Uruguay Family Farm Improvement Project

An MFAT NZ Aid Programme project funded project managed by AgResearch, New Zealand

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1.Executive Summary

Context

The pastoral farming sectors of Uruguay and New Zealand have enjoyed a strong and positive relationship over many decades. This relationship is evident in many aspects of their industry.

- Uruguay has looked to New Zealand for leadership in developing high performing grazing systems for beef, sheep and dairy. Every year there are many contacts between the countries, including study, visits to Field Days, fact finding missions, study tours, investment and commercial transactions.
- Massey and Lincoln educated people are playing important roles in agriculture in Uruguay today
- Work experience programmes where young Uruguayans work on NZ farms for practical training
- The success of WrightsonPAS in taking NZ pastoral species and pasture management to commercial farmers in Uruguay
- Collaborative research projects with AgResearch over many years, such that there is now a formal MOU between AgResearch and their Uruguayan counterpart, INIA.

Uruguay is currently embarking on a very significant investment in the further development of its farming sector, and has invited New Zealand to assist. The history between the two countries, the existing strong relationships, and the opportunity for New Zealand to add significant impact through leveraging of a US$100m development programme, mean that this project is directly aligned with the intent of the Agricultural Diplomacy Programme.

Sixty-three percent of Uruguayan farms are family farms run by families lacking resources and technology to develop their farms, and improve their economic wellbeing. The Uruguayan Ministry of Agriculture (MGAP) has identified development of the sector as a major opportunity for economic development of the country and with funding from the World Bank, The Inter-American Development Bank and FAO are embarking on a large scale development programme over the next five years. The national goal of this programme is to improve the viability and profitability of family farms without damaging the ecologically sensitive pampa grasslands.

Policy, technology transfer and extension will be major components of the MGAP funded work. The project partners also includes the two key delivery organisations, INIA and PA who will be targeting the family farms through their own programmes that are additional to those of MGAP. The New Zealand presence is seen by the partners as helping to align all three organisations, and as a result, enabling considerable synergies that will greatly increase the benefits from the

US $100m investment. Already there is the example of the combining of the different on-farm programmes into a national monitor farm network and greater value being generated from the on-farm activities. The establishment of this network is a direct result of the work that has gone into designing this project.

For a relatively small investment, when compared to the total funding being applied by the Government of Uruguay, this New Zealand project will provide a significant impact.

Project Partners

MGAP develops agricultural policy and contracts services that will assist in promoting rural development. MGAP has invited AgResearch to assist in developing the policies under which the rural development funds will be dispensed. There will then be an opportunity to work with service deliverers, notably Comisión Nacional de Fomento Rural (CNFR), to enhance development outcomes.

The national extension agency Plan Agropecuario (PA) has asked AgResearch to assist in the development of their next 5 year strategic plan, after undertaking a stocktake of their work in developing farm decision support tools. PA has a number of farms from which it collects information. It wishes to improve the use of this information by the wider family farming community, and will make these farms and the information available to be a part of the national monitor farm network, and participate in this work.

INIA has established a Family Farm Programme, as a technology transfer programme. The focus will be on applying technologies that are new to most farmers, particularly in augmenting natural grasslands and establishing improved pastures. New monitoring systems are being established to record both farm performance and environmental impacts. Results from research trials are being applied through on-farm demonstration. The nature and the level of commitment by INIA to technology transfer for the small and medium farmers is quite new for them and the support of AgResearch in applying technology, and measuring its effects, has been actively sought. The INIA farms differ from the PA farms, in that one leans more on technology and the other more on management. However with both organisations combining their farms in the monitor farm network, all farmers will be able to access information that is more comprehensive, more relevant to the farmer, and more likely to result in broader uptake and greater change.

This project will also partner commercial companies. WrightsonPAS have offered to take on additional staff to fully participate, and meat processors will support this initiative that aims to increase the number of animals produced.

The farmer run consultancy service FUCREA, has offered its training resources and experience in farmer-to-farmer led development, to help this project bring together quite disparate groups in Uruguay.

Project Themes

Since acceptance of the project concept, AgResearch have worked closely with INIA and PA, farmers and the industry to develop a programme plan, prioritising key activities and identifying appropriate personnel and resources from New Zealand for the programme. The project will work within three major themes:

- Profitable and resilient farm systems;
- Productive and persistent forage systems
- Effective rural networks.

The themes have been selected to ensure that the support programme is comprehensive. Programmes that have failed in the past have focussed on technology without addressing business profitability or market issues. Or they have ignored key community influencers, and had poor uptake of new ideas. The three themes come together as shown below.

