

I. BASIC INFORMATION

Country/Region:	Latin-American and the Caribbean Region
Technical cooperation project (TC) name:	Sustainable Intensification of Livestock Systems with Legumes: Latin American and Caribbean Cooperation Platform
TC number:	RG-T3327
Project Team Leader/members:	Ana Rios (CSD/RND), Eugenia Saini (FTG/STA), Juan Balbi (FTG/STA), David Gomez (FTG/STA), Carina Carrasco (FTG/STA), and Rodolfo Graham (LEG/SGO)
TC type:	Client Support
Project authorization date:	June 8 th , 2018.
Beneficiaries:	Argentina, Chile, Dominican Republic, Ecuador, Nicaragua, Paraguay, and Uruguay.
Executing agency and contact name:	Fundación ArgenINTA. Sr. Hugo Garcia.
Partner organizations:	Brazil (Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA)) and PROCISUR/IICA (Cooperative Program for the Development of Agricultural Technology in the Southern Cone)
Donors providing funding:	Ministry for Primary Industries (MPI) from New Zealand.
Funding requested:	RFA – REGIONAL FUND FOR AGRICULTURAL TECH: NZ\$100,000 (US\$68,025) RFA – REGIONAL FUND FOR AGRICULTURAL TECH: US\$305,000
Local counterpart funding (in US\$):	1,189,295 in kind <u>232,204 in cash</u> 1,421,499 total local counterpart
Total funding (in US\$):	1,794,524
Execution period (months):	42
Disbursement period (months):	48
Required start date:	August, 2018
Types of consultants:	Firms or individual consultants
Unit responsible for preparation:	RND
Unit responsible for disbursements:	CSD/RND
TC included in the country strategy (y/n):	N/A
TC included in the CPD (y/n):	N/A
GCI-9 Sector Priority:	Climate Change and Food Security
Additional comments:	An agreement with Fundación ArgenINTA is being requested.

II. OBJECTIVES AND JUSTIFICATION OF THE TC

2.1 General objective. This project will **help to improve the Latin American and Caribbean livestock production systems through the adoption of forage legumes**. It specifically aims to: (1) create, establish, and manage a cooperation platform on the use of legumes; (2) assess the impact of systems that include pastures with legumes on the ground on both animal productivity and GHG emissions; and (3) manage knowledge and strengthen capacity in this area.

2.2 Background/Justification. By 2050, demand for food will grow more than 70%. As more than three billion people are expected to be added to the middle class, demand for animal proteins will be especially high. Latin America and the Caribbean, as the world's main food export region, have cemented their role as the global breadbasket, accounting for more than 60% of soy, 44% of beef, 42% of chicken, and 17% of pork exports (Zeigler and Truitt Nakata, 2014).¹ This project brings together eight countries known for having significant livestock farming, with respect to both meat and milk production. They boast nearly 400 million head of cattle, accounting for more than 20% of global stock. Livestock farming in these countries is based on direct grazing, with the exception of Chile, where a portion of it is stabled. Such activity unfolds in markedly different agricultural ecosystems, with very particular soil and climate conditions and exceptionally diverse types of forage resources, which include natural grasslands, pastures, thickets, and scrublands, as well as forest-grazing systems (Batista et al. 2005; Peyraud et al. 2014; Bernardi et al. 2016).² There are, however, clear similarities in large swaths of these countries: (i) Livestock production occurs in marginal areas for agriculture, in nutritionally-deficient—particularly in nitrogen (N)—environments; (ii) livestock productivity is low, with limited grazing management and animal stocks that typically fall below one cow per hectare; (iii) efficiency rates are low (290 grams of daily weight gain and an average removal rate of 4.5%); and (iv) livestock account for high levels of greenhouse gas (GHG) emissions—18% on average—and constitute a main source of emissions in all eight countries. The sustainable intensification paradigm is one option to reverse this situation (Herrero and Thornton 2013).³ Forage legumes in particular can play a central and strategic role because of the nitrogen (N) they contribute through biological nitrogen fixation (BNF), estimated to be between 40 and 170 kg N ha⁻¹ (Anglade et al. 2015),⁴ and because of the improved nutritional value of the animals' diets. Hence, incorporating legumes into pastures would boost animal productivity and lessen the intensity of GHG emissions thanks to lower enteric methane emissions and potential increases in soil carbon storage. Over the past 20 years, there have been significant changes in land use throughout the region due to deforestation and grassland replacement. Livestock account for high levels of GHG emissions in the entire Latin American and Caribbean (LAC) region—18% on average but climbing to 25% in some countries. Livestock emissions generate: (a) CH₄ from enteric fermentation and from the soil; (b) N₂O emitted from the soil from soil nitrogen or excreta; and (c) CO₂ due to land use changes. GHG emissions linked to livestock production have to be determined and soil carbon storage must be increased (Lal 2004; Foley et al. 2011; Cardoso et al. 2016)⁵. These challenges and opportunities can be addressed more efficiently by means of a regional effort that makes it

¹ Zeigler, M.; Truitt Nakata, G., 2014. The Next Global Breadbasket: How Latin America Can Feed the World: A call to action for addressing challenges and developing solutions. See more at: <https://publications.iadb.org/handle/11319/6436#sthash.oWpu0iB8.dpuf>

² Batista W.B.; Taboada, M.A.; Lavado, R.S.; Perelman, S. B.; León, R.J.C., 2005. *Asociación entre comunidades vegetales y suelos de pastizal de la Pampa deprimida*: M. Oesterheld, M.R. Aguiar, C. M. Ghersa, J.M. Paruelo (Editors). *La heterogeneidad de la vegetación de los agroecosistemas. Un homenaje a Rolando J.C. León*. Publisher, UBA School of Agronomy, Buenos Aires, 2005, p. 113-129.

Peyraud, J-L., Taboada, M.A., Delaby, L. 2014. Integrated crop and livestock systems in Western Europe and South America: A review. *European Journal of Agronomy* 57, pp. 31-42.

Bernardi R.E.; de Jonge, I.K.; Holmgren, M. 2016. Trees improve forage quality and abundance in South American subtropical grasslands. *Agriculture, Ecosystems and Environment* 232, pp. 227-231.

³ Herrero M.; Thornton, P.K. 2013. Livestock and global change: Emerging issues for sustainable food systems. *PNAS* 110 (52), pp. 20878–20881.

⁴ Anglade J.; G. Billen; J. Garnier. 2015. Relationships for estimating N₂ fixation in legumes: incidence for N balance of legume-based cropping systems in Europe. *Ecosphere* 6 (3), 1–24.

⁵ Lal, R. 2004. *Agricultural activities and the global carbon cycle. Nutrient cycling in Agroecosystems*. 70: 103-116.

Foley, J.A.; Brauman, K.A.; Cassidy, E.S.; Johnston, M.; Mueller, N.D.; O'Connell, C.; Ray, D.K.; West, P.C.; Balzer, C.; Bennett, E.M.; Carpenter, S.R.; Hill, J.; Monfreda, C.; Polasky, S.; Rockström, J.; Sheehan, J.; Siebert, S.; Tilman, D.; Zaks, D.P.M. 2011. *Solutions for a cultivated planet. Nature* 478, 337–342.

Cardoso, A; Berndt, A; Leytem, A; Alves, B; Carvalho, I; Barros Soares, L; Urquiaga, S; Boddey, R. 2016. *Impact of the intensification of beef production in Brazil on greenhouse gas emissions and land use. Agricultural Systems* 143: 86-96.

possible to bring together human and financial resources from the participating countries, thereby making the most of complementarities and creating synergies to produce new knowledge that enable the development of new technologies and adoption of new practices, as well as a better integration of the capacities of researchers, technical professionals, and producers from the region. The creation of a regional cooperation platform to improve livestock systems based on the use of forage legumes is therefore being proposed. All of this will help to enhance livestock production because carbon will be used more efficiently and calculations using IPCC emission factors will be more precise. Most of the countries lack GHG emission factors adjusted to their national realities; were they to obtain them, such factors could be used in their national climate change submissions.

III. DESCRIPTION OF ACTIVITIES/COMPONENTS AND BUDGET

3.1 The project contemplates the financing of the research and generation / dissemination of knowledge on: 1) building a cooperation platform, 2) assess the impact of pastures with forage legumes on the ground on animal productivity and GHG emissions, and 3) knowledge management and training. A detailed timetable by component is provided in Annex I.

COMPONENT 1: DESIGN AND BUILDING OF THE COOPERATION PLATFORM.

Objective: create a regional cooperation platform. Activities:

Activity 1.1. Creation of the platform. A cooperation platform will be created to improve livestock production systems in Latin America and the Caribbean (LAC) via the introduction of legumes into pastures. Eight countries will initially comprise the platform, which will be coordinated by INTA from Argentina and facilitated by PROCISUR/IICA. The objective is to create, establish, and manage a platform to generate and share knowledge and technologies in connection with the use of forage legumes to improve livestock productivity in the member countries. *Mechanism:* Cooperation agreements or commitment letters between the platform's member countries. *Entities responsible:* INTA-Argentina, Fundación ArgenINTA and PROCISUR/IICA. *Partners:* INIA-Chile, INIA-Uruguay, EMBRAPA-Brazil, IDIAF-Dominican Republic, INIAP-Ecuador, INTA-Nicaragua, and IPTA-Paraguay.

Output 1: Formally constituted platform

Activity 1.2. Governance mechanism. Designation of a coordinating institution supported by PROCISUR/IICA and representatives of the member institutions. *Objective:* Ensure participatory engagement and consensus on the platform. *Mechanism:* This will operate based on annual work plans, assignment of responsibilities and resources, accountability, and periodic and final reports. *Entity responsible:* INTA-Argentina. *Partners:* INIA-Chile, INIA-Uruguay, EMBRAPA-Brazil, INIAF-Dominican Republic, INIAP-Ecuador, INTA-Nicaragua, IPTA-Paraguay and PROCISUR/IICA.

Output 2: Guidelines containing detailed information about the governance structure, functions, and responsibilities established

Activity 1.3. In-person and virtual coordination meetings. In-person meetings will be held annually for programming and the presentation of reports, as will virtual coordination meetings for monitoring execution of collaborative activities. *Objective:* Ensure execution of annual work plans. *Mechanism:* Three annual meetings will be held in different countries to settle on the annual work plans and discuss any progress made. Videoconferences will be organized over *Webex* or other media to review progress and come to agreement on adjustments where necessary. *Entity responsible:* INTA-Argentina. *Facilitator:* PROCISUR/IICA.

Output 3: Annual work plans executed

Activity 1.4. Technical and financial management. Fundación ArgenINTA will ensure efficient management of the platform—including integration of the data submitted by the partners—and will prepare the reports to be sent to FONTAGRO, New Zealand's Ministry of Primary Industries, and PROCISUR/IICA. *Objective:* Ensure efficient technical and financial management and fulfillment of the project objectives. *Mechanisms:* The coordinator will ensure disbursement of the resources necessary for execution of the annual work plans, monitor implementation, request whatever information necessary from the partners, integrate the data, and submit the technical and financial

reports to FONTAGRO and New Zealand's Ministry of Primary Industries, with the support of PROCISUR/IICA. *Entity responsible:* Fundación ArgenINTA. *Partners:* PROCISUR/IICA and partners.

