de Viana
Sarandí del Arapey
Masoller
Pueblo Lavalleja
Paraje Lluveras
Ciudad de Artigas (capital of the department)

- The following urban towns are at a distance not long than 5 km from the landscape unit:

Tranqueras
Tambores
Tacuarembó

- There are no urban towns within a distance of 5 and 10 km around the landscape unit.

Main characteristics affecting soil sensitivity to droughts in the Landscape Units of the Basaltic Cuesta



Source: CIEDUR, 2011. Technical assistance of the AF for the preparation of the project.

South - East Landscape Unit (East Hills)

- South East Area (South - East Landscape Unit) has a total surface of 660.287 hectares distributed among the departments of Rocha (241.160 hectares), Lavalleja (313.327 hectares) and Maldonado (105.799 hectares).
- The area is composed of 7 police sections and a total of 2.530 livestock producers according to a DICOSE Affidavit in year 2010.
- The proportion of shallowness of soils and of moderately shallow and light soils is 73%.

South East Landscape Unit				
Texture and depth	**Depth**	**Texture**	**SUM_HECTARES**	**PERCENT**
ML	Mean: > 25 <= 80 cm	Light: Ar, ArF, FAr	353907,8130	**54**
MM	Mean: > 25 <= 80 cm	Mean: FAcAr, Fr, FL, FAc, FAcL	99056,6830	**15**
DL	Deep: > 80 cm	Light: Ar, ArF, FAr	4334,8550	**1**
DM	Deep: > 80 cm	Mean: FAcAr, Fr, FL, FAc, FAcL	61459,8040	**9**
DH	Deep: > 80 cm	Heavy: AcAr, AcLi, Ac	13260,1220	**2**
SL	Superficial: <= 25 cm	Light: Ar, ArF, FAr	125728,6360	**19**
SM	Superficial: <= 25 cm	Mean: FAcAr, Fr, FL, FAc, FAcL	516,9650	**0**
SP	Superficial: <= 25 cm	Heavy: AcAr, AcLi, Ac	2021,7340	**0**
			660.286,6	**100**
		average of moderately shallow and light soils of the landscape unit	**53,6**	**%**
		average of shallow soils of the landscape unit	**19,4**	**%**
			73,0	

- Livestock producers are distributed as follows:

South _ East Landscape Units / *DICOSE* data		
Stratum	Producers	Surface (ha)
0 - 50 ha	821	18,221
51 - 750 ha	1,558	332,794
more than 751 ha	151	236,760
TOTAL	**2,530**	**587.775**

  The difference in the surface is due to the urban areas, wetlands, rivers and hills not declared by the produced.

- There is a total of 776 family producers registered in the MGAP Registry of Small Producers

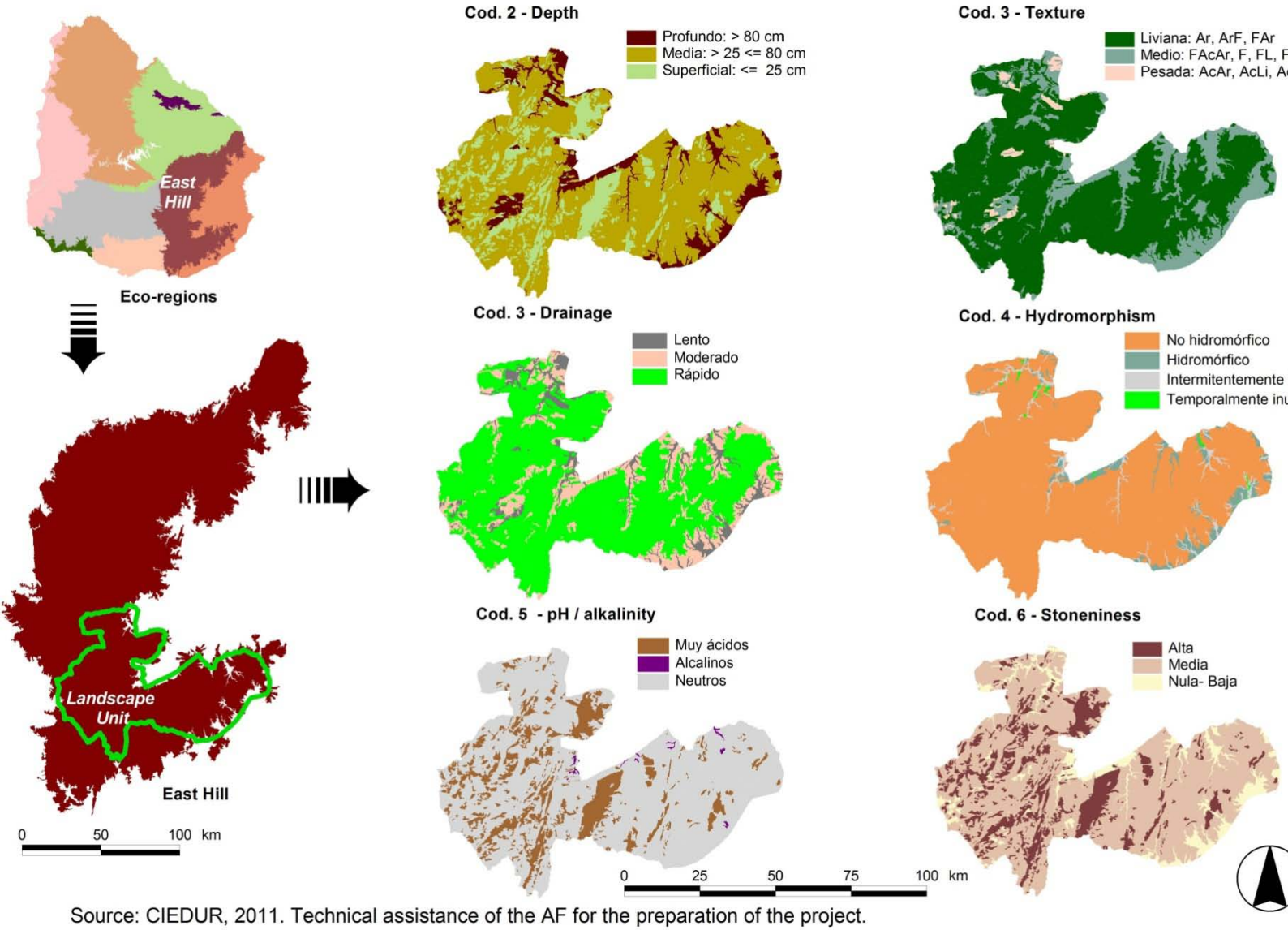
- The following urban towns are located within the landscape unit:

  Pirarajá
  Colón
  Mariscala
  Velásquez
  Aiguá
  Minas (capital of the department)
  19 de Abril
  Rocha (capital of the department)
  Castillos

- There are no urban towns within a distance of 5km from the landscape unit.

- There are no urban towns within a distance of 5km and 10 km around the landscape unit.

Main characteristics affecting soil sensitivity to droughts in the Landscape Units of the East Hill



Source: CIEDUR, 2011. Technical assistance of the AF for the preparation of the project.

ANNEX 1
Appendix 1
Organizations according to landscape units

SOUTH EAST LANDSCAPE UNIT

Name of Organization	Location of physical headquarters	Type of Organization	Level of Development
CALAI (Agricultural Cooperative)	Maldonado - Aigua	Cooperative	Consolidated
El león Agricultural Society	Maldonado - Aigua	Development Society	To be consolidated
Chiarino Milans Rural Society	Maldonado - Aigua (Route 39 km 75)		To be consolidated
Las Cañas Rural Society	Maldonado Las Cañas	Rural Society	To be consolidated
Route 10 Rural Development Society	Rocha - Ciudad Rocha	Development Society	To be consolidated
Velazquez Agribusiness	Rocha - Route 15 20 km from Velázquez to Ciudad Rocha		To be consolidated
Rocha Cooperative	Rocha - Ciudad de Rocha	Cooperative	To be consolidated
Rocha Agricultural Society	Rocha - Ciudad		To be consolidated
19 de abril	Rocha - 19 de abril Route 9 km 220		To be consolidated
Castillos Development Society	Rocha - Ciudad de Castillos	Rural Development Society	Consolidated
Orti Rural Development Society	Lavalleja- Ciudad de Minas	Rural Development Society	Consolidated
Lavalleja Agricultural Society	Lavalleja- Ciudad de Minas		To be consolidated
Candido Cal Society	Lavalleja - Mariscala		To be consolidated
Francisco Cal Unionization	Lavalleja - Paraje Barriga negra		To be consolidated
Rural Development Tables of Southeast region: 3 (North Maldonado, Southeast Rocha and Lavalleja)			

NORTH LANDSCAPE UNIT

Organization / Institution	***Location***	***Level of development***	***Type***
Department: Salto			
Guaviyú de Arapey RS	*Guaviyú de Arapey*	*Consolidated*	*Rural Society*
Mataojo Grande RDS	*Pueblo Cayetano*	*Consolidated*	*Rural Development Society*
Basalto Ruta 31 RDS	*Carumbé*	*Consolidated*	*RDS*
Vera y Cañas RDS	*Vera*	*Consolidated*	*RDS*
CAMANO	*Puntas de Valentín*	*Consolidated*	*Cooperative*
Department: Tacuarembó			
Paso del Cerro Group	*Paso del Cerro*	*To be Consolidated*	*Group*
Liga Campamento Artiguista	*Cerro Travieso*	*Consolidated*	*RDS*
Grupo Quebrada de Laureles	*Cuchilla Laureles*	*To be Consolidated*	*Group*
ARPROLA	*Laureles*	*Consolidated*	*Rural Association*
Pastoreantes Group	*Bañado de Cañas*	*To be Consolidated*	*Group*
Department: Rivera			
Masoller RDS	*Colonia A. Saravia*	*Consolidated*	*RDS*
Valle Lunarejo Cooperative	*Boquerón*	*Consolidated*	*Cooperative*
Grupo ganaderos del Valle	*Ptas. De Lunarejo*	*Consolidated*	*Group*
Department: Paysandú			
Basalto Tambores RDS	*Tambores*	*Consolidated*	*RDS*
Cuchilla de Haedo (ex Basalto Superficial) RDT			*Rural Development Table*
Artigas DT	*Artigas*		*RDT*
Artigas West Development Table	*Itinerant: Tomás Gomensoro, Cainsa and Bella Unión*		*RDT* *group*
Salto East Development Table	*Biassini*		*RDT*
Bañado de Cañas-Tacuarembó Development Table	*Bañado de Cañas*		*RDT*

Annex 1

Appendix 2

Socioeconomic (2) characterization of producers

1.- General characteristics

Agriculture in general and in particularly livestock agriculture is the base of Uruguayan economy. Different livestock activities are developed throughout the year in outdoor grazing. Different types of pastures are the priority sustenance of the different species and animal categories. Livestock production based on the use of natural pastures is the main rural productive activity (MGAP 2000)[2].