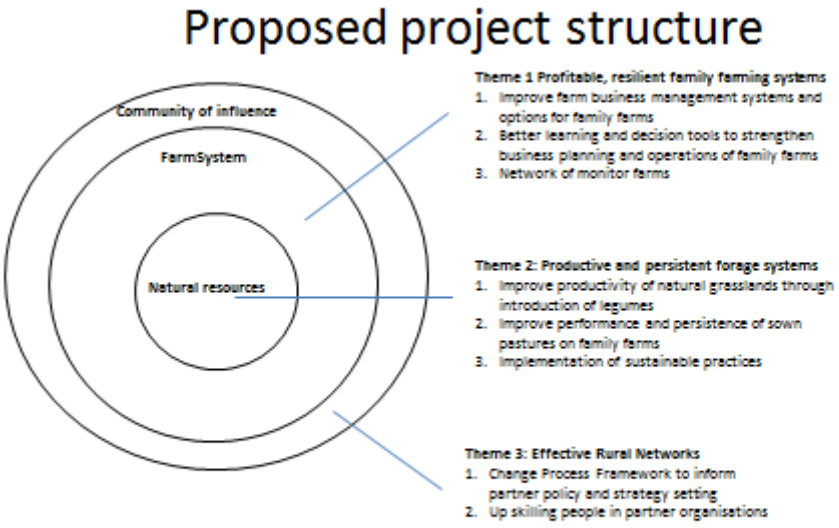


Figure 1. Relationship between the biological, business and community elements of farming, and the themes of this project.

Through this combination of themes AgResearch will help INIA and PA in farm systems design and implementation, development and transfer of new technologies, and extension of appropriate farm business practices for the benefit of farming communities. AgResearch will assist MGAP formulate policies that will result in better targeting of rural development initiatives, and produce more effective outcomes. The project specifically targets activities on a network of Monitor Farms (MF) which will build on activities already established by INIA and PA. The project aims to test and implement technologies which will raise beef production by $100 kg/ha/yr over the current baseline. It has also been designed to meet specific, quantified, targets for uptake and extension by the end of the project (2017) which include:

- Farmers implementing and validating technologies on MFs (15)
- Farmers influenced by programme (250)
- Researchers upskilled for technology development and evaluation (20)
- Technicians trained for project implementation (100)
- Networks formed and trained (5)

Technologies developed and staff trained within the programme will contribute to INIA and PA's ongoing initiatives to develop the beef family farming sector and it is anticipated that these advances will be demonstrated on 900 family farms within five years of project end (2022).

Key risks and mitigation

The key risks to this project are those that have the potential to affect farmer uptake.

External risks posed by drought and market prices can have a significant effect on farmers' willingness to adopt new ideas. If these occur early in the project they would be major risks. If later, and the new practices that have been designed to mitigate these risks have started to be adopted, then the risk is lower. The design supports early adoption.

The level and speed of uptake by farmers is affected by their attitude to change and risk. If the project attempts to target an unsegmented audience then there is a real risk that many of the farmers will be slow to adopt, taking more than the 4 years of the project. However by initially working with farmers who have the resources and the willingness to change, successful outcomes are more likely to be achieved. A core of successful farmers will improve uptake by other farmers.

AgResearch has a long experience of pasture species development in Uruguay. More importantly the presence of the partners, INIA and PA and MGAP, and the knowledge and

experience that they bring, will ensure success. The risk to MFAT is minimal because of the reputation of the partners in the project.

The major environmental risk is the degradation of the pampa grassland. The goal of this project and associated Uruguayan projects is to increase productivity without associated environmental damage. That is repeated here. The assistance that AgResearch will be providing INIA to develop effective environmental monitoring, is a major input into developing persistent forage, reducing overgrazing, and ultimately drought-proofing farms.

Project Governance and Management

This project outputs will be managed by AgResearch, as management services contractor, in collaboration with our Uruguayan development partners INIA and PA. AgResearch will provide overall project management, problem analysis and research, sourcing New Zealand and Uruguayan experts to work with the development partners, farmers, and other project stakeholders. INIA and PA will provide in-country management and implementation.

The governance and management structures that will be put in place will include:

- Project Advisory Committee. This committee will have wide stakeholder representation, will act as an advisory body to the project management team, and ensure effective liaison with each stakeholder groups. Representation will include: INIA/PA/MGAP, farmer groups, rural women's groups, industry associations, local community/local government representatives and a representative from the NZ Aid Programme would also be invited to become a member.

- Project Management Team. This is made up of representatives of INIA, PA and AgResearch, will be responsible for drawing up workplans and budgets, and overseeing the implementation of the project. A project manager will report to the project management team. AgResearch/INIA/PA will provide a secretariat for regular reporting. AgResearch will chair the committee.