Output 4: Technical and financial reports

COMPONENT 2: ASSESS THE IMPACT OF PASTURES WITH FORAGE LEGUMES ON THE GROUND ON ANIMAL PRODUCTIVITY AND GHG EMISSIONS

Objective: Impact assessment of the use of legums in pastures, by measuring animal productivity and GHG emissions. *Activities:*

Activity 2.1. Biological nitrogen fixation. The efficiency of biological atmospheric nitrogen fixation (BNF) by forage legumes in offsetting nitrogen release from agricultural ecosystems, both as outputs and as losses from the soil, is a key aspect of the role of pastures with legumes in the design of productive, competitive, and sustainable animal production. *Objective:* Conduct a large-scale survey of how forage legumes vary in terms of their reliance on BNF for their supply of N, associate such variability with regional soil and climate patterns, and, lastly, quantify the importance of BNF with respect to total use of N by animal production systems. *Mechanisms:* Both leguminous plants and non-nitrogen fixing plants will be collected from each site in order to quantify BNF using the natural abundance of N technique. The physical and chemical properties of the soil and the climate will be assessed together with the BNF data to identify potential limitations. In addition, at an experimental scale, N balances will be drawn up for pastures with legumes that will include N inputs via BNF and releases thereof in product form (meat and milk) as well as via losses from the soil. *Entities responsible:* INIA-Uruguay and INIAP-Ecuador. *Partners:* EMBRAPA-Brazil, INTA-Argentina, IPTA-Paraguay, IDIAF-Dominican Republic, and their project partners.

Output 5: Database on legumes' reliance on BNF and soil and climate variables

Output 6: Technical reports on BNF performance and soil and climate factors that need to be taken into account

Output 7: Publications on advances in knowledge

Activity 2.2. Carbon sequestration⁶. The incorporation of legumes into pastures could lead to increases in the quantity of carbon (C) stored in the soil because of N inputs into the system via BNF. *Objective:* Quantify C stock in the soil in pasturelands—with and without legumes—that have been around for several years, with the same types of soil and the same land use profile. *Mechanisms:* C and N stores or stocks in the soil will be quantified by means of an analysis of soil samples taken in layers up to 50 cm deep in order to determine C and N content and bulk density. *Entities responsible:* EMBRAPA-Brazil and INTA-Nicaragua. *Partners:* INTA-Argentina, INIA-Chile, INIA-Uruguay, IPTA-Paraguay, IDIAF-Dominican Republic, INIAP-Ecuador, and their project partners. *Sampling specifics:* Soil sampling will be done in time-ordered sequences in pasture areas with and without legumes, both having existed the same amount of time, differing only in terms of when legumes were introduced. In the subtropical regions, pastures with native grasses will serve as benchmarks for original vegetation. In tropical regions, however, pastures have commonly developed after forests have been cleared. Hence, in addition to pasturelands, where possible, taking soil samples from nearby areas with the same type of soil and terrain under the remaining original vegetation is recommended. The idea is that these different land uses are transpiring in the same soil, in areas adjacent to one another, thereby minimizing soil and climate differences. *Sampling sites:* Argentina (3), Uruguay (7), Chile (sites in permanent pastures with or without established legumes, in volcanic soils, in inland climate conditions), Brazil (7), Paraguay (1), Nicaragua (in pastures with Brachiaria), Dominican Republic (3), and Ecuador (1). All told, there are to be 16 pairs of treatments (grass monoculture and grasses associated with other crops) that will be evaluated in temperate regions (Argentina, Chile, Uruguay, and southern Brazil) and 13 pairs in tropical regions (Brazil, Paraguay, Nicaragua, and the Dominican Republic and Ecuador).

Output 8: Database on soil density and C and N content in soil profiles

Output 9: Technical reports

Output 10: Scientific publications on advances in knowledge

Activity 2.3. GHG emissions. There is uncertainty as to the role introducing legumes plays on the final balance of GHG emissions from livestock systems. On the one hand, the BNF performed by legumes boosts the amount of

⁶ This activity will be implemented through FONTAGRO and New Zealand funding

active N in the system, which is a potential source of N₂O emissions; on the other hand, however, increased protein in animals' diets could mitigate enteric CH₄ emissions. In order to respond to these questions, which have to do with participating countries' ability to engage in efforts to mitigate climate change, emissions in real productive systems have to be measured. *Objective*: Quantify the effect introducing legumes has on soil methane and nitrous oxide emissions, and on enteric methane emissions from cattle. *Mechanisms*: (i) Soil emissions: N₂O and CH₄ emissions from the soil will be determined using static cameras located on plots with and without legumes that mimic grazing conditions. The evaluations will consider a pasture's yield, variations in available nitrogen and soil moisture, and climate variables and N₂O and CH₄ emissions. Gas samples will be analyzed using gas chromatography, with losses expressed in surface units; (ii) livestock emissions: Livestock emissions will be determined by employing the sulfur hexafluoride (SF₆) technique, taking into account two feed treatments (control pasture without legumes, legume pasture). Productive variables (forage and animal production), enteric methane (CH₄) emissions, and individual animal consumption will be quantified. Losses will be expressed as L CH₄ kg⁻¹ MS consumed. *Entities responsible*: INIA-Chile and INIAF-Dominican Republic. *Partners*: INTA-Argentina, EMBRAPA-Brazil, INIA-Uruguay, and their partners.

Output 11: Regional database of N₂O and CH₄ emissions from the soil for pasture systems with and without legumes, and of enteric CH₄ emissions from cattle, determined for animal systems that have and have not incorporated legumes

Output 12: Annual technical reports

Output 13: Publications produced about the topic in question (informational and scientific)

Activity 2.4. Impact on animal productivity. *Objective*: Quantify the impact of incorporating legumes into pastures on animal productivity. *Mechanism*: Data available from previous work on animal productivity (liters of milk and/or kilos of meat) in pasture systems with and without legumes will be collected. The data will be tabulated and analyzed statistically. *Entities responsible*: INTA-Argentina, INIA-Uruguay, and IPTA-Paraguay.

Output 14: Regional database on the impact of including legumes on animal production

Output 15: Annual technical reports

Output 16: Publications about the topic in question (informational and scientific)

COMPONENT 3: KNOWLEDGE MANAGEMENT AND TRAINING

Objective: Create tools, mechanism and methodologies to promote knowledge management, training and result-dissemination. *Activities*:

Activity 3.1. Virtual platform. The opportunities and potential for engagement among project participants require the development of a tool to facilitate communication and information sharing in real time. *Objective*: Consolidate the data generated by the project on a digital platform open to the public (web page). *Mechanism*: The data will be uploaded to the microsite available for the project on FONTAGRO's website. This will incorporate information from the research teams and research activities, trainings, and dissemination activities, as well as from resulting publications. *Entities responsible*: INTA-Argentina and INIAP-Ecuador. *Partners*: EMBRAPA-Brazil, INIA-Chile, IDIAF-Dominican Republic, IPTA-Paraguay, INIA-Uruguay, INTA-Nicaragua, PROCISUR/IICA, FONTAGRO, and other partners.

Output 17: Project website

Activity 3.2. Dissemination of advancements in knowledge. The data generated by the project will be disseminated on an ongoing basis to different audiences through the most appropriate mechanisms therefor. *Objective*: Disclose project outcomes and data to different audiences. *Mechanisms*: A regional dissemination strategy will be devised, following FONTAGRO's strategic guidelines. Each country will develop its own dissemination activities and outputs, including informational publications, bulletins, presentations at conferences, field days, social media presence, and activities engaging the mass media. For activities that are regional in scope, PROCISUR and IICA will make their member country networks available. INTA-Argentina will coordinate the preparation of technical bulletins and scientific publications stemming from the project. *Entities responsible*: INTA-Argentina and INIAP-Ecuador. *Partners*: EMBRAPA-Brazil, INIA-Chile, IPTA-Paraguay, IDIAF-Dominican Republic, INIA-Uruguay, INTA-Nicaragua, PROCISUR/IICA, FONTAGRO, and other partners.

Output 18: Publications, presentations, articles in the media

Activity 3.3. Training. There will be collaboration to build the capacity of platform members at different levels: Researchers, professionals, and producers. Regionally, the emphasis will be focused mainly on researchers. *Objective:* Build technical and scientific capacity and knowledge about the use of legumes in pastures, both regionally and locally. *Mechanism:* Regionally, INTA-Argentina and PROCISUR/IICA, with the support of the other members, will organize two training workshops in conjunction with the annual platform meetings in years one and three. Locally, each of the platform's member institutions will organize their own respective activities pursuant to the annual work plan agreed on the platform. *Entities responsible:* INTA-Argentina and INIAP-Ecuador. *Partners:* EMBRAPA-Brazil, INIA-Chile, IPTA-Paraguay, IDIAF-Dominican Republic, INIA-Uruguay, INTA-Nicaragua, PROCISUR/IICA, FONTAGRO, and other partners.

Output 19: Thesis, internships, workshops, and courses

TIMETABLE RESULT MATRIX

Component	Activity	Year I				Location	Institution
		I QUARTER	II QUARTER	III QUARTER	IV QUARTER		
Component 1	Activity 1.1	X				All	INTA Argentina, Fundación ArgenINTA and PROCISUR/IICA
	Activity 1.2	X	X	X	X	All	INTA Argentina
	Activity 1.3		X		X	All	INTA Argentina
	Activity 1.4	X	X	X	X	Argentina	INTA Argentina
Component 2	Activity 2.1		X	X	X	All	INIA-Uruguay, INIAP-Ecuador
	Activity 2.2		X	X	X	All	EMBRAPA-Brasil, INTA-Nicaragua. Colaboradores: INTA-Argentina, INIA-Chile, INIA-Uruguay, IPTA-Paraguay, IDIAF-Dom. Rep, INIAP-Ecuador
	Activity 2.3		X	X	X	Ch-Uru-Brz-Arg	INIA-Chile, INIAF- Dom. Rep
	Activity 2.4		X	X	X	Par-Uru-Arg	INTA-Argentina, INIA-Uruguay, IPTA-Paraguay.
Component 3	Activity 3.1		X	X	X	All	INTA-Argentina, INIAP-Ecuador
	Activity 3.2			X	X	All	INTA-Argentina, INIAP-Ecuador
	Activity 3.3			X	X	All	INTA-Argentina, INIAP-Ecuador
		Year II					
Component 1	Activity 1.1					All	INTA Argentina, Fundación ArgenINTA and PROCISUR/IICA
	Activity 1.2	X	X	X	X	All	INTA Argentina
	Activity 1.3		X		X	All	INTA Argentina
	Activity 1.4	X	X	X	X	Argentina	INTA Argentina
Component 2	Activity 2.1	X	X	X	X	All	INIA-Uruguay, INIAP-Ecuador
	Activity 2.2	X	X	X	X	All	EMBRAPA-Brasil, INTA-Nicaragua. Colaboradores: INTA-Argentina, INIA-Chile, INIA-Uruguay, IPTA-Paraguay, IDIAF- Dom. Rep, INIAP-Ecuador
	Activity 2.3	X	X	X	X	Ch-Uru-Brz-Arg	INIA-Chile, INIAF- Dom. Rep