There is a productive specialization within livestock activity which determines the existence of a category of family livestock breeders and producers (MGAP 2007) whose activity is essential for productive structure of livestock regarding meat and wool. Family livestock breeders and producers constitute the majority of producers of the selected landscape units and show income and productivity problems which make them vulnerable to CC (Oyhantçabal y Methol, 2009) from the social and economic point of view.

Due to the lack of updated and specific elaborated data for the landscape units, a characterization of livestock activity, specifically the breeding one, shall be carried out, but without stating differences between the landscapes units. For such purpose, the basic information of Agricultural Census of year 2000 (MGAP, 2000) shall be considered, but, in addition to this, due to dynamics of growth of agricultural activity in the last years, the most current information available shall be used as well.

In year 2000 basic data show that the main social characteristics of livestock breeders and producers which are more similar to current family producers correspond to the category from 0-200 and 200-400 hectares.
With regard to producers differentiated according to sex, 78% were male and 22% were female.
Regarding age, the most frequent age range was that of 50 years old, and prone to grow in the units of smallest size.
Educational level indicated that 66% of producers had finished elementary school.
Nationality indicates that 98% are Uruguayan.
52% of producers dwelled permanently in the property.
With respect to ownership, 63% of producers own the property and 26% are tenants.

Using more current data, Molina, C. (2010)[3] finds that the values of indicators of quality of life and devotion to the activity are the right ones, but the isolation due to the difficulties concerning access and distance from the population centers affect

[2] MGAP, DIEA Agricultural Census, 2000
[3] Molina,C. et al, IPA, 2010

some social aspects, such as participation in general and productive participation. This confirms the relatively low levels of education.

On the other hand, and taking into account economic aspects within livestock production, breeding activity is the one with less income and is consigned to the soils with greater productive restrictions. Family production[4] is the most vulnerable one within the sector.

In year 2010, a study on models of properties (Mila,Tambler & Oyhantçabal)[5] based on DICOSE affidavits and "*carpetas verdes*"[*] with economic records of properties of the Agricultural Plan Institute, established three models of breeding livestock properties. Model 1 with a surface range of 160-240 hectares, model 2 with a range of 200 to 400 hectares and model 3 of 160 to 1440 hectares. Based on that information, the following comparison of economic results was determined:

	Model 1	Model 2	Model 3	BREEDING "rural register" average
Gross Income / hectare	99.9	89.5	82.3	102.0
Production Cost / hectare	76.5	64.1	51.2	68.1
Net Income / hectare	23.4	25.4	31.1	33.9
Relationship Input Product	0.77	0.72	0.62	0.67

Source: IPA[**] and OPYPA[***]

With respect to the income of these producers below poverty line and with Unsatisfied Basic Needs (UBN), although the landscape units defined are of a smaller extension than those defined in a work by Paolino and Perera[6], for the Northeast region (Artigas, Rivera, Cerro Largo, Treinta y tres and Rocha) data may be fully extrapolated and show that this region "…*is the one which has, with respect to the*

[4] In accordance with Ministry Decree issued on 29 July 2008 by the Ministry of Livestock, Agriculture and Fisheries the characteristics of family producers are determined as follows: they shall not have more than 500 ha CONEAT Index 100 or equivalent; they shall not have more than 2 salaried permanent workers, and they shall dwell in the farm or being registered in a registry created for the purpose thereof by *MGAP*.

[5] Mila,F.;Tambler A. ; Oyhantçabal,W. *Modelos prediales Ganaderos* [Model of Livestock Properties], MGAP-OPYPA Anuario 2010 [Yearbook 2010]

[*] N. de T.: "Carpeta verde"_ is like a rural register which contains microeconomic records of agriculture companies such as production, costs, incomes, etc.

[**] Idem: **IPA**_*Instituto Plan Agropecuario*_ Agricultural Plan Institute

[***] Idem: **OPYPA**_ *Oficina de Programación y Política Agropecuaria*_ Agricultural Programming and Policy Office

[6] Paolino, C. y Perera, M. *La Pobreza Rural en Uruguay*, [Rural Poverty in Uruguay] FIDA, 2008.

national average, the greater proportion of poor people dwelling in rural spaces enlarged".

That is the only place where dispersed rural population would have greater relative concentration of poor people than the concentration registered for urban towns of less than 5000 inhabitants in the whole territory.

Among the distribution of poor people in work, according to region and the national total, it may be observed a concentration in the agricultural activity of breeding, which is the one with greater concentration of poor people among all activities taken into account by this study, with 16% of the total of poor people.
Northeast and Centre regions are the regions with greater percentage of people in work in a situation of poverty.

The number of non salaried workers is of 1.7 per livestock farm.
Out of the total of male salaried workers, 63% are farm - hand and out of the total of female salaried workers 91% are farm – hand.
With respect to small family producers, the amount of hectare per worker is of 377, therefore, very few livestock farms like this have permanent salaried workforce.
87% of the properties do not hire day laborers.

Regarding characteristics of the three landscape units selected, and from the economic and social point of view, the one with a greater degree of vulnerability is the North landscape unit, which is located in the Basaltic Cuesta ecoregion.

URUGUAY

BUILDING RESILIENCE TO CC AND VARIABILITY IN VULNERABLE SMALLHOLDERS

ANNEX 2

Project Costs

Table 1

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Components Project Cost Summary

	(US$ '000) Total	% Total Base Costs
1. Adaptation Investments	7.260	78
2. Strengthening of local networks	873	9
3. Knowledge management	723	8
4. Coordination	436	5
Total BASELINE COSTS	9.293	100
Physical Contingencies	20	-
Price Contingencies	159	2
Total PROJECT COSTS	9.471	102

Table 2

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Expenditure Accounts Project Cost Summary

	(US$ '000) Total	% Total Base Costs
I. Investment Costs		
A. Goods, works and non-consultant services	64	1
B. Technical Assistance	1.433	15
C. Training	338	4
D. Investment funds	7.260	78
Total Investment Costs	9.094	98
II. Recurrent Costs		
A. Operating Costs	198	2
Total Recurrent Costs	198	2
Total BASELINE COSTS	9.293	100
Physical Contingencies	20	-
Price Contingencies	159	2
Total PROJECT COSTS	9.471	102

Table 3

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Expenditure Accounts by Components - Base Costs
(US$ '000)

	Adaptation Investments	Strengthening of local networks	Knowledge management	Coordination	Total	Physical Contingencies %	Physical Contingencies Amount
I. Investment Costs							
A. Goods, works and non-consultant services	-	60	4	-	64	-	-
B. Technical Assistance	-	498	544	391	1.433	-	-
C. Training	-	177	161	-	338	-	-
D. Investment funds	7.260	-	-	-	7.260	-	-
Total Investment Costs	7.260	735	708	391	9.094	-	-
II. Recurrent Costs							
A. Operating Costs	-	138	15	45	198	10,0	20
Total Recurrent Costs	-	138	15	45	198	10,0	20
Total BASELINE COSTS	7.260	873	723	436	9.293	0,2	20
Physical Contingencies	-	14	2	5	20	-	-
Price Contingencies							
Inflation							
Local	-	65	60	34	159	-	-
Foreign	-	-	-	-	-	-	-
Subtotal Inflation	-	65	60	34	159	-	-
Devaluation	-	-	-	-	-	-	-
Subtotal Price Contingencies	-	65	60	34	159	1,1	2
Total PROJECT COSTS	7.260	952	784	475	9.471	0,2	22

Table 4

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Project Components by Year -- Base Costs
(US$ '000)

	Base Cost					
	2012	**2013**	**2014**	**2015**	**2016**	**Total**
1. Adaptation Investments	650	1.410	2.080	2.250	870	7.260
2. Strengthening of local netw orks	213	162	178	178	142	873
3. Know ledge management	114	132	172	147	158	723
4. Coordination	87	87	87	87	87	436
Total BASELINE COSTS	1.065	1.791	2.517	2.662	1.257	9.293
Physical Contingencies	2	4	5	5	4	20
Price Contingencies						
Inflation						
Local	6	17	34	46	56	159
Foreign	-	-	-	-	-	-
Subtotal Inflation	6	17	34	46	56	159
Devaluation	-	-	-	-	-	-
Subtotal Price Contingencies	6	17	34	46	56	159
Total PROJECT COSTS	1.074	1.812	2.556	2.713	1.317	9.471