The project will be carried out for 4 years (2013 – 2017) with total NZ investment of NZ$ 4.0m (including the inception tour carried out in February/March 2013). The Uruguayan Government is contributing through INIA USD $0.64m per annum, and via PA, the sum of USD $0.25m per year. The Uruguayan funds are for personnel and facilities already in place, in the programmes most closely aligned with this project.

The New Zealand contribution will primarily meet the costs of providing NZ expertise in both Uruguay and New Zealand. Study tours, training costs and resources for implementation of specific project initiatives are included in the NZ funding. The Uruguayan funds will cover the cost of existing staff, research trials and extension programmes.

The project will be coordinated with the development initiatives of MGAP.

2: Analysis and Strategic Context

Country, region and sector issues

Country Context

Uruguay is located in the south-eastern part of South America between Brazil, to the north, and Argentina, across the Uruguay River. It has a population of 3.3 million people with 1.8 million living in the capital Montevideo and its metropolitan area. With an area of approximately 176,000 square kilometres, Uruguay is smaller than New Zealand, but relies on a similar agricultural base for its economy. It has about 16 M ha of agricultural land, mostly devoted to extensive pastoral agriculture. Agriculture contributes around 14% of the GDP of the country, but agricultural exports currently contribute approximately 60% of export income. After a long period of decline from relative prosperity in the 1950's, the Uruguayan economy was severely hit by the 2000-2002 regional depression. However, in the last decade Uruguay's economy has enjoyed a steady growth, largely as a result of a rebound in both domestic demand and exports, allowing repayment of debt and implementation of social programmes. With the view to developing the rural heartland the Uruguayan Government has included *enhancement of productivity and income and job generation in the agriculture and food sector*; and *protecting the environment and mitigating and adapting to the effects of climate change* among its key priorities for the next 5 years.

Sector context

While the agricultural sector has achieved steady growth over the past decade, growth has been uneven with a large small farmer sector lagging behind. The Family Farm sector has been analysed by the World Bank* (The Ministry of Agriculture (MGAP), estimates that 63% of Uruguayan farms (>37,000 properties) are family farms with an average income of US$3,300 pa. This sector occupies 15% of the country's agricultural land but productivity is well below national average. Uruguayan family farms are mainly dedicated to beef and sheep production, but dairy farming and horticulture are also important. The World Bank (2010) considered that "there is considerable scope to improve the long-term profitability and sustainability of family agriculture by improving management of the natural resource base and incorporating technical knowledge alongside increased physical investments". The authors noted that this would involve "improved pasture management, use of cultivated strategic forage and improved water use (Report p 11) but noted that demands by family producers far exceeded the financial resources available.

The needs of the family farm sector are outlined in a project proposal to the Banco Interamericano de Desarollo (BID) (Appendix F) **Principal Challenges of Family Agriculture.**

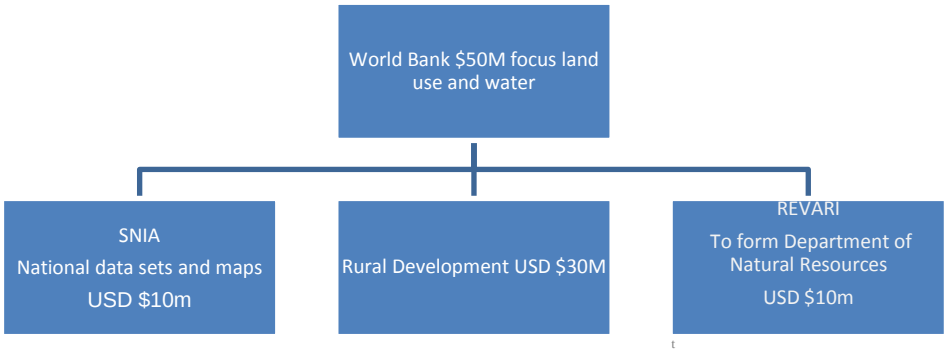
Technological gaps

Evidence of significant differences in productivity reflects the existence of important technological gaps between family farms and large-scale producers. In sheep and cattle production systems, the average yield measured in kg meat/ha for large-scale producers is 144% more than that from family farms. The productivity gap between large and small farms is 60% in litres of milk/ha/yr for dairy systems and 68 % for horticultural production systems.

One of the principal causes of the technological gap observed is the limited generation of technologies suited to address the needs of family farms. To address this need, in 2006 the National Institute of Agricultural Research (INIA) established a National Program of Research on Family Production Systems covering agronomic, economic and social aspects of production.