	Activity 2.4	X	X	X	X	Par-Uru-Arg	INTA-Argentina, INIA-Uruguay, IPTA-Paraguay.
Component 3	Activity 3.1	X	X	X	X	All	INTA-Argentina, INIAP-Ecuador
	Activity 3.2		X		X	All	INTA-Argentina, INIAP-Ecuador
	Activity 3.3			X	X	All	INTA-Argentina, INIAP-Ecuador
Year III							
Component 1	Activity 1.1					All	INTA Argentina, Fundación ArgenINTA and PROCISUR/IICA
	Activity 1.2		X	X	X	All	INTA Argentina
	Activity 1.3		X	X	X	All	INTA Argentina
	Activity 1.4	X	X	X	X	Argentina	INTA Argentina
Component 2	Activity 2.1	X	X	X	X	All	INIA-Uruguay, INIAP-Ecuador
	Activity 2.2	X	X	X	X	All	EMBRAPA-Brasil, INTA-Nicaragua. Colaboradores: INTA-Argentina, INIA-Chile, INIA-Uruguay, IPTA-Paraguay, IDIAF- Dom. Rep, INIAP-Ecuador
	Activity 2.3	X	X	X	X	Ch-Uru-Brz-Arg	INIA-Chile, INIAF- Dom. Rep
	Activity 2.4	X	X	X	X	Par-Uru-Arg	INTA-Argentina, INIA-Uruguay, IPTA-Paraguay.
Component 3	Activity 3.1	X	X	X	X	All	INTA-Argentina, INIAP-Ecuador
	Activity 3.2		X		X	All	INTA-Argentina, INIAP-Ecuador
	Activity 3.3			X	X	All	INTA-Argentina, INIAP-Ecuador
Year IV							
Component 1	Activity 1.1						INTA Argentina, Fundación ArgenINTA and PROCISUR/IICA
	Activity 1.2	x	X			Buenos Aires	INTA Argentina
	Activity 1.3		X			Buenos Aires	INTA Argentina
	Activity 1.4	X	X			Buenos Aires	INTA Argentina
Component 2	Activity 2.1	X	X			Colonia	INIA-Uruguay, INIAP-Ecuador
	Activity 2.2	X	X			Seropédica	EMBRAPA-Brasil, INTA-Nicaragua. Colaboradores: INTA-Argentina, INIA-Chile, INIA-Uruguay, IPTA-Paraguay, IDIAF- Dom. Rep, INIAP-Ecuador
	Activity 2.3	X	X			Chile	INIA-Chile, INIAF- Dom. Rep
	Activity 2.4	X	X			Buenos Aires	INTA-Argentina, INIA-Uruguay, IPTA-Paraguay.
Component 3	Activity 3.1	X	X			Buenos Aires	INTA-Argentina, INIAP-Ecuador
	Activity 3.2	X	X			Buenos Aires	INTA-Argentina, INIAP-Ecuador
	Activity 3.3	X	X				INTA-Argentina, INIAP-Ecuador

3.1 Knowledge management. Management of project-related knowledge can be structured into two components: A decision-making component that includes strategic decisions regarding the project and a research component. The consortium's members will participate in both and the institution spearheading the project will coordinate them. Special emphasis will be placed on internal communication among the project's researchers, so they may efficiently manage and use the information being gleaned inside the different countries. The research component will be devoted to the planning and execution of experiments, data collection, and field data processing and analysis by researchers, students, and field assistants. Furthermore, collaborating researchers will give advice about matters related to research and decision-making. Two training workshops will be held (years one and three) for the teams of researchers involved in the project, specifically on how to quantify the effects of incorporating legumes into pasturelands in Latin America and the Caribbean. In addition, workshops and field days will be conducted with private sector stakeholders (advisors, extension workers, farmers, etc.) to disclose the project's outcomes.

3.2 Sustainability. The sustainability and continuity of this research proposal will rely on five post-project strategies: (1) The project findings will be used and included as the basis for formulating future research proposals in this area. Such proposals are to be presented over the platform, and by each participating group individually, to funding sources both inside and outside of each country; (2) the scientists spearheading the present proposal will continue to be funded by their sponsoring institutions and will thus continue to vertically execute research proposals on this same topic, thereby strengthening the research teams involved in this project; (3) both undergraduate and graduate students will be recruited to study the project topic and will be encouraged to take on professional responsibilities tied to the subject that enable the link between the research team and the students to be sustained; and (4) the information available for publication on the web page will be maintained over time as part of FONTAGRO's body of work (project microsites).

3.3 Regional public goods. The sharing of genetic material among the consortium's countries will be encouraged, taking into account existing laws and regulations in each one of them. Articles resulting from the findings of this project published in peer-reviewed scientific journals, in local publications, or on the websites of the consortium's member institutions will be subject to intellectual property protection. To protect the published findings, full citation of the corresponding references will be required when used by third parties either publicly or privately, in verbal or written media, and/or in academic, technical, governmental, or commercial settings. The findings will be made public and hence, will be used and appropriated primarily by researchers, teachers, and related public authorities.

3.4 Environmental and social impacts. The environmental impact assessment includes technological efficiency, environmental conservation, and social pillars. As to technological efficiency, the project will have a positive impact since the incorporation of legumes will make it possible to reduce the use of chemical nitrogen fertilizers thanks to nitrogen inputs from biological nitrogen fixation (Indicator: Use of agrochemicals). With respect to environmental conservation, GHG (methane and nitrous oxide) emissions from livestock production in the platform's countries are expected to diminish. In addition, carbon sequestration in pastures is expected to improve (Indicator: Effect on the quality of the atmosphere). Moreover, the carbon content of fertile soils is expected to increase (Indicator: Effect on the productive capacity of the soil). Reductions in the use of nitrogen fertilizers thanks to the inclusion of legumes will also potentially lead to reductions in the application of nitrogen fertilizers used in some productive systems, which will result in less N loss from leaching (Indicator: Effect on water quality). Regarding the social pillar, the project will help make family livestock systems more profitable thanks to reduced fertilizer-related costs and/or greater yields, thereby averting their "exit" from this field. Incentives for livestock production help to keep people in rural areas, unlike what has occurred in other agriculture-related cases (Indicator: Changes in farming employment levels). Efforts are being pursued to develop family farming livestock production systems that are resilient to climate fluctuations (drought) and thereby minimize the risks associated with this activity. Since livestock production is very labor intensive in the field, more people would

be employed in rural areas (Indicator: Changes in employment quality). As to health and nutrition, the project will have a positive impact on livestock system laborers inasmuch as they will be working in an environment with fewer polluting gas emissions (Indicator: Changes in worker health). When it comes to family farming, greater animal yields can translate into improvements to the family diet thanks to higher animal protein consumption (milk and/or meat), thus boosting food security in the sector (Indicator: Changes in the nutritional quality of products generated by the project).

3.5 Annex IV provides an implementation timeline for this technical cooperation project; Annex V offers a summary of the evidence of legal representation and backgrounds of the participating institutions; and Annex VI provides summaries of the professional experience of the technical leaders from each participating institution.

3.6 The total amount of the operation is US\$1,794,524; of that, FONTAGRO will provide a total of US\$305,000 and New Zealand will provide a total of NZ\$100,000 (equivalent to US\$68,025 converted into US\$ at the exchange rate in effect on 27 June 2018. Rate: 1 NZD = 0.680254) from its own funds, while US\$1,189,295 will come from in-kind counterpart contributions from the participating institutions. In addition, IICA (via PROCISUR) will support the project activities with US\$232,204 in cash, which will be managed directly by Fundación ArgenInta. Annex VII presents the Procurement Plan, while Annex VIII provides the institutions' letters of commitment. The budget table and maximum totals by spending category are presented below.

IV. INDICATIVE BUDGET

Financial Distribution by FONTAGRO, New Zealand and the co-executing agencies

Resource financed by:	FONTAGRO with New Zealand								COUNTERPART								Subtotal	TOTAL		
	INTA Argentina	INIA Chile	INIAP Ecuador	INTA Nicaragua	IDIAF Rep. Dominican	IPTA Paraguay	INIA Uruguay	Subtotal	INTA Argentina	Embrapa Brazil	INIA Chile	INIAP Ecuador	INTA Nicaragua	IDIAF Dominican Rep.	IPTA Paraguay	INIA Uruguay			IICA/PROCI SUR (2)	
01. Consultants and specialists	28,000	-	-	-	-	-	-	28,000	226,857	308,447	97,801	126,295	37,068	60,000	61,222	181,041	55,562	1,154,293	1,182,293	
02. Goods and Services	3,000	-	-	-	-	-	-	3,000				10,000					-	10,000	13,000	
03. Materials and inputs Fontagro	29,683	35,363	9,636	3,310	3,382	3,928	23,207	108,509				15,000						150,975	165,975	274,484
03. Materials and inputs MPI-NZ (1)	9,304	11,085	3,020	1,038	1,060	1,231	7,274	34,013												
03. Materials and inputs Total	38,987	46,448	12,656	4,348	4,442	5,159	30,481	142,522												
04. Travel and per diem Fontagro	17,655	12,175	7,940	6,600	6,684	7,110	11,275	69,439				2,500						32,055	34,555	103,994
04. Travel and per diem MPI-NZ (1)	8,648	5,964	3,889	3,233	3,274	3,483	5,523	34,013												
04. Travel and per diem Total	26,303	18,139	11,829	9,833	9,958	10,593	16,798	103,452												
05. Training	4,236	4,236	4,236	4,236	4,236	4,236	4,236	29,649				-						15,352	15,352	45,001
06. Dissemination and Knowledge Management	3,429	3,429	3,429	3,429	3,429	3,429	3,429	24,000				2,500						-	2,500	26,500
07. Administrative Cost	30,500							30,500										23,603	23,603	54,103
08. Contingencies	9,403							9,403				5,000						7,720	12,720	22,123
09. Audit	2,500							2,500										2,500	2,500	5,000
10. Infrastructure end equipment								-												
Total	146,357	72,250	32,150	21,845	22,064	23,416	54,943	373,025	226,857	308,447	97,801	161,295	37,068	60,000	61,222	181,041	287,767	1,421,498	1,794,524	

Notes: (1) The Ministry of Primary Industries (MPI) will contribute NZ\$100,000, converted into US\$ at the exchange rate in effect on 27 June 2018. NZ\$100,000 = US\$68,025.43 Rate: 1 NZD = 0.680254 USD. Source: <https://xe.com/currencyconverter/convert/?Amount=100000&From=NZD&To=USD>, these resources will finance activity 2.2; and (2) PROCISUR is providing a \$55,562 in-kind contribution under the category of consultants; the rest will be in cash and administered by Fundación ArgenINTA.

Table of Maximum Totals by category (in US\$)

Total (US\$)		373,025
Spending Category	Up to:	
01. Consultants and specialists	60%	223,815.00
02. Goods and services	30%	111,907.50
03. Materials and inputs	40%	149,210.00
04. Travel and per diem	30%	111,907.50
05. Training	20%	74,605.00
06. Dissemination and knowledge management	20%	74,605.00
07. Administrative costs	10%	37,302.50
08. Contingencies	5%	18,651.25
09. Audit	5%	18,651.25

4.2 The Ministry for Primary Industries of New Zealand expects to commit NZ\$100,000 to this project in order to fulfill this project, which it is equivalent to US\$68,025, based on the exchange rate of 0.680254 US\$/NZ\$, found in XE (Universal Currency Converter) as of June 27th, 2018. Final resources in USD will be dependent on the exchange rate of the date when the resources are received by the Bank from MIP in New Zealand Dollars and converted into Dollars, pursuant to the terms of the arrangement to be entered into between MIP and the Bank, on behalf of FONTAGRO, as detailed in this project document. If a significant adverse movement in exchange rates reduce the amount of dollars contemplated in this budget from MIP's contribution and such amount cannot be covered by the contingency line item, the activities contemplated in the project will be decreased appropriately and the budget will be adjusted accordingly by the project team. Under no circumstances will the Bank be responsible for these exchange rate fluctuations and none of the sub-executing agencies will have the right to claim the full US\$ amount agreed upon at the moment of agreement signature due to detrimental NZ\$/US\$ exchange rate fluctuations.

4.3 Resources of this project to be received from the Ministry for Primary Industries of New Zealand will be provided to the Bank through a Project Specific Grant (PSG). A PSG is administered by the Bank according to the "Report on COFABS, Ad-Hoc and CLFGS and a Proposal to Unify Them as Project Specific Grants (PSGs)" (Document SC-114). As contemplated in these procedures, the commitment from New Zealand will be established through a separate administrative arrangement. Under such arrangement, the resources for this project will be administered by the Bank.

4.4 There will be no 5% administrative fee charge to this project according to Article I, Section 3 of the Administration Agreement between the Bank and FONTAGRO, except as provided in Article II, Section 2 (b) of said agreement.