Table 5

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Project Components by Year -- Totals Including Contingencies
(US$ '000)

	Totals Including Contingencies					
	2012	**2013**	**2014**	**2015**	**2016**	**Total**
1. Adaptation Investments	650	1.410	2.080	2.250	870	7.260
2. Strengthening of local networks	218	172	196	201	166	952
3. Knowledge management	116	138	186	163	181	784
4. Coordination	89	92	95	98	101	475
Total PROJECT COSTS	1.074	1.812	2.556	2.713	1.317	9.471

Table 6

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Expenditure Accounts by Years -- Base Costs
(US$ '000)

	Base Cost					
	2012	**2013**	**2014**	**2015**	**2016**	**Total**
I. Investment Costs						
A. Goods, works and non-consultant services	64	-	-	-	-	64
B. Technical Assistance	278	273	313	288	279	1.433
C. Training	49	72	76	76	66	338
D. Investment funds	650	1.410	2.080	2.250	870	7.260
Total Investment Costs	1.041	1.755	2.469	2.614	1.215	9.094
II. Recurrent Costs						
A. Operating Costs	24	36	48	48	42	198
Total Recurrent Costs	24	36	48	48	42	198
Total BASELINE COSTS	1.065	1.791	2.517	2.662	1.257	9.293
Physical Contingencies	2	4	5	5	4	20
Price Contingencies						
Inflation						
Local	6	17	34	46	56	159
Foreign	-	-	-	-	-	-
Subtotal Inflation	6	17	34	46	56	159
Devaluation	-	-	-	-	-	-
Subtotal Price Contingencies	6	17	34	46	56	159
Total PROJECT COSTS	1.074	1.812	2.556	2.713	1.317	9.471

Table 7

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Expenditure Accounts by Years -- Totals Including Contingencies
(US$ '000)

	Totals Including Contingencies					
	2012	**2013**	**2014**	**2015**	**2016**	**Total**
I. Investment Costs						
A. Goods, works and non-consultant services	65	-	-	-	-	65
B. Technical Assistance	282	286	337	320	319	1.545
C. Training	50	75	82	84	75	365
D. Investment funds	650	1.410	2.080	2.250	870	7.260
Total Investment Costs	1.047	1.771	2.499	2.654	1.264	9.235
II. Recurrent Costs						
A. Operating Costs	27	41	57	59	53	237
Total Recurrent Costs	27	41	57	59	53	237
Total PROJECT COSTS	1.074	1.812	2.556	2.713	1.317	9.471

Table 8 – Adaptation Investments base costs

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Table 1. Adaptation Investments
Detailed Costs

	Unit	Quantities 2012	2013	2014	2015	2016	Total	Unit Cost (Local)	Base Cost (US$) 2012	2013	2014	2015	2016	Total
I. Investment Costs														
A. Adaptation Investments														
Fund for on-farm, multi-farm and collective investments	$/year								520.000,0	1.130.000,0	1.670.000,0	1.810.000,0	700.000,0	5.830.000,0
B. Technical Assistance														
Funds for technical assistance service to sub-projects	$/year								130.000,0	280.000,0	410.000,0	440.000,0	170.000,0	1.430.000,0
Total									650.000,0	1.410.000,0	2.080.000,0	2.250.000,0	870.000,0	7.260.000,0

Table 9 – Adaptation Investments total costs

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Table 1. Adaptation Investments
Detailed Costs
(US$)

	Totals Including Contingencies 2010	2011	2012	2013	2014	Total
I. Investment Costs						
A. Adaptation Investments						
Fund for on-farm, multi-farm and collective investments	520.000,0	1.130.000,0	1.670.000,0	1.810.000,0	700.000,0	5.830.000,0
B. Technical Assistance						
Funds for technical assistance service to sub-projects	130.000,0	280.000,0	410.000,0	440.000,0	170.000,0	1.430.000,0
Total	650.000,0	1.410.000,0	2.080.000,0	2.250.000,0	870.000,0	7.260.000,0

Table 10 – Strengthening of Local Networks base costs

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Table 2. Strengthening of Local Networks
Detailed Costs

	Unit	Quantities						Unit Cost (Local)
		2012	2013	2014	2015	2016	Total	
I. Investment Costs								
A. Strategic Plan								
Update of UP identification study	study	2	-	-	-	-	2	15.000
Diagnostic and strategic plan at the LU level	study	2	-	-	-	-	2	25.000
Subtotal								
B. Training								
Meteorological equipment	kit	6	-	-	-	-	6	10.000
Training on natural resource management	workshop	2	4	4	4	2	16	2.500
Specialized training on CC, climate forecasts and adaptation technologies	workshop	2	2	2	2	2	10	6.900
Subtotal								
C. Demonstration plots and youth projects								
Demonstration plots in schools and organizations	plot	2	4	4	4	2	16	2.500
Youth projects on adaptation to CC and variability	project	-	2	4	4	4	14	2.000
Subtotal								
D. Technical support to the network								
Promotion technical assistant	man/year	1	2	2	2	2	9	17.700
Adaptation investments technical assistant	man/year	1	2	2	2	2	9	17.700
Technical assistance to organizations	man/day	24	48	48	48	48	216	91
Subtotal								
E. Specialized consultant services								
Climate and CC	man/month	-	1	1	1	1	4	5.000
Grasslands management	man/month	-	2	2	2	-	6	5.000
Soil and water management	man/month	-	2	2	2	-	6	5.000
Subtotal								
Total Investment Costs								
II. Recurrent Costs								
A. Network activities								
Meetings and day-training sessions	event	12	24	48	48	36	168	500
B. Mobilization and communications								
Vehicle related costs and per-diem	$/year	1	2	2	2	2	9	5.300
Cell phone communications	$/year	1	2	2	2	2	9	720
Subtotal								
Total Recurrent Costs								
Total								

Table 10 (continues)

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Table 2. Strengthening of Local Networks
Detailed Costs

	Base Cost (US$)					
	2012	**2013**	**2014**	**2015**	**2016**	**Total**
I. Investment Costs						
A. Strategic Plan						
Update of UP identification study	30.000,0	-	-	-	-	30.000,0
Diagnostic and strategic plan at the LU level	50.000,0	-	-	-	-	50.000,0
Subtotal	80.000,0	-	-	-	-	80.000,0
B. Training						
Meteorological equipment	60.000,0	-	-	-	-	60.000,0
Training on natural resource management	5.000,0	10.000,0	10.000,0	10.000,0	5.000,0	40.000,0
Specialized training on CC, climate forecasts and adaptation technologies	13.800,0	13.800,0	13.800,0	13.800,0	13.800,0	69.000,0
Subtotal	78.800,0	23.800,0	23.800,0	23.800,0	18.800,0	169.000,0
C. Demonstration plots and youth projects						
Demonstration plots in schools and organizations	5.000,0	10.000,0	10.000,0	10.000,0	5.000,0	40.000,0
Youth projects on adaptation to CC and variability	-	4.000,0	8.000,0	8.000,0	8.000,0	28.000,0
Subtotal	5.000,0	14.000,0	18.000,0	18.000,0	13.000,0	68.000,0
D. Technical support to the network						
Promotion technical assistant	17.700,0	35.400,0	35.400,0	35.400,0	35.400,0	159.300,0
Adaptation investments technical assistant	17.700,0	35.400,0	35.400,0	35.400,0	35.400,0	159.300,0
Technical assistance to organizations	2.184,0	4.368,0	4.368,0	4.368,0	4.368,0	19.656,0
Subtotal	37.584,0	75.168,0	75.168,0	75.168,0	75.168,0	338.256,0
E. Specialized consultant services						
Climate and CC	-	5.000,0	5.000,0	5.000,0	5.000,0	20.000,0
Grasslands management	-	10.000,0	10.000,0	10.000,0	-	30.000,0
Soil and water management	-	10.000,0	10.000,0	10.000,0	-	30.000,0
Subtotal	-	25.000,0	25.000,0	25.000,0	5.000,0	80.000,0
Total Investment Costs	201.384,0	137.968,0	141.968,0	141.968,0	111.968,0	735.256,0
II. Recurrent Costs						
A. Network activities						
Meetings and day-training sessions	6.000,0	12.000,0	24.000,0	24.000,0	18.000,0	84.000,0
B. Mobilization and communications						
Vehicle related costs and per-diem	5.300,0	10.600,0	10.600,0	10.600,0	10.600,0	47.700,0
Cell phone communications	720,0	1.440,0	1.440,0	1.440,0	1.440,0	6.480,0
Subtotal	6.020,0	12.040,0	12.040,0	12.040,0	12.040,0	54.180,0
Total Recurrent Costs	12.020,0	24.040,0	36.040,0	36.040,0	30.040,0	138.180,0
Total	213.404,0	162.008,0	178.008,0	178.008,0	142.008,0	873.436,0

Table 11 – Strengthening of Local Networks total costs

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Table 2. Strengthening of Local Networks
Detailed Costs
(US$)