Scale and networks

Family farms are small. Around 60 % of livestock family farms are less than 200 hectares (the national average is 450 hectares) and family orchards (representing 84% of the horticulturists of the country) average 15 hectares, medium and large-scale producers average 53 hectares. To meet the social and economic needs of the family farmers and provide a foundation for economic development from rural Uruguay, the Government has established a Department for Rural Development and secured 3 large loans from international sources (World Bank, BID and FAO) totalling $100M over the next 5 years. The following is a diagram of their funding landscape



(Figure 2).

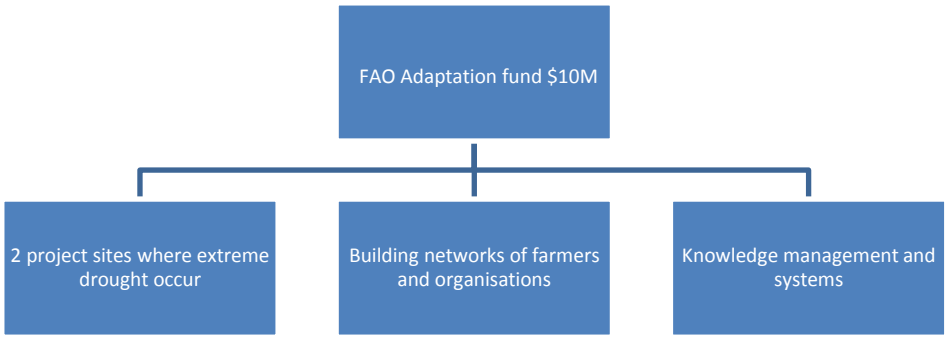


Figure 2. Project funding landscape

MGAP through this funding landscape are looking to build the capacity of farmers and organisations to adapt to increased intensity of climate variability and other drivers such as competition from land use, high and unstable input prices, and low farm returns. They are keen to have increased capability to monitor, review and verify changes and build capacity in knowledge systems. They want to see efficient and targeted use of water to increase production while retaining the biodiversity of their natural grassland and water quality. They also want to build a country brand that builds on and adds value to products from excellent environmental performance. They are keen to increase productivity per farm and to build interconnected communities of farmers. They also want vibrant rural communities to retain and attract people.

A further concern of MGAP is the farming sectors ability to respond to environmental shocks. Uruguay has been severely affected by droughts in the last 5 years which caused considerable loss to the agricultural sector (including NZ Farm Systems). The Government is seeking to build agricultural systems that are resilient and able to overcome these shocks and respond to any future challenges from global climate change.

This proposal will add value to the Uruguayan Government initiative by providing technical and business advice, and training, to assist MGAP in the allocation of donor funds, loans and government investments to “meet our responsibilities and spend the money wisely”, as expressed by a senior official during our mission.

Stakeholder analysis

Ministry of Livestock, Agriculture and Fisheries, Uruguay (MGAP)

MGAP (www.mgap.gov.uy) is the branch of Government charged with oversight of the rural sector. The current Minister of Agriculture is Mr Tabare Aguerre. Our key point of contact in the Ministry is Alicia Martins, she will act as our conduit to the various initiatives that will be coordinated within the Ministry as noted in the funding landscape figure1.

A special department, DGDR (Direccion General de Desarollo Rural) was established in 2009 to manage the Government’s rural development programmes. During the mission we met frequently with MGAP/DGDR who were highly supportive of the aims of this project as we share similar goals. They see an excellent synergy between the project and their development programmes and want to collaborate and provide a pathway for uptake of programme outputs. They are keen to be linked with the project and have put their knowledge and expertise at our disposal.

In the design phase of this project the following commentary has been offered by our colleague Hermes Morales from PA:”It is really more and more clear that this project will have important synergies with the projects that the Minister is launching financed by the World Bank or the Interamerican Development Bank. …..I am convinced that the NZ connection will be more important to develop a high quality “learning platform” (DSS for different levels, different places and different people) in the huge umbrella of the National Livestock Information System (SNIA in his Spanish version), that should be developed in the next 4 years. Clearly, the “soft” components (capacity building among others) will be very important, and these are the foundations for the project’s sustainability”.

INIA

Our project partner, INIA (www.inia.uy) is Uruguay’s main organisation for development of agricultural technology. With 600 staff and an annual budget of US$20M, INIA´s mission is to contribute to the integrated development of the agricultural sector by: “Generating, incorporating and adapting knowledge and technology, taking into account State policies, economic sustainability and social equity”.