V. EXECUTING AGENCY AND EXECUTION STRUCTURE

5.1 This project will be executed by the Bank through the Technical-Administrative Secretariat (TAS) of FONTAGRO and Fundación ArgenInta. The PSG Agreement with the Ministry of Primary Industries (MPI) of New Zealand will detail its roles and responsibilities. The TAS and co-executing agency "Fundación ArgenInta" will be responsible for the preparation and submission to the Bank (ORP/GCM) of the project reporting in compliance with the stipulation of the Administration Agreement. If at the end of PSG execution the project is closed with a positive uncommitted and unspent balance, the TAS and Fundación ArgenInta will be responsible for informing ORP/GCM to transfer the unspent balance as agreed to by the Donor and the Bank pursuant to the terms of the PSG Administration Agreement.

5.2 FONTAGRO is a regional program that promotes collaboration among its member countries to support research and innovation in the agricultural sector. It is sponsored by the IDB and IICA and it operates with a Secretariat based at the IDB in Washington, DC. Its Board of Directors is made up by the Director Generals of the national research institutions of the member countries. Over the years it has supported 135 projects for a total of US\$105 M (US\$19 M managed by FONTAGRO, US\$67 provided as counterpart funding by partners, and the rest by other strategic partners). Its Medium-Term Plan focuses on improvement of family agriculture through three topics: linkages to markets, climate change and sustainable use of natural resources.

5.3 **The executing agency** (EA) is Fundación ArgenINTA from Argentina. Fundación ArgenINTA is a non-governmental organization that was established and chartered as a private law legal entity in 1993. Its mission is to enable INTA to meet its objectives by helping to: Promote research and agricultural extension; link science and technology with production, and encourage actions designed to improve agricultural enterprises and rural life. Fundación ArgenINTA has 80 people deployed throughout the country in 17 delegations. Together, Fundación ArgenINTA, INTEA S.A., and INTA comprise Grupo INTA. INTA – Argentina is a decentralized government agency that is operationally and financially self-sufficient and falls under Argentina's Ministry of Agro-Industry. INTA was established in 1956 and since then has been engaged in developing innovations in both research and extension in the different value chains, regions, and territories to boost competitiveness and sustainable development in Argentina, as well as to improve living conditions for rural families. It is present in Argentina's five eco-regions (Northwest, Northeast, Cuyo, Pampeana, and Patagonia) via a structure comprised by: A central headquarters; 15 regional centers; 52 experimental stations; 6 research centers (Agro-industry; Political, Economic and Social Sciences; Veterinary and

Agricultural Sciences; Agricultural Research; Natural Resources; and Family Farming); 23 research institutions; and more than 350 extension units. For their part, two private entities created by INTA in 1993—Intea S.A. and Fundación ArgenINTA—have joined with it to form Grupo INTA. INTA likewise has a unit abroad (Labintex Europa). Its programming structure includes 15 national programs for managing innovation in production chains and in the territories, two research networks (plant eco-physiology and agro-ecology) and 120 *Proyectos Regionales con Enfoque Territorial* [Regional Projects with a Territorial Focus] (PRETs) for the institutional approach. Its permanent staff includes more than 7,500 employees.

5.4 Acquisitions. The executing agency must perform the acquisition of goods and services, observing the Goods and Works Acquisitions Policy financed by the IDB (document GN-2349-9). For hiring consultants, the Policy for the Selection and Hiring of consultants financed by the IDB (GN-2350-9) will apply.

5.5 Financial management system and internal control. The executing agency shall maintain internal controls to ensure that: i) Project resources are used for the agreed purposes, with special attention to the principles of economy and efficiency; ii) the transactions, decisions and activities of the Project are duly authorized and executed in accordance with the applicable policies and regulations; and iii) the transactions are properly documented and recorded so that timely and reliable reports can be produced. Financial management will be governed by the provisions of the Financial Management Guide for Projects Funded by the IDB (OP-273-6) and the Operations Manual (MOP) of FONTAGRO.

5.6 External financial audit report and other reports. The executing agency must contract the external audit of the project based on the terms of reference sent by the STA. The audit will cover the total amount of the operation (including the local and local counterpart). During the term of the project, the executing agency must present to the Bank and through the Technical Administrative Secretariat (STA), the annual technical progress reports and the semiannual financial reports. At the end of the project, the executing agency will submit to the Bank, through the STA, a Final Technical Report and an Audited Final Financial Report. They will be reviewed and approved by the Bank, through the STA.

5.7 Summary of the monitoring and reporting organization. The executor is in charge of the supervision and monitoring of the TC during its term. The monitoring and supervision of the project allows to monitor the evolution of the scope of the products established in the results matrix of the previous section. Monitoring, supervision and reporting will be carried out using the Bank's policy approach and the guidelines approved by FONTAGRO.

5.8 Disbursements. The execution period is 42 months and the disbursement period is 48 months. The disbursements will be semiannual, provided the justification of a minimum of 80% of the expenses executed on the balance of available funds of the advances made previously.

Co-executing agencies:

5.9 INTA – Argentina is a decentralized government agency that is operationally and financially self-sufficient and falls under Argentina's Ministry of Agro-Industry. INTA was established in 1956 and since then has been engaged in developing innovations in both research and extension in the different value chains, regions, and territories to boost competitiveness and sustainable development in Argentina, as well as to improve living conditions for rural families. It is present in Argentina's five eco-regions (Northwest, Northeast, Cuyo, Pampeana, and Patagonia) via a structure comprised by: A central headquarters; 15 regional centers; 52 experimental stations; 6 research centers (Agro-industry; Political, Economic and Social Sciences; Veterinary and Agricultural Sciences; Agricultural Research; Natural Resources; and Family Farming); 23 research institutions; and more than 350 extension units. For their part, two private entities created by INTA in 1993—Intea S.A. and Fundación ArgenINTA—have joined with it to form Grupo INTA. INTA likewise has a unit abroad (Labintex Europa). Its programming structure includes 15 national programs for managing innovation in production chains and in the territories, two research networks (plant eco-physiology and agro-ecology) and 120 *Proyectos Regionales con Enfoque Territorial* [Regional Projects with a Territorial Focus] (PRETs) for the institutional approach. Its permanent staff includes more than 7,500 employees.

5.10 INIA – Chile, created in 1964, is a private law, non-profit corporation that is part of Chile's Ministry of Agriculture. INIA is Chile's main agricultural research institution, and its mission is to create, adapt, and transfer technologies to help the agricultural sector sustainably contribute to food security and quality and respond competitively and sustainably to the country's major development challenges. INIA is continuously partnering with

individuals and institutions, both Chilean and foreign, that can serve as counterparts in the advancement of research/development projects. For data exchange and dissemination, in addition to direct products or services, INIA primarily uses technology transfer and training, joint projects, information sharing via publications, and direct engagement among researchers. It currently has more than 1,000 specialized workers, of whom 176 are researchers, 452 professionals and support technicians, and 420 operators who engage in administrative, field, and lab work in connection with research, technology transfer, and extension, to the service of Chile's agri-food sector. It is present nationwide, from Arica to Magallanes, in the form of 10 regional research centers, ten experimental centers, six technical offices, and specialized laboratories in each of the Institute's agencies.

5.11 IPTA – Paraguay was created in 2010 as a public law self-sufficient legal entity linked to the Executive Branch via the Ministry of Agriculture and Livestock after the Office of Agricultural Research (DIA) merged with the Office of Animal Production and Research (DIPA). Its aim is to strengthen and improve Paraguay's research system and respond efficiently and effectively in everything having to do with the technical and scientific development of the agriculture and forest sectors. IPTA's primary objective is to create, salvage, adapt, validate, disseminate, and transfer agricultural technology, and to manage agricultural and forest genetic resources through research programs and technologies that make it possible to boost forest and agricultural product productivity in an effort to make such products more competitive for both the domestic market and the export market.

5.12 INIA – Uruguay is a private law public institution created in 1989 with the mission of "generating and adapting knowledge and technology to help the country and its agriculture sector develop sustainably, bearing in mind State policies, social inclusion, and market and consumer demand." INIA has five regional centers spread throughout Uruguay. It has 11 national research programs within 11 specific production systems.

5.13 INIAP – Ecuador was established in 1959 by the Government of Ecuador to find solutions to the growing problems affecting agricultural production and the development model adopted. Owing to a lack of resources, however, the Institute was not able to begin its research activities until 1961 when it commenced work on a State-owned farm that later became the Santa Catalina Experimental Station. INIAP currently boasts the following experimental farms: "Tumbaco" in the province of Pichincha; "Dr. Hugo Vivar Ochoa" in the province of Loja; and "Palora" and "Domono" in the province of Morona Santiago. Since its inception, INIAP has been engaged in important scientific research, which has enabled it to generate, validate, and transfer knowledge and technologies that have unquestionably helped to boost the production and productivity of Ecuador's main agricultural rubrics through the delivery of 217 varieties and hybrids and 33 different crops.

5.14 INTA – Nicaragua was created in 1993 as an Executive Branch agency and member of the Production Cabinet of the Reconciliation and National Unity Government. Its mission is to help boost agricultural productivity, improve the sustainable management of natural resources, enhance sovereignty and food security, and reduce poverty through scientific research and technological innovation via public-private partnerships, with a prominent role being played by farmers' families. INTA has a National Center for Agricultural and Biotechnology Research, three technological development centers, and an experimental field, distributed regionally, as well as six experimental stations.

5.15 IDIAF – Dominican Republic is the State institution responsible for executing the country's agricultural and forestry research and validation policy. Its mission is to "contribute to food security and the competitiveness of Dominican agri-business." IDIAF has four research programs (Food Security; Rural Development; Markets and Competitiveness; Natural Resources and Biodiversity) and four regional centers (Northern Center, Southern Center, Center for Animal Production, and Center for Agricultural Technologies), which themselves each have experimental stations—10, 7, 5, and 2, respectively.

Partner organizations:

5.16 EMBRAPA – Brazil was established in 1973 and is linked to the Ministry of Agriculture, Livestock, and Food Supply (MAPA). Since its creation, EMBRAPA has taken on the challenge of developing, together with partners

from the National Agricultural Research System, a genuinely Brazilian tropical agriculture and livestock model, surmounting the barriers that limited the production of food, fibers, and energy in the country. It has 17 central units, 46 decentralized units in all of Brazil's regions, 4 virtual laboratories abroad (Labex), and 3 international offices in Latin America. EMBRAPA boasts a team of 2,424 researchers, 84% of whom hold doctorates or post-docs from Brazilian and foreign universities.

5.17 The **Cooperative Program for the Development of Agricultural Technology in the Southern Cone (PROCISUR/IICA)** is comprised of the following national agricultural research institutions: Argentina (INTA), Bolivia (INIAF), Brazil (EMBRAPA), Chile (INIA), Paraguay (IPTA), Uruguay (INIA), and IICA, and has been working with regional networks for more than 35 years. Management of PROCISUR operates on the basis of strategic lines that include sustainable intensification, which addresses the region's priority technological and institutional challenges.

5.18 The New Zealand Ministry of Primary Industries is a government agency that primarily seeks to promote growth in New Zealand in connection with the agricultural sector, for the benefit of its citizens. In recent years, the Ministry has been supporting FONTAGRO on climate change mitigation projects by providing contributions that foster new scientific knowledge and, especially, capacity building in Latin American and Caribbean institutions.

VI. MAJOR ISSUES

6.1 External factors jeopardizing the project objectives are mainly associated with: (1) Issues surrounding the signing of cooperation agreements between the participating institutions, stemming from differences in each country's legal requirements for this type of initiative. This includes administrative and financial aspects; (2) budget constraints in the institutions in the countries involved in the consortium that hinder execution of the experiments planned; (3) problems arising from differences in exchange parity due to the receipt of budgets in dollars; (4) limits to how long those taking part in the project remain on the job. High staff turnover could limit the impact of specific training activities. This platform will make efforts to provide the training necessary for proper execution of the activities planned; (5) the emergence of health-related problems that completely or partially affect execution of the experiments. To mitigate this risk, the experimental sites will be supervised continuously so that any issues that might arise can be handled in a timely fashion; and (6) issues associated with climate events such as prolonged droughts or floods. In order to mitigate the effects thereof, field experiments will be conducted for more than a year in an effort to reflect climate variability in the different productive and environmental variables evaluated.