	Totals Including Contingencies					
	2010	**2011**	**2012**	**2013**	**2014**	**Total**
I. Investment Costs						
A. Strategic Plan						
Update of UP identification study	30.450,0	-	-	-	-	30.450,0
Diagnostic and strategic plan at the LU level	50.750,0	-	-	-	-	50.750,0
Subtotal	81.200,0	-	-	-	-	81.200,0
B. Training						
Meteorological equipment	60.900,0	-	-	-	-	60.900,0
Training on natural resource management	5.075,0	10.454,5	10.768,1	11.091,2	5.712,0	43.100,8
Specialized training on CC, climate forecasts and adaptation technologies	14.007,0	14.427,2	14.860,0	15.305,8	15.765,0	74.365,1
Subtotal	79.982,0	24.881,7	25.628,2	26.397,0	21.477,0	178.365,8
C. Demonstration plots and youth projects						
Demonstration plots in schools and organizations	5.075,0	10.454,5	10.768,1	11.091,2	5.712,0	43.100,8
Youth projects on adaptation to CC and variability	-	4.181,8	8.614,5	8.872,9	9.139,1	30.808,4
Subtotal	5.075,0	14.636,3	19.382,6	19.964,1	14.851,1	73.909,2
D. Technical support to the network						
Promotion technical assistant	17.965,5	37.008,9	38.119,2	39.262,8	40.440,7	172.797,1
Adaptation investments technical assistant	17.965,5	37.008,9	38.119,2	39.262,8	40.440,7	172.797,1
Technical assistance to organizations	2.216,8	4.566,5	4.703,5	4.844,6	4.990,0	21.321,4
Subtotal	38.147,8	78.584,4	80.941,9	83.370,2	85.871,3	366.915,5
E. Specialized consultant services						
Climate and CC	-	5.227,3	5.384,1	5.545,6	5.712,0	21.868,9
Grasslands management	-	10.454,5	10.768,1	11.091,2	-	32.313,8
Soil and water management	-	10.454,5	10.768,1	11.091,2	-	32.313,8
Subtotal	-	26.136,3	26.920,3	27.727,9	5.712,0	86.496,5
Total Investment Costs	204.404,8	144.238,6	152.873,1	157.459,3	127.911,3	786.887,0
II. Recurrent Costs						
A. Network activities						
Meetings and day-training sessions	6.699,0	13.799,9	28.427,9	29.280,7	22.619,4	100.826,9
B. Mobilization and communications						
Vehicle related costs and per-diem	5.917,5	12.189,9	12.555,6	12.932,3	13.320,3	56.915,6
Cell phone communications	803,9	1.656,0	1.705,7	1.756,8	1.809,5	7.731,9
Subtotal	6.721,3	13.845,9	14.261,3	14.689,2	15.129,8	64.647,6
Total Recurrent Costs	13.420,3	27.645,9	42.689,2	43.969,9	37.749,2	165.474,5
Total	217.825,1	171.884,5	195.562,3	201.429,1	165.660,5	952.361,5

Table 12 – Knowledge Management base costs

Uruguay

Building Resilience to CC and Variability in Vulnerable Smallholders — Building R

Table 3. Knowledge Management

Detailed Costs

	Unit	Quantities						Unit Cost (Local)
		2012	2013	2014	2015	2016	Total	
I. Investment Costs								
A. Seminars and workshops on CC and variability								
Local participatory workshops	workshop	-	2	2	2	2	8	2.000
National seminars on CC and variability	seminar	-	1	1	1	1	4	5.000
MVOTMA dissemination and communication plan	global							
Subtotal								
B. Evaluation studies								
Case studies	study	-	2	2	2	-	6	2.000
Mid term review	study	-	-	1	-	-	1	25.000
Project completion evaluation report	study	-	-	-	-	1	1	25.000
Subtotal								
C. MVOTMA consultancies	global							
D. Research projects	global							
E. Staff UACC								
Technical assistant	man/year	1	1	1	1	1	5	29.704
Communications assistant	man/year	1	1	1	1	1	5	29.704
Subtotal								
F. Communication equipment UACC								
Professional camera	unit	1	-	-	-	-	1	1.400
Microphones and miscellaneous	global							
Subtotal								
G. Communication								
Web site developemnt	consultancy	1	-	-	-	-	1	1.500
Local media advertisement	contract	2	2	2	2	2	10	3.300
Subtotal								
Total Investment Costs								
II. Recurrent Costs								
A. Publication and communication								
Printing material and supplies	$/year	1	1	1	1	1	5	3.000
Total Recurrent Costs								
Total								

Table 12 (continues) Uruguay

Building Resilience to CC and Variability in Vulnerable Smallholders

Table 3. Know ledge Management

Detailed Costs

	Base Cost (US$)					
	2012	**2013**	**2014**	**2015**	**2016**	**Total**
I. Investment Costs						
A. Seminars and workshops on CC and variability						
Local participatory w orkshops	-	4.000,0	4.000,0	4.000,0	4.000,0	16.000,0
National seminars on CC and variability	-	5.000,0	5.000,0	5.000,0	5.000,0	20.000,0
MVOTMA dissemination and communication plan	25.000,0	25.000,0	25.000,0	25.000,0	25.000,0	125.000,0
Subtotal	25.000,0	34.000,0	34.000,0	34.000,0	34.000,0	161.000,0
B. Evaluation studies						
Case studies	-	4.000,0	4.000,0	4.000,0	-	12.000,0
Mid term review	-	-	25.000,0	-	-	25.000,0
Project completion evaluation report	-	-	-	-	25.000,0	25.000,0
Subtotal	-	4.000,0	29.000,0	4.000,0	25.000,0	62.000,0
C. MVOTMA consultancies	15.000,0	15.000,0	15.000,0	15.000,0	15.000,0	75.000,0
D. Research projects	-	10.000,0	25.000,0	25.000,0	15.000,0	75.000,0
E. Staff UACC						
Technical assistant	29.704,0	29.704,0	29.704,0	29.704,0	29.704,0	148.520,0
Communications assistant	29.704,0	29.704,0	29.704,0	29.704,0	29.704,0	148.520,0
Subtotal	59.408,0	59.408,0	59.408,0	59.408,0	59.408,0	297.040,0
F. Communication equipment UACC						
Professional camera	1.400,0	-	-	-	-	1.400,0
Microphones and miscellaneous	2.400,0	-	-	-	-	2.400,0
Subtotal	3.800,0	-	-	-	-	3.800,0
G. Communication						
Web site developemnt	1.500,0	-	-	-	-	1.500,0
Local media advertisement	6.600,0	6.600,0	6.600,0	6.600,0	6.600,0	33.000,0
Subtotal	8.100,0	6.600,0	6.600,0	6.600,0	6.600,0	34.500,0
Total Investment Costs	111.308,0	129.008,0	169.008,0	144.008,0	155.008,0	708.340,0
II. Recurrent Costs						
A. Publication and communication						
Printing material and supplies	3.000,0	3.000,0	3.000,0	3.000,0	3.000,0	15.000,0
Total Recurrent Costs	3.000,0	3.000,0	3.000,0	3.000,0	3.000,0	15.000,0
Total	114.308,0	132.008,0	172.008,0	147.008,0	158.008,0	723.340,0

Table 13 – Knowledge Management total costs

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Table 3. Know ledge Management
Detailed Costs
(US$)

	Totals Including Contingencies					
	2010	**2011**	**2012**	**2013**	**2014**	**Total**
I. Investment Costs						
A. Seminars and workshops on CC and variability						
Local participatory w orkshops	-	4.181,8	4.307,3	4.436,5	4.569,6	17.495,1
National seminars on CC and variability	-	5.227,3	5.384,1	5.545,6	5.712,0	21.868,9
MVOTMA activities	25.375,0	26.136,3	26.920,3	27.727,9	28.559,8	134.719,3
Subtotal	25.375,0	35.545,3	36.611,7	37.710,0	38.841,3	174.083,3
B. Evaluation studies						
Case studies	-	4.181,8	4.307,3	4.436,5	-	12.925,5
Mid term review	-	-	26.920,3	-	-	26.920,3
Project completion evaluation report	-	-	-	-	28.559,8	28.559,8
Subtotal	-	4.181,8	31.227,6	4.436,5	28.559,8	68.405,6
C. MVOTMA consultancies	15.225,0	15.681,8	16.152,2	16.636,8	17.135,9	80.831,6
D. Research projects	-	10.454,5	26.920,3	27.727,9	17.135,9	82.238,7
E. Staff UACC						
Technical assistant	30.149,6	31.054,0	31.985,7	32.945,2	33.933,6	160.068,1
Communications assistant	30.149,6	31.054,0	31.985,7	32.945,2	33.933,6	160.068,1
Subtotal	60.299,1	62.108,1	63.971,3	65.890,5	67.867,2	320.136,2
F. Communication equipment UACC						
Professional camera	1.421,0	-	-	-	-	1.421,0
Microphones and miscellaneous	2.436,0	-	-	-	-	2.436,0
Subtotal	3.857,0	-	-	-	-	3.857,0
G. Communication						
Web site developemnt	1.522,5	-	-	-	-	1.522,5
Local media advertisement	6.699,0	6.900,0	7.107,0	7.320,2	7.539,8	35.565,9
Subtotal	8.221,5	6.900,0	7.107,0	7.320,2	7.539,8	37.088,4
Total Investment Costs	112.977,6	134.871,4	181.990,1	159.721,9	177.079,8	766.640,8
II. Recurrent Costs						
A. Publication and communication						
Printing material and supplies	3.349,5	3.450,0	3.553,5	3.660,1	3.769,9	17.783,0
Total Recurrent Costs	3.349,5	3.450,0	3.553,5	3.660,1	3.769,9	17.783,0
Total	116.327,1	138.321,4	185.543,6	163.381,9	180.849,7	784.423,7

Table 14 – Coordination base costs

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Table 4. Coordination
Detailed Costs