The benefits of collaboration are implicit in the new INIA Strategic Plan (Plan Estrategico Institucional 2011-2015) (PEI) which calls for development of an "agro-intelligent" country which should "promote innovation in all its forms (products, processes, services, institutions and social) as a foundation of competitivity through increases in productivity and added value in food and agro-industrial chains". INIA have identified the benefit of working with New Zealand and prioritised the relationship with AgResearch which is covered by a Heads of Agreement signed in 2009. This project contributes specific modules as input into INIA projects. INIA will provide counterpart staff and office/laboratory resources. The value of partner programmes to this initiative is as follows: In the case of INIA there are three National Research Programs involved: Sustainability (with 4 scientists and research facilities valued at 190,000 USD/year), Family Farm Production (2 Staff and research facilities –RF- amounting 150,000 USD/year), Pastures and Forages (3 staff and RF amounting USD 110,000/year); Biotechnology (2 staff and RF amounting to USD 150,000/ yr; Administrative staff and support amounting to USD 40,000/ yr. This brings the total contribution of INIA to $640 k p.a. or USD 2.56 m over the whole project.

PA

Plan Agropecuario (PA) (http://www.planagro.com.uy/) is a public organisation with the mission to support livestock production at family farm level using knowledge management and capability building as the main strategy for change. It links with farmers and their organizations through, field days, training courses and the media. PA has been collaborating with AgResearch scientists for five years. Plan Agropecuario has a total staff of 40 people and an annual budget of 1.6 m USD it will make available staff and resources from its Knowledge Integration Project which equates to 4.5 FTE's at a cost of $250,000 USD/year.

Other relevant organizations

Our partners work with a range of Governmental, private and NGO's to implement their policies including:

Farmer associations

Federación Rural (FRU), Asociación Rural (ARU) www.federacionrural**.com.uy**

In the design phase of the project we met with the President of the Florida Association Rural, Sanco Y Mollos de Timote, and Juan Carlos Delladiazza, one of the monitor farmers. The challenges facing them include financing new stock after selling capital stock during the drought;

enhancing natural grassland production through the introduction of legumes and having enough feed to reduce the time to weaning. This farmer group now have access to an e-learning facility provided by the Ministry of Education (www.mec.gub.uy). This group is intended to be one of the monitor farms groups that the Plan Agropecuario and INIA will work with and will be incorporated into the project.

Cooperativas Agrarias Federadas (CAF) www.caf.org.uy.

First and second level Uruguayan cooperatives have come together to form an organization to represent them, CAF. It does this through its communication, representative and management activities. CAF aims to promote the development of the agricultural cooperative system with a view to improving the quality of life for rural producers.

Comisión Nacional de Fomento Rural (CNFR) www.cnfr.org.uy.

This organisation promotes rural agrarian cooperative societies and other base organizations. It covers 15,000 family farm members from a wide range of Uruguayan producers. Pastoral farmers belonging to CNFR work through local groups and participate the the regional "Round tables" for development to identify local priorities.

Commercial organisations

MARFIG GROUP is the third largest Brazilian food processing company with a pre-eminent status in Uruguay. MARFIG GROUP are keen to see growth in the family farm sector to secure reliable, traceable, high quality beef products. They have emphasised the importance of collectives of family farms to build the critical mass of desired product. MARFIG GROUP will assist the project by identifying key beef product targets and liaising with groups of farmers to deliver these.

WrightsonPAS (WPAS) is the largest seed company in Uruguay selling perennial ryegrass to the dairy farmers and mainly fescue to beef farmers. During the inception visit we met CEO Marcello Banchero, Research Director Marcel Labandera and other members of the team. WPAS are very positive towards cooperation and give full support of the programme. They are keen to discuss co-funding of a staff position to work with improved forages for small farmers. Currently WPAS is engaged with AgResearch in conjunction with INIA to carry out animal health trials on fescue endophyte. They are keen to advance their endophyte research and launch new products into the market. They are also enthusiastic about rhizobium and microbial growth promoters.

NGOs

Asociación de Mujeres Rurales del Uruguay (Rural Womens'Assn) (http://www.agroinfo.net).

These associations ensure representation of stakeholder views and an inclusion of gender and environmental issues. They also offer an implementation pathway to farmers.

Regional organisations

PROCISUR is a regional organisation to promote cooperation between INIA, IICA and other stakeholders around the world in science, technology and innovation, to help improve productivity, competitiveness, and sustainability of natural resources, food security, rural territorial development and social equity of regional agriculture. Trevor Jackson met with Emilio Ruz, CEO, PROCISUR, and discussed ongoing interest in regional development in pastoral research. He suggested that we plan for a regional (MERCOSUR) meeting about 2 yrs through our programme to promote positive development outcomes. PROCISUR will coordinate the meeting and promote among their regional associates.

Problem analysis

Low farm productivity and low family income

There are 32,000 small farmers of which 75% are beef farmers. We have chosen therefore to focus the programme in the first instance on small family beef farms. It should be noted that, given their number, beef farmers are also the main environmental managers in Uruguay.