VII. EXCEPTIONS TO BANK POLICIES

7.1 The project does not consider exceptions to Bank policies.

VIII. ENVIRONMENTAL AND SOCIAL STRATEGY

8.1 The project will be implemented by the Agricultural National Research Institutions that are related for the environmental strategy in each country. Regarding to the social strategy, the project will promote capacity building activities (trainings, workshops and other similar) to strength skills and knowledge management to the direct and indirect team associated with the project, farmers and others stakeholders directly or indirectly associated to the platform.

IX. REQUIRED ANNEXES

Annex I. Participating Organizations

Executing Agency

Organization: INTA Name: Juan Balbin Title: Chairman of the Governing Board Address: Rivadavia 1439, piso 2, CABA Country: Argentina Tel.: +54 11 4338 4600 Email: presidencia@inta.gob.ar Skype:
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Researcher	Assistant
Organization: INTA Name: Miguel Taboada Title: Director, <i>Instituto de Suelos, Centro de Investigaciones de Recursos Naturales</i> Address: Nicolas Repetto y de los Reseros s/n (1686) Hurlingham, Buenos Aires Country: Argentina Tel.: +54 11 4621 3207 Email: taboada.miguel@inta.gob.ar Skype:	Organization: INTA Name: Alejandro Costantini Title: Researcher, <i>Centro de Investigaciones de Recursos Naturales</i> Address: Nicolas Repetto y de los Reseros s/n (1686) Hurlingham, Buenos Aires Country: Argentina Tel.: +54 11-4621-1448/2096 ext. 157 Email: costantini.alejandro@inta.gob.ar Skype:

Administrator

Organization: Fundación ArgenINTA Name: Hugo García Title: Executive Director Address: Av. Cerviño 3101, CABA Country: Argentina Tel.: +54 11 4802-6101 Int. 121 Email: dirfundacion@argeninta.org.ar Skype:

Co-executing Agencies

Co-executing agency: INIA Name of project lead: Marta Alfaro Valenzuela Title: Researcher – INIA Remehue Email: malfaro@inia.cl Phone: +65-263 0656 Country: Chile
Co-executing agency: IPTA Name of project lead: Alodia González Title: Researcher – <i>Centro de Investigación de Capitán Miranda (CICM)</i> Email: aloalta@hotmail.com Phone: +595 71 211296 Country: Paraguay

<p>Co-executing agency: INIA Name of project lead: Fernando A. Lattanzi Title: Director, <i>Programa de Investigación en Pasturas y Forrajes</i>, INIA La Estanzuela Email: flattanzi@inia.org.uy Phone: +598 4574 8000 Country: Uruguay</p>
<p>Co-executing agency: INTA Name of project lead: Félix Picado Zeledón Title: Researcher on grasses, forage, and nutrition Email: fopz7@yahoo.com Phone: +50588283859 Country: Nicaragua</p>
<p>Co-executing agency: IDIAF Name of project lead: Víctor Asencio Cuello Title: Assistant Researcher, head of grasses and forage at the <i>Centro de Producción Animal</i> Email: vasenciocuello@gmail.com Phone: +18096275202 Country: Dominican Republic</p>
<p>Co-executing agency: INIAP Name of project lead: Carlos Molina Title: Researcher and Director of the <i>Estación Experimental Tropical Pichilingue</i> Email: carlos.molina@iniap.gob.ec Phone: +593967783928 Country: Ecuador</p>

Partner Organizations

<p>Partner organization: EMBRAPA Name of project lead: Bruno José Rodrigues Alves Title: Researcher – <i>Embrapa Agrobiologia</i> Email: bruno.alves@embrapa.br Phone: +55 21 3441-1500 Country: Brazil</p>
<p>Partner organization: PROCISUR Name of project lead: Cecilia Gianoni Title: Executive Secretary Email: sejecutiva@procisur.org.uy Phone: +598 24101676 ext. 128 Country: Uruguay</p>

Annex II. Logical Framework

	Outcomes	Output	Objectively Verifiable Indicators	Means of Verification	Assumptions
GENERAL OBJECTIVE	Help improve Latin American and Caribbean (LAC) livestock systems through the adoption of forage legumes				
SPECIFIC OBJECTIVES	a) Create, establish, and manage the cooperation platform on legume use b) Assess the impact of pastures with legumes on the ground on both animal productivity and greenhouse gas (GHG) emissions c) Undertake actions to manage knowledge and training				
COMPONENT 1: Design and Build a Cooperation Platform					
Activity 1.1 Creation of the platform	Institutions committed to executing project activities and properly using project resources.	Formally constituted platform	No. of agreements signed	Signed agreements	There is institutional and financial commitment.
Activity 1.2. Governance mechanism	The region's research teams are working in coordination.	Governance structure, responsibilities, and project leads specified in the formal document	No. of meetings	Record of the meetings	There is institutional and financial commitment.
Activity 1.3 In-person and virtual coordination meetings	Work agenda adjusted based on project progress.	Annual work plans executed	No. of meetings	Record of the meetings	There is institutional and financial commitment.
Activity 1.4 Technical and financial management of the platform	Technical and financial results of the platform integrated.	Technical and financial reports	No. of reports	Progress reports	There is institutional and financial commitment.
COMPONENT 2. Assess the Impact of Pastures with Forage Legumes on the Ground on Animal Productivity and GHG Emissions					
Activity 2.1. Assess the efficiency of biological nitrogen fixation from forage legumes	N input by legumes known in the 8 countries.	Regional database Technical reports Publications	No. of databases No. of technical reports No. of publications	Annual and final technical reports	There is institutional and financial commitment.
Activity 2.2 Quantify the effect of legumes on soil carbon sequestration	Impact of legumes on the known carbon stock in the 8 countries.	Regional database Technical reports Publications	No. of databases No. of technical reports No. of publications	Annual and final technical reports	There is institutional and financial commitment.
Activity 2.3. Quantify the effect of legume incorporation on GHG emissions	Impact of legumes on N ₂ O emissions and soil methane in 4 countries and on enteric methane in 2 countries.	Regional database Technical reports Publications	No. of databases No. of technical reports No. of publications	Annual and final technical reports	There is institutional and financial commitment.
Activity 2.4. Measure the impact on animal productivity	Impact of legumes on certain animal production determined in 8 countries. Experimental plots established in 4 countries.	Regional database Technical reports Publications Experiment established	No. of databases No. of technical reports No. of publications No. of plots established	Annual and final technical reports	There is institutional and financial commitment.
COMPONENT 3. Knowledge Management and Training					
Activity 3.1. Develop a virtual platform	Information available for all users	Updated web page	Web page	Web page active on FONTAGRO's website	Active participation of the partners.

Activity 3.2. Dissemination of advancements in knowledge	Project information shared with different audiences.	Scientific publications Informational publications Technical bulletins Presentations at conferences and meetings Field days Presence in the media Presence on social networks	No. of scientific publications No. of informational publications No. of technical bulletins No. of presentations given No. of field days conducted No. of mentions in the media No. of mentions on social media	Publications Presentations Reports News Attendance lists Programs Graphs	Active participation of the partners and interest on the part of the users. There is financing.
Activity 3.3. Capacity-building for members of the platform at different levels: Researchers, professionals, producers	Researchers trained in the topic. Producers, technical professionals, and students learn about the technologies and practices used in the project.	Theses written Fellows trained Workshops and courses held Internships done Field days	No. of theses written No. of fellows trained No. of workshops and courses No. of internships done No. of field days conducted	Theses Reports Attendance lists Programs Graphs	Active participation of the partners and interest on the part of the users. There is financing.

Annex III. Results Matrix

Outcome	Unit of Measure	Baseline	Baseline Year	P	Year 1	Year 2	Year 3	Goal	Means of Verification
Expected results									
Platform for cooperation on the use of legumes, created and managed	Quantity	0	0	P	0	0	1	1	Platform constituted and up and running (records of meetings and reports)
Impacts of pastures with forage legumes on the ground on animal productivity and GHG emissions estimated	Quantity	0	0	P	4	4	4	12	Annual reports with the results of measurements of BNF impact, carbon sequestration, GHG emissions, and animal production
Actions undertaken to manage knowledge and training	Quantity	0	0	P	3	4	14	21	Virtual platform constituted and workshop and training activities reports

Components														Financial Progress: <i>Cost by year and total cost in \$[11]</i>				
Output	Topics	Standard Output Group	Standard Output Indicator		Background Indicator (Indicator)		Baseline Year	Baseline	P	Year 1	Year 2	Year 3	Goal	Means of Verification	Year 1	Year 2	Year 3	Total
			Indicator	Unit Measured	Indicator	Unit of Measure												
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]									
COMPONENT 1. Design and Build a Cooperation Platform																		
Output – Activity 1.1. Formally constituted platform	Food security and agriculture (FS and A)	Legislation and agreements between multiple countries	Agreements concluded between multiple countries	No. of pacts or agreements	Multi-country agreements concluded	No. of agreements	2018	0	8				8	Multi-country agreements signed	3,000	3,000	3,000	9,000
Output – Activity 1.2. Governance mechanism	FS and A	Governance model	Governance models implemented	No. of governance models	No. of models	No. of models	2018	0	1				1	Record of the meetings	3,000	-	-	3,000
Output – Activity 1.3. In-person and virtual coordination meetings	FS and A	Action plan for countries	Regional meetings on project execution attended	No. of meetings	No. of action plans developed	No. of plans	2018	0	6	2	2	2	6	Record of the meetings	22,250		22,250	44,500
Output – Activity 1.4. Technical and financial management	FS and A	Action plan for countries	Monitoring and evaluation activities to improve execution of new projects supported	No. of reports	No. of action plans implemented	No. of plans	2018	0	3	1	1	1	3	Reports	3,000	3,000	3,000	9,000
COMPONENT 2. Assess the Impact of Pastures with Forage Legumes on the Ground on Animal Productivity and GHG Emissions																		
Output – Activity 2.1. BNF	FS and A	Knowledge product	Reports	No. of reports	Annual reports published	No. of reports	2018	0	3	1	1	1	3	Reports	14,880	14,880		29,760
	FS and A	Knowledge product	Work documents prepared	No. of documents	Work documents prepared	No. of documents	2018	0	10	0	8	2	10	Documents				
	FS and A	New databases	New databases created	No. of databases	Databases created	No. of databases	2018	0	1	0	1	0	1	Database				
Output – Activity 2.2. Carbon sequestration	FS and A	Knowledge product	Reports	No. of reports	Annual reports published	No. of reports	2018	0	3	1	1	1	3	Reports	39,607	39,607		79,213
	FS and A	Knowledge product	Work documents prepared	No. of documents	Work documents prepared	No. of documents	2018	0	10	0	8	2	10	Documents				
	FS and A	New databases	New databases created	No. of databases	Databases created	No. of databases	2018	0	1	0	1	0	1	Database				
Output – Activity 2.3. GHG emissions	FS and A	Knowledge product	Reports	No. of reports	Reports published	No. of reports	2018	0	3	1	1	1	3	Reports	72,500			72,500
	FS and A	Knowledge product	Work documents prepared	No. of documents	Work documents prepared	N/A	2018	0	6	0	0	6	6	Documents				
	FS and A	New databases	New databases created	No. of databases	Databases created	No. of databases	2018	0	1	0	1	0	1	Database				