	Unit	Quantities						Unit Cost	Base Cost (US$)					
		2012	2013	2014	2015	2016	Total	(Local)	2012	2013	2014	2015	2016	Total
I. Investment Costs														
A. Staff DGDR														
Coordinator technical assistant	man/year	1	1	1	1	1	5	29.704	29.704,0	29.704,0	29.704,0	29.704,0	29.704,0	148.520,0
Monitoring and Evaluation Assistant	man/year	1	1	1	1	1	5	29.704	29.704,0	29.704,0	29.704,0	29.704,0	29.704,0	148.520,0
Clerk	man/year	1	1	1	1	1	5	18.772	18.772,0	18.772,0	18.772,0	18.772,0	18.772,0	93.860,0
Total Investment Costs									78.180,0	78.180,0	78.180,0	78.180,0	78.180,0	390.900,0
II. Recurrent Costs														
A. Operating costs														
Office supplies and miscelaneous	global								9.000,0	9.000,0	9.000,0	9.000,0	9.000,0	45.000,0
Total Recurrent Costs									9.000,0	9.000,0	9.000,0	9.000,0	9.000,0	45.000,0
Total									87.180,0	87.180,0	87.180,0	87.180,0	87.180,0	435.900,0

Table 15 – Coordination total costs

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Table 4. Coordination
Detailed Costs
(US$)

	Totals Including Contingencies					
	2010	2011	2012	2013	2014	Total
I. Investment Costs						
A. Staff DGDR						
Coordinator technical assistant	30.149,6	31.054,0	31.985,7	32.945,2	33.933,6	160.068,1
Monitoring and Evaluation Assistant	30.149,6	31.054,0	31.985,7	32.945,2	33.933,6	160.068,1
Clerk	19.053,6	19.625,2	20.213,9	20.820,4	21.445,0	101.158,0
Total Investment Costs	79.352,7	81.733,3	84.185,3	86.710,8	89.312,2	421.294,3
II. Recurrent Costs						
A. Operating costs						
Office supplies and miscelaneous	10.048,5	10.350,0	10.660,5	10.980,3	11.309,7	53.348,9
Total Recurrent Costs	10.048,5	10.350,0	10.660,5	10.980,3	11.309,7	53.348,9
Total	89.401,2	92.083,2	94.845,7	97.691,1	100.621,8	474.643,1

Table 16 – Disbursement Schedule

Uruguay
Building Resilience to CC and Variability in Vulnerable Smallholders
Disbursement schedule
(US$ '000)

	Upon Agreemen Signed	2012 June 30	2013 June 30	2014 June 30	2015 June 30	2016 June 30	Total
Project Funds	300.000	773.553	1.812.289	2.555.952	2.712.502	1.317.132	9.471.428
IE Fee	30.000	69.250	99.250	99.250	99.250	99.250	496.250
Total	330.000	842.803	1.911.539	2.655.202	2.811.752	1.416.382	9.967.678

Transferred by Trustee in 2 Annual Tranches subject to submission of financial balance.

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ANNEX 3

Management Fee Breakdown

MANAGEMENT FEE BREAKDOWN

This section introduces the costs breakdown of the management fee allocated to the project. The estimated fee is about 5% of the managed funds. Table 1 shows the breakdown of the fee during the five years of project implementation.

Table 1: Breakdown of Management Fee
US Dollars

Costs	Year 1	Year 2	Year 3	Year 4	Year 5
Management	20.230	20.230	20.230	20.230	20.230
Operations	24.589	24.589	24.589	24.589	24.589
Administration, TI & Infrastructure	11.205	11.205	11.205	11.205	11.205
Auditing, Consulting & Evaluation Services	31.000	31.000	31.000	31.000	31.000
Travel & Stay	7.500	7.500	7.500	7.500	7.500
Unforeseen Costs	4.726	4.726	4.726	4.726	4.726
Total	**99.250**	**99.250**	**99.250**	**99.250**	**99.250**

The management fee includes six kinds of costs:

1. Cost of Management: includes the payment of management staff assigned to the direction and supervision of the project. The average assignment of time at this level will be 12%. The breakdown of these costs per management level is shown in Table 2
2. Operating costs: we report the cost of the Project Executive assigned to follow up and the cost derived of the intervention of our Procurement Specialist. In the first case the time assignment reaches 50%, while the procurement specialist assignment will be 25% of his time. The breakdown of these costs for each management level is shown in Table 2
3. Administration, TI & Infrastructure: we estimate the cost derived from the services rendered by other areas of ANII´s organization. These costs are estimated as 25% of the sum of management and operating costs
4. Auditing, Consulting and Evaluation: This group includes three concepts:
    a. Auditing services to monitor the usage of adequate practices of accounting and acquisitions, at the level of beneficiaries and the technical unit
    b. Consulting services that may be required during the follow up
    c. Advisors and technical services required for project monitoring
    d. The breakdown of these costs is shown in Table 3
5. Travel & Stay: travel costs associated with the monitoring of the project and the direct exchange of information with the Technical Team of the Adaptation Fund
6. Unforeseen: estimated as 5% of total cost

It´s important to remark that the costs reported in items 1, 2 y 3 correspond to the reimbursement of the ANII´s cost of personnel and services dedicated to the project. This means that these funds won´t be applied to compensations of ANII´s staff. The ANII´s personnel involved in the project will receive his regular wage.

Table 2 – Management & Operating Costs
US Dollars

Costs	Staff Level	Annual Cost	Time Assignment	Allocated Cost
Management Costs	CEO	85.000	5%	4.250
	Operations Manager	64.600	10%	6.460
	Operations Deputy Manager	47.600	20%	9.520
Operations Costs	Project Executive - Level I	38.250	50%	19.125
	Procurement Specialist	21.857	25%	5.464
			Total Annual Cost	**44.819**

Table 3 – Audit, Consulting and Evaluation Costs
US Dollars

Item	Year 1	Year 2	Year 3	Year 4	Year 5
Auditing Services	10.000	15.000	18.500	23.000	27.500
Consultancy Services	5.000	5.000	5.000	5.000	5.000
Technical & Evaluation Services	7.500	7.500	7.500	7.500	7.500
Total	**22.500**	**27.500**	**31.000**	**35.500**	**40.000**

URUGUAY

BUILDING RESILIENCE TO CC AND VARIABILITY IN VULNERABLE SMALLHOLDERS

ANNEX 4

TECHNICAL ASSISTANCE OF THE AF FOR THE PREPARATION OF THE PROJECT:

CONSULTATION ON THE PERCEPTION OF CC AND MANAGEMENT OF ADAPTATION OPTIONS

Study on the Perception

of Climate Change Problems

and management of adaptation options

Report carried out by *Equipos MORI*

2 October 2011

Study on the Perception of Climate Change Problems and management of adaptation options

BACKGROUNDS (TOR)

The Adaptation Fund was established by the Parties to the Kyoto Protocol to the United Nations Framework Convention on Climate Change in order to finance projects or specific adaptation programs in developing countries which are Parties of the Kyoto Protocol. The Fund is financed with 2% of the Certified Emission Reductions (CER's) issued by projects of Clean Development Mechanism (CDM) and funds coming from other sources. The *MGAP* is developing a project to be submitted to the Adaptation Fund of the Kyoto Protocol. The objective of the project is to promote and support participative processes of reduction of vulnerability to change variability and climate change in territories very sensitive to lack of rainfalls and in which there is a significant presence of family livestock producers in accordance with the definition of the *MGAP*. The Ministry of Livestock, Agriculture and Fisheries in the framework of the project for the Adaptation Fund of the Kyoto Protocol "Building Resilience to climate change and change variability in vulnerable smallholders" invited to carry out this consultantship of reference, which comprises the activities which are described hereinafter.

OBJECTIVES (TOR)

The main objective of this research is to generate qualitative information to contribute to the process of preparation of the project to be submitted to the Adaptation Fund of the Kyoto Protocol by the Uruguayan Government, ensuring that the points of view of the social actors within

the territory are taken into account in the preparation of the project. It is a matter of gathering and analyzing the perceptions, attitudes and behaviours of the family livestock producers and the local institutions regarding vulnerability to climate change, the need to undertake adaptation participative projects to deal with the effects of climate change, as well as to validate predisposition to get involved in the actions of the project.

Specific Objectives (TOR)

To compile and systematize information supporting the design of ways of intervention. In particular:

a) To know the level of sensitization in relation to climate variability and climate change: perception of the phenomenon and evaluation of its impacts at a national and regional level and considering also real estate.

b) To enquire about understanding of actions and measures to reduce climate risk.

c) To identify actions and strategies already introduced as a response and the planned actions.

d) To identify significant barriers for adopting adaptation measures.

e) To gather requirements to institutions (information, technical assistance, training, financing, etc.).

f) To know the disposition to get involved in the associative processes of climate risk management.

g) To collect information about the main hypotheses of the project.

METHODOLOGICAL ASPECTS

In order to fulfil the general and specific objectives presented for this consultantship, a field work which comprised the following was carried out:

a) Collective interviews and participative observation at the Rural Development Tables of ***Salto*** (*Colonia, Lavalleja*), ***Lavalleja*** (at *Barriga Negra*), ***Maldonado*** (at *Las Cañas*) and ***Treinta y Tres*** (at *Quebrada de los Cuervos*)

b) Meetings with representatives of different **rural development societies** and **unionizations** (*Pan de Azúcar* Rural Development Society, *Vera y Cañas* Rural Development Society, *Francisco Cal* Unionization and *Basalto* Group Route 31)

c) **Personal interviews** with 21 qualified informants of the concerning departments (*Lavalleja*, *Maldonado*, *Treinta y Tres* and *Salto*)

RESULTS

Comments on methodology and characteristics of public consulted

Given the objectives presented, as a starting point a list of informants agreed upon with the representatives of the Ministry of Livestock, Agriculture and Fisheries (*MGAP*) was considered. The consultation comprised a very important number of people, as it is a qualitative type of research: a total of 120[1] people were interviewed, from which about 80 correspond to family livestock rural producers and 40 correspond to technicians who represent the institutions involved in the Tables (*MGAP*, National Colonization Institute, Agricultural Plan, *ASSE*[*], etc.). Producers were all representatives of the development societies of the regions studied, about 12 associations on the whole.