Family farms growing beef on the pampa have received less attention than their large scale counterparts. They have been vulnerable to severe climatic events such as droughts, and disease outbreaks, such as foot and mouth. Under difficult farming conditions and with limited support, farmers have farmed to minimise risk and losses rather than maximise profit. The end result has been low productivity on the family farms, and low family income. Recently the small

farm sector has come under Government attention for development to both alleviate rural poverty and raise national productivity. Problem areas include:

Lack of knowledge of productivity and process on small farms

Family farms have long been ignored in Uruguay with research and technology directed at and transferred to large scale producers. Little research has been carried out within the small farm sector and consequently opportunities for advancement and potential problems are poorly understood. For this reason INIA and PA are working in a Family Farm programme to address technology, social and environmental issues at the farm level (Appendix F4)

Low pasture quantity and quality resulting in low animal weight

The low quality and poor growth rates of unimproved 'natural pastures' of the pampa lead to low growth rates of stock mean that stock have to be retained longer to reach target weights (Appendix F3). Much of the limited food available is used simply to maintain animal body weights rather than contribute to weight gain. In turn this means that less stock are able to be carried on the farm, and animals have to be grazed through into periods more prone to drought. Cultivation and establishment of new, high-producing pastures appears to be an option, but persistence of new pastures is poor in Uruguay and the reasons remain unclear.

Lack of access to appropriate technologies and technological assistance

The World Bank report (2010) considered that small farmers are held back by lack of technological assistance and financial resources for investment. Farmers are also held back by lack of knowledge of which technologies (e.g. forage species, pasture development) will provide desirable results within their farming situation. There has been a lack of on-farm research and technological support which, in addition to lack of credit, has limited farmer uptake of appropriate technologies. In addition, new technologies which could have a major benefit for small farmers, such as low cost small scale machinery or seed coating for improved establishment, have not been tested in the small farm environment.

Lack of farm management business decision making skills

Currently farmers are making business decisions based on their experience, their resources, and the state of the market. If new forage systems are promoted to them they will need to be able to evaluate the impact of those systems on their farm business. There are a number of implications of which they will be unaware, and their farm management business skills are not something that has had to be developed in the past.

Limited connected extension activity and integrated knowledge transfer

Providing new forage species by itself will not solve the problems of low productivity and low profitability. There will be elements within a new farming system that will require new husbandry

skills and new decision making skills by the farmers. The World Bank report noted that extension services to the family farm sector were limited. While the new funds available can be used to boost extension staff it is unlikely that there would ever be sufficient for the more than 32,000 family farms. However there is a potentially large source of support available if seed suppliers, meat processors, rural lenders, veterinarians, scientists, extension agents, educational institutes, and industry organisations, are included. At present this support system is fragmented and disjointed. If farmers are to acquire new knowledge and skills through demonstration, training, mentoring, etc., then the knowledge of those to whom they turn for support will also need to be appropriate and connected. The traditional approach of simply up skilling individual extension workers to work with farmers will not be sufficient.

Balancing profit and environmental outcomes

The relationship between the dual outcomes of productivity and reduced environmental footprint are not well articulated as to date there has been little evidence of local community concern about the impact of farming on the environment. However the Uruguayan government is very aware of the potential harm to the environment that new farm systems to increase profit may lead to and are keen to ensure that this is attended to while new systems are being explored and implemented. A key to increasing productivity will be increasing resource efficiency and this will have environmental co- benefits including less nutrient and GHG emissions to water and air, persistent and resilient natural grassland biodiversity and efficient use of water. Our partner organisations Plan Agropecuario and INIA have asked us specifically to assist them in tool development to allow prediction and monitoring of these environmental impacts and to assist in development of specific forage technologies.

Cooperation between farms in response to market opportunities

One means to improve farm returns, and/ or reduce farm costs is through increased co-operation among family farms. During our inception visit we held discussions with technicians and farmer on farmers networking with others to add value to their returns on stock. We met with a farmer belonging to a PA monitor farm Gustavo Gonzáles who was linking with a neighbouring farmer to finish stock. There exists therefore opportunities to gain more productivity through networked farms particularly when the product is aligned with a market signal. Discussions with MARFIG GROUP a meat processor and Fabio Montessi INIA have indicated that opportunities in particular with beef and wool exist to be exploited.

Lessons learned

MGAP have seen considerable advances through implementation of agricultural R&D in the past decade and have set in motion the current development strategy.

INIA have recently reviewed their programmes over the past 20 years[1] and conclude that "In order to maximise the probability of impacts in R&D, INIA has to develop a strategy to prioritise and focus its technical programmes taking into account a) the actual institutional capabilities, b) what is already being carried out by others and c) basing itself on a solid strategy of alliances and inter-institutional collaboration". In the current project INIA is building on the strategy.