Output – Activity 2.4. Animal Production	FS and A	Evaluation	Observational units established	No. of units established	Observation units established	No. of units established	2018	0	4	4	0	0	4	10,000	10,000	20,000		
	FS and A	Knowledge product	Reports	No. of reports	Reports published	No. of reports	2018	0	2	1	1	0	1				Reports	
	FS and A	Knowledge product	Work documents prepared	No. of documents	Work documents prepared	No. of documents	2018	0	1	0	0	1	1				Documents	
	FS and A	New databases	New databases created	No. of databases	Databases created	No. of databases	2018	0	1	0	1	0	1				Database	
COMPONENT 3. Knowledge Management and Training																		
Output – Activity 3.1. Virtual platform	FS and A	Virtual platforms	Virtual platforms designed	No. of platforms	Virtual platforms designed	No. of platforms	2018	0	1	1	0	0	1	Platforms	6,000	2,000	2,000	10,000
Output – Activity 3.2. Dissemination of advancements in knowledge	FS and A	Knowledge product	Bulletins published	No. of bulletins	Bulletins published	No. of bulletins	2018	0	10	0	5	5	15	Bulletins	12,000	12,000	24,000	
	FS and A	Events	Workshops	No. of field days	Events to promote collaboration between academia and producers	No. of events	2018	0	12	0	4	8	12	Events				
Output – Activity 3.3. Training	FS and A	Training	Training workshops	No. of workshops	Entertainment events	No. of entertainment events	2018	0	2	1	0	1	2	Report	14,824		14,825	29,649
														Administrative costs			30,500	
														Contingencies			9,403	
														Audit			2,500	
														Total cost			373,025	

Notes: (1) The Ministry of Primary Industries (MPI) will contribute NZ\$100,000, converted into US\$ at the exchange rate in effect on 27 June 2018. NZ\$100,000 = US\$68,025.43 Rate: 1 NZD = 0.680254 USD. Source: <https://xe.com/currencyconverter/convert/?Amount=100000&From=NZD&To=USD>; and (2) PROCISUR is providing a \$55,562 in-kind contribution under the category of consultants; the rest will be in cash and administered by Fundación ArgenINTA. The final distribution is as follow (in US\$):

FONTAGRO	305,000
MPI-NZ	68,025
Total	373,025

Annex IV. Timeline

Component	Activity	Year I				Location	Institution
		I QUARTER	II QUARTER	III QUARTER	IV QUARTER		
Component 1	Activity 1.1	X				All	INTA Argentina, Fundación ArgenINTA and PROCISUR/IICA
	Activity 1.2	X	X	X	X	All	INTA Argentina
	Activity 1.3		X		X	All	INTA Argentina
	Activity 1.4	X	X	X	X	Argentina	INTA Argentina
Component 2	Activity 2.1		X	X	X	All	INIA-Uruguay, INIAP-Ecuador
	Activity 2.2		X	X	X	All	EMBRAPA-Brasil, INTA-Nicaragua. Colaboradores: INTA-Argentina, INIA-Chile, INIA-Uruguay, IPTA-Paraguay, IDIAF-Dom. Rep, INIAP-Ecuador
	Activity 2.3		X	X	X	Ch-Uru-Brz-Arg	INIA-Chile, INIAF- Dom. Rep
	Activity 2.4		X	X	X	Par-Uru-Arg	INTA-Argentina, INIA-Uruguay, IPTA-Paraguay.
Component 3	Activity 3.1		X	X	X	All	INTA-Argentina, INIAP-Ecuador
	Activity 3.2			X	X	All	INTA-Argentina, INIAP-Ecuador
	Activity 3.3			X	X	All	INTA-Argentina, INIAP-Ecuador
		Year II					
Component 1	Activity 1.1					All	INTA Argentina, Fundación ArgenINTA and PROCISUR/IICA
	Activity 1.2	X	X	X	X	All	INTA Argentina
	Activity 1.3		X		X	All	INTA Argentina
	Activity 1.4	X	X	X	X	Argentina	INTA Argentina
Component 2	Activity 2.1	X	X	X	X	All	INIA-Uruguay, INIAP-Ecuador
	Activity 2.2	X	X	X	X	All	EMBRAPA-Brasil, INTA-Nicaragua. Colaboradores: INTA-Argentina, INIA-Chile, INIA-Uruguay, IPTA-Paraguay, IDIAF- Dom. Rep, INIAP-Ecuador
	Activity 2.3	X	X	X	X	Ch-Uru-Brz-Arg	INIA-Chile, INIAF- Dom. Rep
	Activity 2.4	X	X	X	X	Par-Uru-Arg	INTA-Argentina, INIA-Uruguay, IPTA-Paraguay.
Component 3	Activity 3.1	X	X	X	X	All	INTA-Argentina, INIAP-Ecuador

	Activity 3.2		X		X	All	INTA-Argentina, INIAP-Ecuador
	Activity 3.3			X	X	All	INTA-Argentina, INIAP-Ecuador
Year III							
Component 1	Activity 1.1					All	INTA Argentina, Fundación ArgenINTA and PROCISUR/IICA
	Activity 1.2		X	X	X	All	INTA Argentina
	Activity 1.3		X	X	X	All	INTA Argentina
	Activity 1.4	X	X	X	X	Argentina	INTA Argentina
Component 2	Activity 2.1	X	X	X	X	All	INIA-Uruguay, INIAP-Ecuador
	Activity 2.2	X	X	X	X	All	EMBRAPA-Brasil, INTA-Nicaragua. Colaboradores: INTA-Argentina, INIA-Chile, INIA-Uruguay, IPTA-Paraguay, IDIAF- Dom. Rep, INIAP-Ecuador
	Activity 2.3	X	X	X	X	Ch-Uru-Brz-Arg	INIA-Chile, INIAF- Dom. Rep
	Activity 2.4	X	X	X	X	Par-Uru-Arg	INTA-Argentina, INIA-Uruguay, IPTA-Paraguay.
Component 3	Activity 3.1	X	X	X	X	All	INTA-Argentina, INIAP-Ecuador
	Activity 3.2		X		X	All	INTA-Argentina, INIAP-Ecuador
	Activity 3.3			X	X	All	INTA-Argentina, INIAP-Ecuador
Year IV							
Component 1	Activity 1.1						INTA Argentina, Fundación ArgenINTA and PROCISUR/IICA
	Activity 1.2	x	X			Buenos Aires	INTA Argentina
	Activity 1.3		X			Buenos Aires	INTA Argentina
	Activity 1.4	X	X			Buenos Aires	INTA Argentina
Component 2	Activity 2.1	X	X			Colonia	INIA-Uruguay, INIAP-Ecuador
	Activity 2.2	X	X			Seropédica	EMBRAPA-Brasil, INTA-Nicaragua. Colaboradores: INTA-Argentina, INIA-Chile, INIA-Uruguay, IPTA-Paraguay, IDIAF- Dom. Rep, INIAP-Ecuador
	Activity 2.3	X	X			Chile	INIA-Chile, INIAF- Dom. Rep
	Activity 2.4	X	X			Buenos Aires	INTA-Argentina, INIA-Uruguay, IPTA-Paraguay.
Component 3	Activity 3.1	X	X			Buenos Aires	INTA-Argentina, INIAP-Ecuador

	Activity 3.2	X	X			Buenos Aires	INTA-Argentina, INIAP-Ecuador
	Activity 3.3	X	X				INTA-Argentina, INIAP-Ecuador

Annex V. Team participants, affiliation, role, time-dedication and tasks

Institution / Country	Legal Representative	Project Lead	Role	Commitment (in %) to the project	Main Tasks
INTA-Argentina	Juan Balbín	Miguel Taboada	Senior researcher	30%	Work team coordinator
INTA-Argentina	Juan Balbín	Alejandro Constantini	Assistant researcher	30%	Coordination assistant
EMBRAPA-Brazil	Gustavo Ribeiro Xavier	Bruno J.R. Alves	Researcher – Head of BNF area	30%	Coordination of the Brazilian group and linkages with the other members
INIA-Uruguay	Fabio Montossi	Fernando Lattanzi	Researcher – Head of carbon sequestration area	20%	Coordination of the Uruguayan group and linkages with the other members
IPTA-Paraguay	Santiago Bertoni	Alodia González	Researcher – Co-head of pastureland production area	30%	Coordination of the Paraguayan group and linkages with the other members
INIA-Chile	Pedro Bustos	Marta Alfaro V.	Researcher – Head of GHG emissions area	20%	Coordination of the Chilean group and linkages with the other members
INTA-Nicaragua	Luis Urbina Abaunza	Felix Picado Zeledon	Researcher	25%	Selection of grassy areas with legumes, sampling, shipment of samples, training, attendance at planning and evaluation meetings, and preparation of informational materials and technical reports
IDIAF-Dominican Republic	Rafael Pérez Duverge	Victor Asencio Cuello	Researcher	25%	Participation in meetings, training; preparation of reports and publications
INIAP-Ecuador	Juan Manuel Domínguez	Luis Rodríguez	Researcher	30%	Coordinate activities within the cooperation platform, manage and conduct evaluations of the impact of pastures with legumes on the ground on both animal productivity and GHG emissions, and train technical professionals, teachers, and farmers.

Annex VI. Summarized Curriculum Vitae

Dr. Miguel A. TABOADA – Instituto Nacional de Tecnología Agropecuaria [National Institute of Agricultural Technology] (INTA) and CONICET, Argentina. I am an agricultural engineer with a Master's degree in Soil Sciences (1991, Universidad de Buenos Aires (UBA), Argentina) and a doctorate in Eco- and Agricultural Systems (2006, L'Institut National Supérieur de Toulouse, France). I am also an Associate Professor (on leave) in the Department of Fertility and Fertilizers – UBA School of Agriculture (active professor between 1985 and 2014). I have been Director of the Soils Institute, CIRN, INTA since 2009 and a member of the CONICET Research Track (currently as Senior Researcher) since 1992. Since 2013, I have been one of the 27 experts on the Intergovernmental Technical Panel on Soils, Global Soil Partnership, FAO, representing Latin America and the Caribbean (2013 –, ITPS-GSP-FAO). I have published more than 50 articles, as well as several book chapters and books, on pasture soil management, sodium-saline soils, soil physics in connection with no-till farming, and soil aggregate mechanisms. In recent years, my research has focused on greenhouse gas emissions in Argentina's farming systems.

Dr. Fernando A. LATTANZI – Instituto Nacional de Investigación Agropecuaria [National Institute for Agricultural Research] (INIA), Uruguay. I am an agricultural engineer with a Master's degree in Animal Production (1998, Universidad Nacional de Mar del Plata, Argentina) and a doctorate in Agricultural Sciences (2004, Technical University of Munich, Germany). I was a British Council fellow (2001, The Macaulay Institute, Scotland) and worked as an Adjunct Professor and researcher at the Technical University of Munich. I have published more than 30 articles, as well as several book chapters, on physiology, ecology, and forage plant agronomy. Since 2015, I have served as Director of INIA Uruguay's Pasture and Forage Research Program. Our research involves the genetic enhancement of grasses and forage legumes and the design of management strategies for sown pastures and for natural grasslands that combine efficient production with controlled environmental impact.

Dr. Marta A. ALFARO – Instituto Nacional de Investigaciones Agropecuarias [National Institute for Agricultural Research] (INIA), Chile. I am an agricultural engineer—graduate of Chile's Universidad de La Frontera (1995)—and hold a doctorate in Soil Sciences from the University of Reading, United Kingdom (2002). As a researcher at INIA Remehue since 1996, my work has focused on the environmental impact of agricultural activity on the environment (soil, water, and air), including nitrogen cycling and nutrient and pathogen transfer, with robust work in recent years in the areas of GHG emissions in livestock systems and the development of climate change mitigation and adaptation measures for livestock. I represent Chile at the Global Research Alliance and the FIL-IDF and am the senior reviewer for GHG inventories and national submissions for the UNFCCC for Annex I countries. I serve as coordinator for Chile's National GHG Inventory and technical editor of the *Chilean Journal of Agricultural Research*, and am a member of the FONDECYT-CONICYT Science Committee. I have published more than 50 scientific publications and book chapters on the environment and livestock production and have received scientific commendations from the *Sociedad Chilena de Producción Animal* [Chilean Animal Production Association], Chile's Ministry of Agriculture, and the Osorno Association of Dairy Producers.