The group of rural livestock producers was composed of people of different sex and age range (between 18 and 80 years old), although most of them were male, heads of the households of between 40 and 60 years old. As it was foreseen, all of them were family livestock producers (up to 500 hectares) from the shallow Basaltic regions of the north and east of the country.

The research was favoured by an excellent participation of actors in the Development Tables and counted on additional information which was not foreseen at the beginning. As tables counted on more than 10 participants in many cases, and lasted about 3 or 4 hours, we had the

[1] Some of the people participating in the development tables or rural associations are not in the meeting minutes, therefore, the annexed list contains a smaller number (105 people).

[*] N. de T.: **ASSE**_*Administración de los Servicios de Salud del Estado*_State Health Service Administration

chance to carry out collective interviews with participants, and also to talk individually with many of the attending actors.

The length of the meetings, which were implemented before this research, allowed the researchers to complement the information with the one generated from the *participative observation* technique. Participative observation consists of obtaining data, on the part of the researcher, and from the inclusion within the group, of the fact or phenomenon observed in order to get information from inside and to be able to observe within their environment how individuals behave.

In this case, researchers were able to share travels with technicians, lunches with producers, informal chats before and after the meetings and participated in general chats at Development Tables which were not included in the research, thus enriching results.

Sensitization with respect to climate change and variability: perception of such phenomena and evaluation of their impacts

Producers' view

Perception about existence of problems is unanimous, as well as concern about their current and future effects. Most accounts of producers are related to productive matters, although the impact of climate change in health and in the development of daily activities is mentioned as well.

The level of understanding about "climate change" concept is relatively high, although it is not completely structured at the discursive level. Concepts such as "climate change", "global warming", "pollution", "ozone hole" are mixed. However, most mentions are addressed towards climate variability issue, and specifically the perception that the seasons are more blurred every time making the climate unpredictable is expressed.

On the other hand, the problems produced by the sun appear, being understood that its rays are more powerful every time, affecting the water sources, animals and rural workers.

In spite of the range of "climate change" concept, all references made by producers ended up spontaneously in one problem: **water scarcity for animal consumption**. This came up in every consultation to producers, although a greater concern among the inhabitants of the north of the country is perceived in the first place. In the second place, the problems concerning lack of food for livestock generated from drought appear.

In a less important way other issues such as impossibility of counting on **reliable weather forecasts**, specific difficulties produced by sun radiation (problems in skin and eyes for producers and animals) and the perception

of a reduction in the length of livestock feeding, also related to sun radiation, appear.

There is also a relative consensus about the fact that these problems have become especially evident in the last 10 or 15 years, and different stories where water sources known to be durable have begun to dry up more frequently every day, where climate changes unpredictably and other ones about bizarre behaviours of animals are told.

“There used to be four seasons… now there are only two!”

“The impacts of climate change in livestock farms are evident.

Recovery of the pastures is much lower. When time of cow mating arrives, many heats are lost due to lack of rains and “green”. Low birth rates of calves is prejudicial to us economically as we have less calves”

“The main problem for livestock producers is lack of water reserves”

“The main problem of climate change is undoubtedly lack of water for animals… And sometimes even for men”

“Climate changed, we no longer have a stable springtime as we used to, rainfalls are no longer the same as in old springtime, maybe it rains throughout the year and when it has to rain, it does not rain… and this becomes worse year over year”

“The sun is too strong… at 10 am in the morning the animals are already looking for shade”

“Climate changed, in wintertime there is a dreadful heat and in summertime it is unbearable,

everything changed, storms, the sun is stronger”

“There are people who run out of water for animals from time to time”

“I saw a Southern Lapwing in the shade. You can ask around, nobody ever saw a Southern Lapwing in the shade”

Technicians' view

Technicians consulted agree in the diagnosis that producers perceive that the climate has changed in the last years and that the situation is becoming more complex for them. However, some technicians state clearly that though the concern of producers exist, they don't necessarily act accordingly when it is about preparing for critical situations.

"Producers have an important level of perception regarding these problems. They are sensitized"

"Producers show much concern about climate issue"

"Most producers know the issue and are concerned, but many times they seem not fully aware about the measures to be taken"

When approaching climate change issue, technicians draw attention to the problem of climate variability and in the more frequent occurrence of extreme events. Unlike rural producers, which consider the problem regarding lack of water for consumption at the same level than that of lack of food or even more importantly, technicians put special emphasis in lack of food for livestock as the main consequence of negative effects of climate change.

"I directly prefer talking about climate variability instead of climate change. It may be noticed in our country in the increase of the number and sequence of droughts and an apparent greater effect of the sun

This climate variability has an impact on the productive process, generating a decrease in production, which is directly related to lack of food. As a consequence thereof, the costs for producers increase, above all due to the need to resort to dietary supplement"

"The main problem of climate variability is the low pasture production,

which determines that producers have to get rid of livestock… and repopulation of livestock is expensive”

“I think that we are facing a climate change process, which in Uruguay is fundamentally being manifested by the occurrence of some extreme events, such as drought. The main problem for livestock producers is lack of stability in the productive process, mainly due to a scarcity in food and water for animals”

“Climate change represents a big problem for producers currently. The main difficulties for livestock breeders are generated in the production of fodders and as a consequence in the production of calves”

“With respect to breeding, the impact is on the low production of calves, which makes it difficult to have a steady production. Regarding fattening, it is difficult to fulfil the fattening goals”

Understanding of actions and measures adopted or to be adopted in the future

Producers' view

Understanding of possible measures to be adopted is, in the first place, high among the consulted producers and several have adopted some of the measures already mentioned.

Given that drought and lack of water are the most mentioned effects of climate change by producers, adaptation measures are logically connected to these problems. Measures arisen spontaneously are creating and / or maintaining small water reservoirs for animal beverage and maintaining and looking after spring waters (water sources).

In the second place, in a guided way and based on the development of the talk, the problems of droughts related to food and possible adaptation measures connected to them, such as **forage reserves** appear. The possibility to create reservoirs as an adaptation measure to climate change appears into the backgrounds among producers.

In a less important way, the existence of **shade** for animals appear as necessary, although it is not related as a serious situation in no case and producers did not talk further on the occasional disadvantages which the fact of not having shade on a farm may cause. In connection to this, there was no specific understanding about the impact that this may have regarding development of animals.

"Building small water reservoirs for animal beverage is the most important need to cover… Besides, these must be properly made, because there are water reservoirs which do not last"

"It is not common that a landowner runs out of water completely, because small water reservoirs for animal beverage are built, but this situation happened not long ago and it certainly may happen again"

"Solutions to climate problems should be having artesian wells

or building big water reservoirs for animal beverage to solve water problems and to help watering.

Also it would be good that INIA[*] would get drought resistant pastures."

"It is necessary to have available water supply,

but it is necessary to have food reserves as well."

Finally, it is important to highlight that although producers acknowledge to some extent that they work with more animals than they should, spontaneously they do not consider the chance to work with less animals as an adaptation measure. This disagrees with technician's opinion, which is considered next.

Technicians' view

As to technicians, problems regarding food arise as more important than problems regarding water for animal consumption, which is different from what rural producers consider.

Given the abovementioned, most mentioned measures to be adopted by technicians are not the ones referring to storage of water for consumption, but those related to food.

"Measures to be currently taken are basically three: having the right amount of animals, resorting to dietary supplement and to a lesser extent considering early weaning"

[*] N. de T.: **INIA**_*Instituto Nacional de Investigación Agropecuaria*_National Institute of Agricultural Research

“With respect to the possible measures to be adopted, I believe the most important thing to do is to achieve more efficient management of natural and planted pastures and to build small water reservoirs for animal beverage. And adoption of these measures depends, to a great extent, on producers directly, in addition to some investments in order to facilitate access to credit and technical assistance”

“The thing is that rural producers work with more animals than they should, they have got too many animals and exceed the limits. But is hard to convince them to reduce stocking rates”

“Most vulnerable producers are the ones working with more animals than they should. They are affected first and then they take more time to recover. The ones who work with right stocking rates work better”

As it may be noticed, technicians highlight, as an adaptation measure, the fact of counting on food for critical times, but not only thinking about stock up, but also in the possibility of reducing the amount of livestock (livestock unit) per hectare.

Bearing this in mind, technicians agreed that the main adaptation measures are to train producers to adopt habits and customs aimed at making them less vulnerable at critical times: to insist on the benefits of working with the right amount of animals for their farms (lands), to insist on the possibility of building forage reserves and to insist on the minimum necessary details in order to ensure waterholes sustainability.

Barriers for adopting adaptation measures to climate change

Producers' view

For producers, main barriers for adopting adaptation measures are external. In any case, during conversations insufficiencies of their own are acknowledged. More celerity to execute plans is requested to the Ministry of Livestock, Agriculture and Fisheries (*MGAP*).

In that respect, producers talked about very convenient plans aiming to build and/or clean small water reservoirs for animal beverage and other plans related to the supply of animal ration as examples. Although most of them considered these plans as adequate ones (with subsidies up to 80% in some cases), many agreed that the execution thereof was too slow and in some cases, such plans were scarce in volume and never took place.

Sometimes, precise cases were told (above all on the part of very small producers) in which they could not get access to the abovementioned plans due to their own characteristics, lack of regulation of registers, etc. This group was clearly identified as the most vulnerable one, though it is considered that it is a very small group.