In our work in New Zealand and international development projects we have learnt that to achieve real impacts we must have excellent partners and be working on a clear plan developed with stakeholders and involving the community. To ensure partner ownership and uptake of the programme we have adopted the following Project Development Principles

- Selection of development partners with a sound reputation for successful implementation of R&D (INIA and Plan Agropecuario)
- Thorough consultation with partners and stakeholders in development of the ADD.
- Priority areas set by partners, in response to stakeholder demands, identifying areas where AgResearch can contribute within existing programmes to national goals.
- Analysis of development landscape to ensure that NZ inputs are providing a unique contribution delivering the most "bangs for buck" through catalysing the pasture development process in Uruguay.
- Ensuring "no harm" through risk analysis to ensure that projects lead to sustainable economic growth and farmer viability without damaging the environment.

New Zealand companies and individual farmers have invested in Uruguayan agriculture over many years, with mixed success. The most frequent error has been to assume that the New Zealand and Uruguayan environments are similar enough that NZ farming systems can be imposed without amendment. This approach has often been made worse by unwillingness to listen to local advice, in the belief of the superiority of NZ skills and knowledge of grazing management. There has been a failure to recognise that the NZ strength is in understanding, adapting and applying, the principles of animal nutrition and pasture management to fit the context, not simply implementing a "one system fits all" solution.

A lesson that AgResearch has had to learn in New Zealand, is that there is a gap between publishing research results and farm practices being adopted. The true value of the research is not realised until it is incorporated into the farming system. This is also relevant to South America and elsewhere in developing countries. Simply producing research results that demonstrate an

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[1] M. Pareja; J. Bervejillo; M. Bianco; A. Ruíz y A. Torres. 2011. Evaluación de los impactos económicos, sociales, ambientales e institucionales de 20 años de inversión en investigación e innovación agropecuaria por parte del Instituto Nacional de Investigación Agropecuaria (INIA) - Uruguay. Resumen Ejecutivo. IICA, 41 pp.

improvement in some aspect does not automatically lead to farmer adoption. AgResearch has had a specialist capability for many years designed to work with farmers and farmer groups to ensure that research is relevant, and that research results can be utilised by farmers. The focus, as it is in this project, is to achieve outcomes on farm, and in industry.

Consistency with existing New Zealand and other donor/ multilateral programmes and policy/strategy

This programme is closely aligned with the NZ Government policy for sustainable economic development with its focus on agriculture (Govt policy statement March 2011). The project provides for an investment in economic development through increasing capability and effectiveness of rural development programmes in Uruguay. It does this by working to maintain resilience of farms while not degrading the environment and build strong communities, thus aligning with the priority themes for the aid programme. It also falls within ODA eligibility criteria (www.oecd.org/dac/stats). There are currently no other NZ funded development projects in Uruguay (or the surrounding pampa region) although experimental work is carried out by Wrightson Pas in evaluation of new grass and clover cultivars (with input from AgResearch).

The programme has been designed to meet criteria of the MFAT RFI for Agricultural Diplomacy and shows a strong emphasis on partnerships to deliver in areas of comparative advantage as (required) by this initiative.

As a result of the agricultural commodity boom and pro-agriculture and rural development policies by the Uruguayan Government agricultural R&D is currently in an expansion phase in Uruguay. Research and extension organisations have been strengthened by Government investment and recent large scale investments from the World Bank, Inter-American Bank for Development (BID) and FAO that will bring US$100M of investment to the sector over the next 5 years. There is concern from politicians and officials to see that this investment is well spent and is directed to the right projects and funding validated technologies.

Our project has particular alignment with the World Bank project goal of promoting farmer adoption of improved environmentally sustainable agricultural and livestock practices that are climate smart. This objective is expected to be achieved through the development and implementation of instruments that would provide farmers with critical and timely information for the adoption of improved on-farm management. These tools focus on natural resources management as well as technical and financial assistance to promote investments in their production systems aimed at reducing risks and making them more resilient to extreme climatic events. Our programme is fully supported by the Uruguayan Government as, through dialogue, we have focussed on the areas of greatest concern to the Uruguayans where our input will have the greatest effect. Our focus on productivity gains through the whole of farm

system is where the greatest synergies will sit and our approach to work with the farmer groups identified by INIA and Plan Agropecuario in their programmes increases alignment. Through our conversations to build the design we have already had an impact in facilitating the conversation between Plan Agropecuario and INIA to share farmer group resources.

Information on the current state of the rural economy and investment plans is provided in World Bank and BID documents (See Appendix F8).