Agricultural Engineer, Alodia GONZÁLEZ – Instituto Paraguayo de Tecnología Agraria [Paraguayan Institute of Agricultural Technology] (IPTA), Paraguay. I am an agricultural engineer, enrolled in the Soil and Water Management Master's track (Universidad de Lleida – Spain). I was a fellow in Japan (2001, National Agricultural Research Centre – Tsukuba – Japan) where I worked on management of organic materials in the soil in dry farming, soil analysis in the lab, and fertilization. Since 2015, I have been Director of the IPTA Soils Department, where research has been done on plant nutrition and soil management in connection with soy, corn, and wheat. I teach on the subject of soil at the Universidad Nacional de Itapúa and de San Carlos and have published articles in Paraguayan science journals and presented at conferences on soil.

Víctor J. ASENICIO CUELLO. Researcher at the Instituto Dominicano de Investigaciones Agropecuarias y Forestales [Dominican Institute of Agricultural and Forestry Research] (IDIAF), Dominican Republic. I am an agricultural engineer, with a concentration in Animal Production from the Universidad Autónoma de Santo Domingo (UASD), Dominican Republic. I hold a Master's degree in Agricultural Sciences, with a focus on Grasses and Forage (2011) and was an Assistant Professor (2009) at the University of Puerto Rico, Mayagüez Campus, Puerto Rico. I also have a postgraduate certification in teacher training focused on competency-based learning (Universidad Central del Este, San Pedro de Macorís, 2015). I am a professor, grasses and forage researcher (studies on the introduction of grasses and forage legumes, pasture management and conservation, and forage alternatives), coordinator and collaborator on climate change-related projects, a published author and co-author in journals and books, and funded by FONTAGRO IDB, the FAO, and other agricultural sector institutions.

Carlos MOLINA HIDROVO – Instituto Nacional de Investigaciones Agropecuarias [National Institute for Agricultural Research] (INIAP), Ecuador. I am an animal sciences engineer, graduate of the Universidad Técnica de Manabí, with a specialized degree in the Production and Management of Temperate Climate Pasturelands, awarded by the Universidad Central of Ecuador; I also hold a Master's degree in Animal Production, with a concentration in Animal Nutrition, from the Escuela Superior Politécnica de Chimborazo. I began my professional career as a researcher in the Livestock Program at INIAP's Pichilingue Tropical Experimental Station from January 2001 to July 2012. Subsequently, from August 2012 to March 2014, I served as Technical Manager and thereafter (to the present day), as Director of INIAP's Pichilingue Tropical Experimental Station. I have taken part in at least five research projects and have approximately 10 publications in level I, II, and III indexed journals; I have also been a presenter at national and international events on livestock.

Félix Omar PICADO ZELEDÓN – Instituto Nicaragüense de Tecnología Agropecuaria [Nicaraguan Institute of Agricultural Technology] (INTA), Nicaragua. I am an agricultural engineer, with postgraduate studies in Animal Nutrition (2008) and an international diploma with a concentration in livestock-related agro-ecology (2016). I have worked at INTA since 1999 and have been serving as a researcher on grasses, forage, and nutrition since 2008. The studies have focused primarily on large and small livestock feed, namely: Legumes in strips of pasture; accessions of *canavalia* for feeding cattle; legume silage in pastures; rotational grazing systems; and the addition of mountain microorganisms into cattle and hog feed. I have presented the outcomes of technology associating *gliricidia sepium* with marandú grasses (2015) and *Sacharina seca* [enriched sugarcane] for dairy cow feed (2016).

Dr. Bruno J. R. ALVES – Empresa Brasileira de Pesquisa Agropecuária [Brazilian Agricultural Research Corporation] (EMBRAPA), Brazil. I am an agricultural engineer with a Master's degree (1992) and doctorate (1996) in Soil Sciences from the Universidad Federal Rural de Rio de Janeiro, Brazil, and a post-doctorate (2005) in Geosciences from the University of Edinburgh, UK. I am an accredited professor in the Agricultural Postgraduate Program at the Universidad Federal Rural de Rio de Janeiro (active professor since 1998). Since 2015, I have been a member of the EMBRAPA Climate Change Management Committee and the National Research Council's (CNPq) Agricultural Committee. I have published more than 100 articles and several book chapters and books on biological nitrogen fixation, nitrogen and carbon recycling in agricultural systems, use of stable isotopes (^{15}N and ^{13}C) in agriculture, and soil carbon sequestration and GHG in agricultural systems in Brazil.

Annex VII. Procurement Plan

PLAN DE ADQUISICIONES DE COOPERACIONES TECNICAS NO REEMBOLSABLES										
País: América Latina y Caribe				Agencia Ejecutora (AE): INTA, Argentina.			Sector Público y privado			
Número del Proyecto:				Nombre del Proyecto: Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe						
Período del Plan:										
Monto límite para revisión ex post de adquisiciones:				Bienes y servicios (monto en U\$S): 3.000	Consultorias (monto en U\$S): 28.000	Materiales e insumos (monto en U\$S): 108.509	Viajes y viáticos: (monto en U\$S): 69.439	Capacitación (monto en U\$S): 29.649	Diseminación y divulgación (monto en U\$S): 24.000	Gastos administrativos (monto en U\$S): 42.403
Nº Item	Ref. POA	Descripción de las adquisiciones (1)	Costo estimado de la Adquisición (U\$S)	Método de Adquisición (2)	Revisión de adquisiciones (3)	Fuente de Financiamiento y porcentaje		Fecha estimada del Anuncio de Adquisición o del Inicio de la contratación	Revisión técnica del JEP (4)	Comentarios
						BID/MIF %	Local / Otro %			
1		Consultores:								
		Consultor para fomento del fortalecimiento de la	9,000	CCIN	Ex Post			100		
		Especialista en difusión y comunicación -	9,000	CCIN	Ex Post			100		
		Diseñador de la página web del proyecto -	10,000	CCIN	Ex Post			100		
2		Bienes y servicios								
		Servicios para organización y mejora de la	3,000	CP	Ex Post			100		
3		Materiales e insumos								
		Materiales e insumos para actividades de	142,522	CP	Ex Post			100		
4		Viajes y viáticos								
		Movilidad interna para actividades de campo y	58,952	CD	Ex Post			100		
		Organización de reuniones presenciales de	44,500	CP	Ex Post			100		
5		Capacitación								
		Reuniones de capacitación -componente 3-	29,649	CD	Ex Post			100		
6		Diseminación y divulgación de actividades								
		Presentación de resultados y difusión en eventos	24,000	CD	Ex Post			100		
		Imprevistos	9,403		Ex Post			100		
		Auditoría Externa	2,500		Ex Post			100		
		Gastos operativos	30,500		Ex Post			100		
Total			373,025	Preparado por:			Fecha:			
<p>(1) Se recomienda el agrupamiento de adquisiciones de naturaleza similar tales como equipos informáticos, mobiliario, publicaciones, pasajes, etc. Si hubiesen grupos de contratos individuales similares que van a ser ejecutados en distintos periodos, éstos pueden incluirse agrupados bajo un solo rubro con una explicación en la columna de comentarios indicando el valor promedio individual y el período durante el cual serían ejecutados. Por ejemplo: En un proyecto de promoción de exportaciones que incluye viajes para participar en ferias, se pondría un ítem que diría "Pasajes aéreos Ferias", el valor total estimado en US\$ 5 mil y una explicación en la columna Comentarios: "Este es un agrupamiento de aproximadamente 4 pasajes para participar en ferias de la región durante el año 2014".</p>										
<p>(2) Bienes y Obras: LP: Licitación Pública; CP: Comparación de Precios; CD: Contratación Directa.</p>										
<p>(2) Firmas de consultoría: SCC: Selección Basada en la Calificación de los Consultores; SBCC: Selección Basada en Calidad y Costo; SBMC: Selección Basada en el Menor Costo; SBPF: Selección Basada en Presupuesto Fijo. SD: Selección Directa; SBC: Selección Basada en Calidad</p>										
<p>(2) Consultores individuales: CCIN: Selección basada en la Comparación de Calificaciones Consultor Individual ; SD: Selección Directa.</p>										
<p>(2) Sistema nacional: SN: Para CTNR del Sector Público cuando el sistema nacional esté aprobado para el método asociado con la adquisición.</p>										
<p>(3) Revisión ex-ante / ex-post / SN. En general, dependiendo de la capacidad institucional y el nivel de riesgo asociados a las adquisiciones la modalidad estándar es revisión ex-post. Para procesos críticos o complejos podrá establecerse la revisión ex-ante. En casos que el sistema nacional esté aprobado para el método asociado con la adquisición, la supervisión es por sistema nacional</p>										
<p>(4) Revisión técnica: Esta columna será utilizada por el JEP para definir aquellas adquisiciones que considere "críticas" o "complejas" que requieran la revisión ex ante de los términos de referencia, especificaciones técnicas, informes, productos, u otros.</p>										

Annex VIII. Commitment Letters for Local Counterpart Contributions



2018 - Año del Centenario de la Reforma Universitaria

Instituto Nacional de Tecnología Agropecuaria

Nota DN N° 216 / 2018

Buenos Aires, 16 de marzo de 2018

CARTA DE COMPROMISO Y APORTES

Dra. Eugenia Saini
Secretaria Ejecutivo FONTAGRO

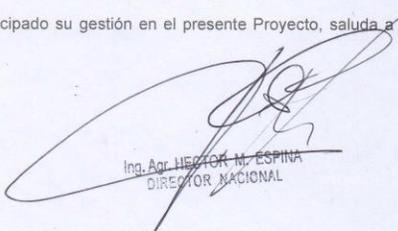
Asunto: Carta de Aporte de Contrapartida. Proyecto "Intensificación sostenible de sistemas ganaderos con leguminosas: Plataforma de cooperación latinoamericana y Caribe"

Estimada Dra. Eugenia Saini:

Nos es grato conformar la participación del Instituto Nacional de Tecnología Agropecuaria (INTA) de Argentina como organismo co-ejecutor y administrador del Proyecto "Intensificación sostenible de sistemas ganaderos con leguminosas: Plataforma de cooperación latinoamericana y Caribe". La Institución se compromete a un aporte en especie por contrapartida de u\$ 226.857 (doscientos veintiséis mil ochocientos cincuenta y siete dólares americanos), de acuerdo al siguiente detalle:

Categorías de gasto	U\$
01. Consultores	226.857
02. Bienes y Servicios	
03. Materiales e insumos	
04. Viajes y viáticos	
05. Capacitación	
06. Gestión del conocimiento y capacitaciones	
07. Gastos administrativos	
08. Imprevistos	
09. Auditoría externa	
10. Infraestructura y equipamiento	
TOTAL	226.857

Sin otro particular, y agradeciendo por anticipado su gestión en el presente Proyecto, saluda a Ud. con distinguida consideración.


Ing. Agr. HECTOR M. ESPINA
DIRECTOR NACIONAL



Ministerio de Agroindustria
Presidencia de la Nación



001596,

Osorno, 11 de octubre de 2017.