The problems connected to celerity in execution also appear in relation to private actors and are confused with responsibility of *MGAP*. In the case of machinery for building and cleaning of small water reservoirs for animal beverage, and beyond delays attributed to the *MGAP*, bottlenecks are generated in critical times which prevent producers to satisfy their needs. The same happens to contractors (machinery) when making meadows, forage reserves, etc. The fact they are small producers makes them less attractive to suppliers of the abovementioned services, which, in times of high demand respond to other clients' interests (for instance "big rice

growers" in *Treinta y tres*). In addition to this, they state that due to the characteristics of their lands (soil) many times contractors raise objections to go to their regions or increase their fees in order to make up for possible breaking of machinery, spare parts, etc. This problem was shared by the inhabitants of the north as well as by the ones of the east.

Another of the "external" barriers mentioned is the high price of specialized technical assistance for building wetlands and other water reservoirs. Building a good wetland and a sustainable one means an extra expenditure regarding assistance which is not taken into account in the current plans provided by the *MGAP* or the Municipalities. Apparently, this expense is also risky as a producer may spend money in the corresponding study to build one without being sure that subsidy for the wetland is approved.

In summary, they request to the *MGAP*:

- A greater celerity in the execution of plans, which are considered as good and advantageous when they arrive on time.
- More amount of plans and more comprehensive ones (for instance, including technical studies to build wetlands and other sources of water with drinking troughs in a proper way)
- Training in issues related to resources (wetlands, springs) in order to ensure sustainability and sensitize on the importance of the matter.

In some cases, more control upon the illegal artificial watering is requested as well. In this case, it is distinctly a problem coming out less frequently and presented mainly in the region of *Treinta y Tres*.

Some barriers for adopting adaptation measures are also acknowledged. Among producers, mainly at the Development Tables, **strong self criticism with respect to the carless way producers look after wetlands and natural water courses came out.** This came out especially among North producers. Several successful examples of

“fenced” wetlands and springs with their corresponding drinking troughs were quoted, but still understanding that, most producers acknowledged that their waterholes did not comply with these requirements.

There is also some self criticism among producers in connection with the management of livestock farm. It is reluctantly acknowledged (though perceived as almost inevitable) that fields are saturated with livestock units and the fact that this makes them especially vulnerable is also mentioned. In response to this, most producers mention all over again the difficulties to build reservoirs (due to the price of meadow, machinery, etc.), which they perceive as external to them.

“The most important barriers are lack of machinery in the region and difficulty in order to prepare food. Bringing a machine here is expensive, and many times machines don’t even come!”

“The main barrier we have is economical... We are always running from behind. But I think we are able to take some measures… and we need technical assistance and financing”

“There are problems, of course there are … I believe that main barriers are logistic. From the moment in which government makes the decision, for instance, to import grains, a long period goes by. The situation is already critical. Measures have to be fast - developing from the bureaucratic point of view”

“The Ministry has done things, indeed. Anyway, there are things which could be made easier. There is a lot of bureaucracy. Paperwork takes long time”

“We need to be aware. A wetland is made in a hurry here and we do not make an effort to fence it in or anything … and livestock tears it apart”

“Currently one gets by as one can. We are trying to reduce the amount of animals per hectares, of bovine as well as ovine, but it is hard… It is very hard for small producers to reduce the amount of animals”

“Ministry of Livestock has too much bureaucracy. Responses take too long to arrive”

Technician’s view

Unlike what has been stated about producers’ views, and, in a logical way, consulted technicians put special emphasis on the barriers of adoption on the part of rural producers.

They insist on the concepts already mentioned, where the adoption of measures is not only about improving the existing conditions (for instance, to build or clean a wetland) but also about a better management of the current resources (for instance, to look after the existing ones).

Many times they do acknowledge lack of resources of institutions such as the *MGAP*, which generates insufficient and slow plans and they are also aware about the problems due to lack of machinery and services which these producers put up with in times of high demand. Therefore, they consider extremely important the fact that producers should be prepared for critical times.

“Agricultural producers don’t like to put money in the bank and feel better by spending money in livestock … This may become a problem!”

“And… I would say there is a cultural barrier… and producers don’t know mitigation practices. And there is lack of financial resources as well. To a greater extent, producers should be trained, and to a lesser extent, producers should be given technical assistance and economic support”

“Yes, of course these producers do not represent a good offer to machinery contractors. Build a “tiny meadow” for producers like these is very expensive. But they have to get used to this matter and that’s all”

“The Ministry lacks resources, sometimes plans are proposed, people register and then they are cancelled or take a long time to be carried out, and this is complicated because people get discouraged”

“The main barrier I detect is the impossibility to make some producers to reduce the amount of animals in their livestock settlements. They have to have “bare” soils, because seeing pastured soils is a waste for them. And then a drought comes and turns them upside down, logically”

“I believe they must become aware that the most important thing is to work more comfortably … not with large stocking rates of animals. On the contrary, they have to sell livestock off cheaply and the percentages of pregnancies are truly low.”

“I believe that we have to keep on insisting on education and training as actions to be carried out in order to support producers. The access to financing is also very important.”

Willingness to get involved and participate in partnership processes related to climate risk management

Producers' view

With reference to producers consulted, the need to get involved in partnership processes is clearly acknowledged, although some reluctance related to cultural matters ("lack of habits") is also acknowledged.

Some producers related experiences of partnership, in general positive ones, form the point of view of economic outcome, though due to difficulties in coordination are sometimes put aside.

Experiences related are in general, recent. In these cases it is about relatively spontaneous and informal partnerships, addressed to contract machinery and achieve some "scale". Even though producers highlight the most negative aspects, the fact that these partnerships are sporadic even among producers who had good experiences indicates that the "habit" of getting involved into partnerships is not fully set up within this group.

"I believe that there are some measures which may be accepted if they are managed in partnerships. Measures which may be more successfully accepted are building of wetlands, waterholes and artesian wells in a shared way. And if they are implemented in a livestock settlement and it works, other producers are going to copy it"

"We got together, some years ago, in order to clean some wetlands. It was a lot cheaper, but very complicated because other producers, when realizing there were machines in their areas used them and consequently some producers complained about the situation"

"In order to form partnerships, "tables" and associations of producers are fundamental, to avoid individual problems like who has the priority to use machines, etc."

"Producers cannot be reluctant. Sometimes some of us are more daring, others are less daring, but this is changing little by little. I want producers to be more daring, more supportive. I don't want they waste two or three years and then see the success of producers who run the risk. This is what happens currently"

"It is difficult, as producers are too individualist. Some producers understand the matter and form partnerships, achieve scale, and get best buying conditions, etc. But not all producers understand this. There is a lot of work to be done, especially regarding awareness "

"In order to form partnership producers should have to have the chance to get free technical assistance and policies encouraging team work, for instance, to have tax advantages"

"Organizations of producers must have a leading role. Every institution should have to perform tasks in a distinctive way, without superposing them "

"In order to work in a partnership, the Ministry must have the leading role."

Technicians' view

Technicians agree that it may be very useful to form partnerships to try to solve some of the problems abovementioned.

In their opinion, association among producers should have to have a starting point organized from institutions, as they acknowledge producers are not used to doing so. For instance, the possibility to encourage partnerships in order to exploit Colonization lands such as forage banks or breeding fields.

"There are things which are not going to be developed if they are not promoted by institutions. It is difficult to carry them out in an isolated way"

“Measures more likely to be implemented in an associative way are training of producers, building of forage banks and common access to water”

“In my opinion (for partnership processes) organizations of producers play a decisive role because producers are directly related to them and they are themselves a part thereof”

“I believe that the Ministry of Livestock has to have a more active role than the one it has currently in the matter. This part of the State is not present enough and their actions aren’t as expeditious as they should. It is obvious that it is the State which has to promote this”

“Rural producers are used to do things in their own way and it is difficult for them to change it. It is necessary to give them a boost”

“Producers are reluctant to form partnerships. Nevertheless the groups which have been formed have achieved progress, which is better than nothing, but it is difficult”

“I think organizations of producers are the best- suited in order to manage to implement programs within the region. Therefore, the Ministry of Livestock has to coordinate and facilitate supporting mechanisms; it has to be a facilitator. Currently measures take too long to be implemented”

Final Comments

In the first place, there is a clear consensus among producers about the fact that a process of climate change is going through in the country. Regardless understanding of the strict definition of the concept, producers agree that climate has changed in the last two decades and that has become more unpredictable.

The most related consequence to climate change is drought, mainly lack of water for animal consumption and in the second place the consequences of drought in connection to food. Consequently, adaptation options appear spontaneously related to building and cleaning of wetlands and springs, and then to the food supply (forage reserves). This order is more evident in the North shallow Basaltic region; in the East region, the importance of these problems is dealt with in producers' discourse. With respect to technicians' discourse, the most important consequences of climate events are problems related to food.

In the opinion of producers, barriers for adopting adaptation measures are mostly external. Plans executed by the *MGAP* until now, such as building of wetlands and subsidy and finance to purchase ration are acknowledged. However, **more plans and above all more fast-developing ones in terms of execution are requested** to the *MGAP*.

There is also a general opinion shared by producers and technicians that there is lack of infrastructure in the regions studied (*Salto*, *Treinta y Tres*, *Lavalleja* and *Maldonado*). Machines needed to make water reservoirs and food for livestock are not available. This, in addition to the profile of producers studied (family producers) result in scale problems. In times of high demands, these producers do not represent an attractive offer to machinery holders supplying these services to third parties. Given these

inconveniences, which are rather structural, there are many requests for subsidies to purchase rations in order to complement livestock food.

Producers acknowledge lack of proper care on their part with respect to water reserves, a diagnosis also agreed upon with technicians. Most producers acknowledge the advantages of closing wetlands and building drinking troughs; however, few producers consulted apply them currently. Also there are problems related to the high amount of animals with respect to the capacity of fields. In this case, most producers think it is a "necessary evil" hard to work with from their point of view. According to technicians consulted, this is an endemic problem and there is a relative consensus that producers need to become aware of its consequences, not entirely perceived by them.

With respect to participation and possibility to form partnerships, some reluctance which seems to be changing due to the growing presence of the Development Tables is perceived among the people consulted. In fact, most experiences about partnerships among producers seem to be recent according to narrations, and in some cases, generated in this environment. Experiences related to partnerships are positive in general, and evidently there is some need for cooperativism, and in principle, rural development tables seem to be an excellent environment to promote these actions. The primary evaluation of the tables being studied (*Salto*, *Lavalleja*, *Maldonado* and *Treinta y Tres*) is evidently positive, as they happen to be a fluid space of actors' interaction (guided by MGAP representatives) and there is a visible degree of trust among the actors (producers, technicians, MGAP representatives, Colonization Institute, Agricultural Plan, etc.). According to our diagnosis, these spaces are potentially ideal in order to give the needed stimulus to partnerships searched among producers.

ANNEX

List of participants of this study

Name	Group	Department
Alcides Moreira	Qualified Informant	LAVALLEJA
Joaquin Lapetina	Qualified Informant	LAVALLEJA
Miguel Custiel	Qualified Informant	LAVALLEJA
Paula Trelles	Qualified Informant	LAVALLEJA
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Juan Larrea	Qualified Informant	MALDONADO
Leonardo Machado	Qualified Informant	MALDONADO
Mateo Pastore	Qualified Informant	MALDONADO
Pedro Heguy	Qualified Informant	MALDONADO
Marcelo Pereira	Qualified Informant	MONTEVIDEO
Carlos Paiva	Qualified Informant	SALTO
Esteban Montes	Qualified Informant	SALTO
Nelson Albernaz	Qualified Informant	SALTO
Cipriano Olivera	Qualified Informant	TREINTA Y TRES
I. Olivera	Qualified Informant	TREINTA Y TRES
Estela Cuadrado	Qualified Informant	TREINTA Y TRES
José Luis Amaro	Qualified Informant	TREINTA Y TRES
Julio Iguini	Qualified Informant	TREINTA Y TRES
Nestor Gutierrez	Qualified Informant	TREINTA Y TRES
Danilo Bartaburu	Qualified Informant	SALTO
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Fernando de la Sierra	*Lavalleja* RDT	LAVALLEJA
Gustavo Moratório	*Lavalleja* RDT	LAVALLEJA
Marcos Martinez	*Lavalleja* RDT	LAVALLEJA
Mª Fernandez	*Lavalleja* RDT	LAVALLEJA
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Walter Desar	*Lavalleja* RDT	LAVALLEJA
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Olga Bidart	*Salto* RDT	SALTO
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Treinta y Tres RDT	*Treinta y Tres* RDT	TREINTA Y TRES
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Sandra Rodriguez	*Vera y Cañas* RDS	SALTO

Building Resilience to CC and Variability in Vulnerable Smallholders / Uruguay
Alignment of Project Objectives/Outcomes with Adaptation Fund Results Framework

Project Objective(s)[1]	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator
Reduced vulnerability and increased resilience to CC and variability in small farms engaged in livestock production located in extremely drought sensitive LUs	No of livestock investment farm plans addressing CC and variability financed No of livestock groups' projects addressing CC and variability financed	**Outcome 4. Increased adaptive capacity within relevant development and natural resource sectors**	**4.2 Physical infrastructure improved to withstand climate change and variability induced stress**
Strengthened local capacity for adapting to CC and variability and for responding to extreme events (particularly severe droughts)	No of organizations trained and networking to address CC and variability No of farmers members of these organizations involved in the activities that address CC and variability impacts.	**Outcome 2. Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses**	**2.1 No. and type of targeted institutions with increased capacity to minimize exposure to climate variability risks**
	No of farmers in the LUs participating in the preparation of strategic plans to address CC and variability No of farmers adjusting stocking rate and adopting adequate livestock management practices according to climate information and warnings	**Outcome 3. Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level**	**3.2 Modification in behavior of targeted population**
Improved capacity for understanding and facing CC and variability at	Water stress risk management and best practices identified and	**Outcome 1. Reduced exposure at national level**	**1. Relevant threat and hazard information**

[1] The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

national and regional level	understood to increase resilience to droughts in livestock production, particularly for vulnerable areas (superficial soils) No of publications and dissemination events at national level	**to climate-related hazards and threats**	**generated and disseminated to stakeholders on a timely basis**
	Specific risks of agricultural sector to CC and variability identified and assessed with indicators and action plans for critical sectors	**Outcome 7. Improved policies and regulations that promote and enforce resilience measures**	**7. Climate change priorities are integrated into national development strategy**
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**
Infrastructure for increasing resilience to droughts and water stress in superficial soils strengthened and expanded	No of water harvest infrastructure constructed or refurbished No of grassland ha under sustainable management practices No of forage banks or common paddocks created or strengthened	**Output 4. Vulnerable physical, natural and social assets strengthened in response to climate change impacts, including variability**	**4.1.2 No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by assets type)**
Networks developed at the LU level to address CC and variability	No of grass-root leaders and staff trained in each LU No of participatory strategic plans prepared and under implementation No of farm plans and proposals aligned with the strategic plan that are effectively implemented No of farmers involved in the implementation of the strategic plan No of farmers and technical assistant staff receiving training on CC and	**Output 2.1 Strengthened capacity of national and regional centres and networks to respond rapidly to extreme weather events**	**2.1.1. No of staff trained to respond to, and mitigate impacts of climate-related events** **2.1.2 Capacity of staff to respond to and mitigate impacts of climate related events from targeted institutions increased**

	variability, water harvest and grassland and stocking rate management in face of water stress		
	Dissemination events and media releases on impacts and responses to CC and variability in the livestock sector. No of farmers receiving climate early warnings through the network based on available information on seasonal forecasts Early warnings released at the local level by the LU networks through the media or SMS	**Output 3. Targeted population groups participating in adaptation and risk reduction awareness activities**	**3.1.2 No of news outlets in the local press and media that have covered the topic**
The agricultural sector has identified the risks induced by the CC and variability and has identified best practices to increase resilience of livestock sector to extreme events	No of research projects providing new evidence on CC and variability No of research projects providing risk and vulnerability assessment of agricultural activities to CC and variability No of research and development projects on best practices for adapting to CC and variability No of research projects on critical levels of climate variables as an input to early warning systems	**Output 1. Risk and vulnerability assessments conducted and updated at a national level**	**1.1 No and type of projects that conduct and update risk and vulnerability assessments**
	CC Unit at the Ministry of Agriculture strengthened and regularly assessing agricultural sector risks induced by CC and variability and mainstreaming adaptation to CC in	**Output 7. Improved integration of climate-resilience strategies into country development plans**	**7.2 No or targeted development strategies with incorporated climate change priorities enforced**

	research and extension priorities and development projects implemented by the MGAP		

Annex: the AF Results Framework

Objective: Reduce vulnerability and increase adaptive capacity to respond to the impacts of climate change, including variability at local and national levels.

EXPECTED RESULTS	INDICATORS
Goal: Assist developing-country Parties to the Kyoto Protocol that are particularly vulnerable to the adverse effects of climate change in meeting the costs of concrete adaptation projects and programmes in order to implement climate-resilient measures.	
Impact: Increased resiliency at the community, national, and regional levels to climate variability and change.	
Outcome 1: Reduced exposure at national level to climate-related hazards and threats	1. Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis
Output 1: Risk and vulnerability assessments conducted and updated at a national level	1.1. No. and type of projects that conduct and update risk and vulnerability assessments
	1.2 Development of early warning systems
Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	2.1. No. and type of targeted institutions with increased capacity to minimize exposure to climate variability risks
	2.2. Number of people with reduced risk to extreme weather events
Output 2.1: Strengthened capacity of national and regional centres and networks to respond rapidly to extreme weather events	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events
Output 2.2: Targeted population groups covered by adequate risk reduction systems	2.1.2. Capacity of staff to respond to, and mitigate impacts of, climate-related events from targeted institutions increased
	2.2.1. Percentage of population covered by adequate risk-reduction systems
	2.2.2. No. of people affected by climate variability
Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses
	3.2. Modification in behavior of targeted population

Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1.1 No. and type of risk reduction actions or strategies introduced at local level
	3.1.2 No. of news outlets in the local press and media that have covered the topic
Outcome 4: Increased adaptive capacity within relevant development and natural resource sectors	4.1. Development sectors' services responsive to evolving needs from changing and variable climate
	4.2. Physical infrastructure improved to withstand climate change and variability-induced stress
Output 4: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	4.1.1. No. and type of health or social infrastructure developed or modified to respond to new conditions resulting from climate variability and change (by type)
	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types)
Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	5. Ecosystem services and natural assets maintained or improved under climate change and variability-induced stress
Output 5: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	5.1. No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type of assets)
Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	6.1 Percentage of households and communities having more secure (increased) access to livelihood assets
	6.2. Percentage of targeted population with sustained climate-resilient livelihoods
Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1.No. and type of adaptation assets (physical as well as knowledge) created in support of individual- or community-livelihood strategies
	6.1.2. Type of income sources for households generated under climate change scenario
Outcome 7: Improved policies and regulations that promote and enforce resilience measures	7. Climate change priorities are integrated into national development strategy
Output 7: Improved integration of climate-resilience strategies into country development plans	7.1. No., type, and sector of policies introduced or adjusted to address climate change risks
	7.2. No. or targeted development strategies with incorporated climate change priorities enforced