CARTA DE APORTE DE CONTRAPARTIDA

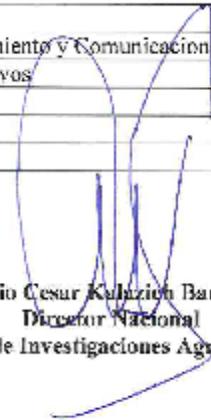
Doctor
Hugo Li Pun
Secretario Ejecutivo
FONTAGRO

Estimado Dr. Li Pun:

Nos es grato confirmar la participación del Instituto de Investigaciones Agropecuarias (INIA Chile) como organismo co-ejecutor del proyecto "Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe". La institución se compromete a un aporte de contrapartida de US\$97,801 durante el periodo de ejecución total de proyecto (42 meses), de acuerdo al siguiente detalle:

Categorías de Gasto	Total (US\$)
01. Consultores	97,801
02. Equipos e infraestructura	
03. Materiales e insumos	
04. Viajes y viáticos	
05. Capacitación	
06. Gestión del conocimiento y Comunicaciones	
07. Gastos Administrativos	
08. Imprevistos	
09. Auditoria Externa	
Total	97,801

Atentamente,


Julio Cesar Kulzich Barassi
Director Nacional
Instituto de Investigaciones Agropecuarias



Instituto de
Investigaciones
Agropecuarias
Ministerio de Agricultura

INIA Remehue: Ruta 5 Sur, km 8 Norte, Casilla 24-0 - Osorno
Tel: +56 61 233 4800



Oficio Nro. INIAP-INIAP-2017-1018-OF
Quito, D.M., 13 de octubre de 2017

Asunto: Carta de Aporte de Contrapartida. Proyecto: "Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe"

Doctor
Hugo Li Pun
Secretario Ejecutivo
FONDEO DE TECNOLOGIA AGROPECUARIA, FONTAGRO
En su despacho

Señor Secretario Ejecutivo:

Nos es grato confirmar la participación del Instituto Nacional de Investigaciones Agropecuarias - INIAP, como organismo co-ejecutor del proyecto "Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe".

La institución se compromete a un aporte de contrapartida en especie, de \$ 161.295,40 (dólares americanos), de acuerdo al siguiente detalle:

Categorías de Gasto	Aporte (En especie)
01. Consultores y Especialistas	126.295,40
02. Bienes y servicios	10.000,00
03. Materiales e insumos	15.000,00
04. Viajes y viáticos	2.500,00
05. Capacitación	0
06. Gestión del conocimiento y Comunicaciones	2.500,00
07. Gastos Administrativos	0
08. Imprevistos	5.000,00
09. Auditoria Externa	0
Total	\$ 161.295,40

El desglose del aporte corresponde a las categorías de gastos establecidos por el Fondo.

Reciba un cordial saludo.

Atentamente,

Dr. Juan Manuel Domínguez A.
Director Ejecutivo INIAP

Av. Eloy Alfaro N°30-350 y Av. Amazonas
Edificio M&FAP - 5to. piso
Tel.: + (591) 2 2587645 | 21659493 | 2504095
www.iniap.gob.ec





Gobierno de Reconciliación
y Unidad Nacional

El Pueblo, Presidente!

2018

**UNID@S EN Por Gracia
VICTORIAS! de Dios!**

Doctor
Héctor Hugo Li Pun
Secretario Ejecutivo FONTAGRO

Estimado Dr. Li Pun:

Nos es grato confirmar el interés del Instituto Nicaragüense de Tecnología Agropecuaria (INTA), de participar en la implementación del proyecto: **Intensificación Sostenible de Sistemas Ganaderos con Leguminosas: Plataforma de Cooperación Latinoamericana y del Caribe.** La institución se compromete a un aporte de contrapartida en especie, de US\$ 37,067.79 (Treinta y Siete Mil Sesenta y Siete dólares americanos con 79/100) de acuerdo al siguiente detalle:

Descripción	INTA	Nicaragua
Consultoría / Salario	\$	37,067.79
Bienes y Servicios-	\$	-
Materiales e Insumos	\$	-
Viáticos:	\$	-
Capacitaciones	\$	-
Gestión del Conocimiento	\$	-
Gastos Administrativos	\$	-
TOTAL	\$	37,067.79


Cra. Claudia Cárdenas
Co-Directora
INTA Nicaragua

CC: Archivar



CRISTIAMA, SOCIALISTA, SOLIDARIA!
Instituto Nicaragüense de Tecnología Agropecuaria
Frente a La Estación V de La Policía Nacional, Colonia Centroamérica.
Telf: 22769471 - www.inta.gob.ni - gaj@inta.gob.ni



MINISTERIO DE
AGRICULTURA
Y GANADERÍA



Instituto Paraguayo de Tecnología Agraria
Tembiporupyahu Kokue Paraguái Pegua Nangarekoha



Asunción, 04 de abril del 2018

IPTA N° 213 /2018

Señora

Dra. Eugenia Saini, Secretaria Ejecutiva
FONTAGRO

Presente:

Asunto: Carta de Aporte de Contrapartida: Proyecto Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe.

Estimada Dra. Eugenia Saini,

Nos es grato confirmar la participación del Instituto Paraguayo de Tecnología Agraria (IPTA) como organismo co-ejecutor del proyecto Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe. La institución se compromete a un aporte de contrapartida en especie de [sesenta y un mil doscientos veintidós] dólares americanos, de acuerdo al siguiente detalle.

Categorías de Gasto	Dólares americanos
01. Consultores	61.222
02. Bienes y servicios	
03. Materiales e insumos	
04. Viajes y viáticos	
05. Capacitación	
06. Gestión del conocimiento y Comunicación	
07. Gastos Administrativos	
08. Imprevistos	
09. Auditoria Externa	
10. Infraestructura y equipamiento	
Total	61.222

Sin otro particular, hago propicia la ocasión para saludarlo muy atentamente.


ING. (AOR) S. VILLAGO BERTONI H.
Presidente

- 1 -



INSTITUTO DOMINICANO DE INVESTIGACIONES AGROPECUARIAS Y FORESTALES -IDIAF

“Año del Desarrollo Agroforestal”

10 de octubre del 2017
DE/0474/17

Doctor
Héctor Hugo Li Pun
Secretario Ejecutivo, FONTAGRO

Asunto: Carta de Aporte de Contrapartida. Proyecto Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe.

Estimado Dr. Héctor Hugo Li Pun:

Nos es grato confirmar la participación del Instituto Dominicano de Investigaciones Agropecuarias y Forestales como organismo co-ejecutor del proyecto **Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe**. La institución se compromete a un aporte de contrapartida en especie 60,000.00 dólares americanos, de acuerdo al siguiente detalle:

Categorías de Gasto	
01. Consultores	US\$60,000.00
02. Bienes y servicios	
03. Materiales e insumos	
04. Viajes y viáticos	
05. Capacitación	
06. Gestión del conocimiento y Comunicaciones	
07. Gastos Administrativos	
08. Imprevistos	
09. Auditoria Externa	
Total	

Agradeciendo de manera anticipada su atención a esta comunicación, le reiteramos nuestros sentimientos de consideración distinguida, le saluda,

Atentamente,


Rafael Pérez Duvergé
Director Ejecutivo

DE/lg



Calle Rafael Augusto Sánchez No.89, Ensanche Evaristo Morales, Santo Domingo, D.N., República Dominicana
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Sitio Web: <http://www.idiaf.gob.do> * E-mail: idiaf@idiaf.gov.do

Montevideo, 19 de octubre de 2017
DN 62-2017

Asunto: Carta de Aporte de Contrapartida. Proyecto "Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe"

Doctor
Dr. Héctor Hugo Li Pun
Secretario Ejecutivo, FONTAGRO

Estimado Dr. Héctor Hugo Li Pun,

Nos es grato confirmar la participación del Instituto Nacional de Investigación Agropecuaria (INIA) de Uruguay como organización co-ejecutora del proyecto "Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe". La institución se compromete a un aporte de contrapartida en especie de [monto total] dólares americanos, de acuerdo al siguiente detalle:

Categorías de Gasto	
01. Consultores	USD 181,041.-
02. Bienes y servicios	
03. Materiales e insumos	
04. Viajes y viáticos	
05. Capacitación	
06. Gestión del conocimiento y Comunicaciones	
07. Gastos Administrativos	
08. Imprevistos	
09. Auditoria Externa	
Total	USD 181,041.-

Atentamente,


Ing. Agr. Fabio Montossi
Director Nacional
Instituto Nacional de Investigación Agropecuaria (INIA)



www.inia.uy



C.CNPAB Nº 401/2017

Seropédica, 10/10/2017

Asunto: Carta de Aporte de Contrapartida. Proyecto "Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe"

Doctor Hugo Li Pun

Secretario Ejecutivo, FONTAGRO

Estimado Dr. Hugo Li Pun,

Nos es grato confirmar la participación de la Embrapa Agrobiología como organización asociada del proyecto Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe. La institución se compromete a un aporte de contrapartida de 308,447.00 dólares americanos, de acuerdo al siguiente detalle:

Categorías de Gasto	US\$
01. Consultores	308,447.00
02. Bienes y servicios	0.00
03. Materiales e insumos	0.00
04. Viajes y viáticos	0.00
05. Capacitación	0.00
06. Gestión del conocimiento y Comunicaciones	0.00
07. Gastos Administrativos	0.00
08. Imprevistos	0.00
09. Auditoria Externa	0.00
Total	308,447.00

Atentamente,

Gustavo Ribeiro Xavier
Jefe General
Embrapa Agrobiología

Gustavo Ribeiro Xavier
Chefe Geral
Embrapa Agrobiologia
Mat.: 311787/Portaria 1550



Center of Excellence for Training in Sustainable Agriculture
Commission on Science and Technology for Sustainable Development in the South - COMSATS
Third World Academy of Science - TWAS

Ministério da Agricultura, Pecuária e
Abastecimento

Empresa Brasileira de
Pesquisa Agropecuária
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http://www.procisur.org.uy
Casilla de Correo 1217
11200 Montevideo, Uruguay

Dr. Hugo Li Pun
Secretario Ejecutivo
FONTAGRO

CARTA AVAL

Nos es grato confirmar la participación del Programa Cooperativo para el Desarrollo Tecnológico Agroalimentario y Agroindustrial del Cono Sur - PROCISUR, como organismo co-financiador y co-ejecutor del Proyecto Consensuado "Intensificación sostenible de sistemas ganaderos con leguminosas: plataforma de cooperación Latinoamericana y del Caribe".

En calidad de Presidente de la Comisión Directiva del PROCISUR avalo el instrumento de cooperación técnica del Fondo Regional de Tecnología Agropecuaria (FONTAGRO) y comprometo las acciones del Grupo de Trabajo del proyecto Leguminosas del PROCISUR, a través de los profesionales designados por los institutos de investigación de los países miembros del PROCISUR, así como de la Secretaría Ejecutiva del Programa.

El aporte de contrapartida del PROCISUR en efectivo se valora en US\$ 232.204 y en especies en US\$ 55.562, con un total de US\$ 287.766.

01. Consultores	55.562*
02. Bienes y servicios	-
03. Materiales e insumos	150.975
04. Viajes y viáticos	32.055
05. Capacitación	15.352
06. Gestión del conocimiento y Comunicaciones	-
07. Gastos Administrativos	23.603
08. Imprevistos	7.720
09. Auditoria Externa	2.500
Total	287.766

* Corresponde al aporte en especies por el tiempo de las integrantes de la Secretaría Ejecutiva durante los 42 meses de duración del proyecto.

Julio Kalezich Barassi
Director Nacional INIA Chile
Presidente Comisión Directiva
PROCISUR

Santiago, Chile, 18 de diciembre del 2017



29 June 2018

Dr. Eugenia Saini
Executive Secretary
Fontagro
[by email]

Dear Dr Eugenia Saini

On behalf of the Ministry of Primary Industries (MPI), we are pleased to announce our interest in joining the project "Sustainable intensification of livestock systems with legumes: Latin American and Caribbean cooperation platform". The Ministry of Primary Industries (MPI) agrees in the term of references of the project and will contribute with an amount of NZ\$100,000 to this project, to be administrated by FONTAGRO. The funding will be assigned in these categories of costs:

Category of Cost	NZ\$
01. Consultants	
02. Good and Services	
03. Materials and other inputs	50,000
04. Travel and Per Diem	50,000
05. Training	
06. Knowledge Management and Communications	
07. Administrative Costs	
08. Incidentals	
09. External Audit	
Total	\$100,000

Yours sincerely,

Trish Ranstead
Manager, International Relations

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