World Bank 2010. URUGUAY, Family Agriculture Development, Report No.55220-UY, Sustainable Development Department Latin America and Caribbean Region, June 20, 2010, 142 pp.

BANCO INTERAMERICANO DE DESARROLLO (BID). Uruguay, Programa de Desarrolo Productivo Rural (UR-L1064), Propuesta de prestamo (Current document). 32 pp.

World Bank 2011. Project appraisal document on a proposed loan in the amount of US$49.0M TO THE ORIENTAL REPUBLIC OF URUGUAY FOR THE SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES AND CLIMATE CHANGE. Report N°: 62277-UY, September 8, 2011. 72 pp.

Rationale for New Zealand involvement

This programme grows out of science and study collaborations between NZ and Uruguay, and many years of farmer and student exchanges. It will take the opportunity provided by "Agricultural Diplomacy" to demonstrate how New Zealand know-how and technologies can act as a catalyst generating greater and better development outcomes from existing in country programmes. The relevance of NZ expertise has been keenly demonstrated by the interest from Uruguayan farmers and science providers in NZ R&D and farm systems with frequent visits and invitations to NZ scientists to take part in Uruguayan meetings.

The programme aligns with the Uruguayan Government's goal of increasing viability and sustainability of the family farm sector and some of our team members have already been involved at a small level allowed by available financing. The support of MFAT has allowed these small initiatives to be expanded and formulated into a full scale programme with a strong input into Uruguayan development. The programme focuses on increasing rural incomes through raising productivity without compromising the environment. The Uruguayan partners have requested assistance in sustainable pasture production, land use management and improved farm systems as these are clearly recognised as areas of New Zealand's comparative advantage.

Within the project we aim to increase Uruguay's capability to advance in agricultural development and environmental management, act as a catalyst to bring Uruguayan organisations to work

together on projects of national importance and create within Uruguay a centre of excellence in agricultural research which will serve the region.

3: Activity Description

Through this project we will assist our partners to provide successful development outcomes for Uruguay. This will be achieved through delivery of a set of project outputs that will underpin ongoing development. This will include assistance with planning to ensure best use of resources. We will produce a cohort of well-trained research staff creating tools and systems to improve agricultural productivity and extension staff capable of implementing and extending these technologies to groups of farmers providing better lives and incomes for them and their families.

Results diagram.

The following results diagram demonstrates the link with our project outcomes and the high level Uruguayan goal supported by their ministry (MGAP). The strong links with our Uruguayan partners and the goal of the Ministry means that we will contribute to achievement of the outcomes and the ultimate goal through sharing cases, data sets, farming systems and building of capacity that will have a wider contribution beyond the life of the project. This behaviour will be enhanced through close communication between all parties across the programmes that will be funded from a range of sources' including the World Bank, FAO, and the Government of Uruguay.

The overall project goal is: ***Improving the profitability and viability of Uruguayan Family Farms without compromising the environment***

Outputs are grouped under three themes, each focussed on a different target group – farmers, researchers, and rural networks (Figure 1). Theme 1 Profitable, resilient family farming systems; Theme 2: Productive and persistent forage systems and Theme 3: Effective Rural Networks. Extension agents link all three themes. The outputs from all three are necessary to achieve the project goal, and are brought together through their application with farmers on their farms.

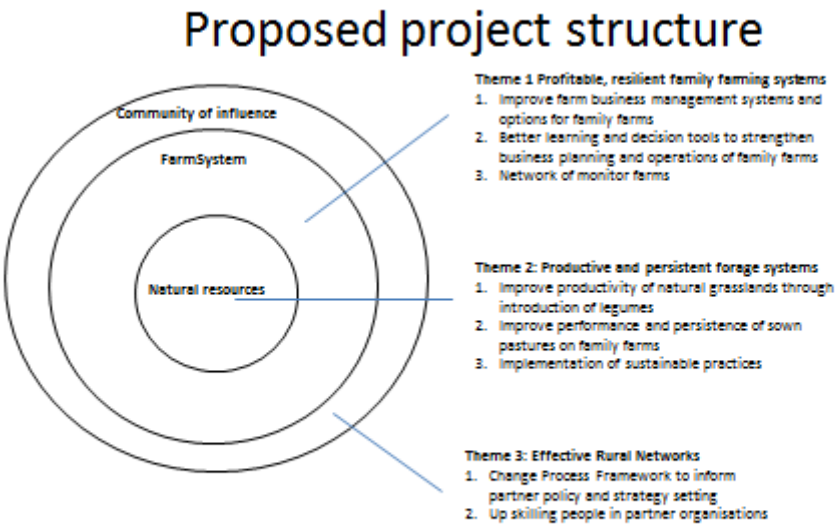
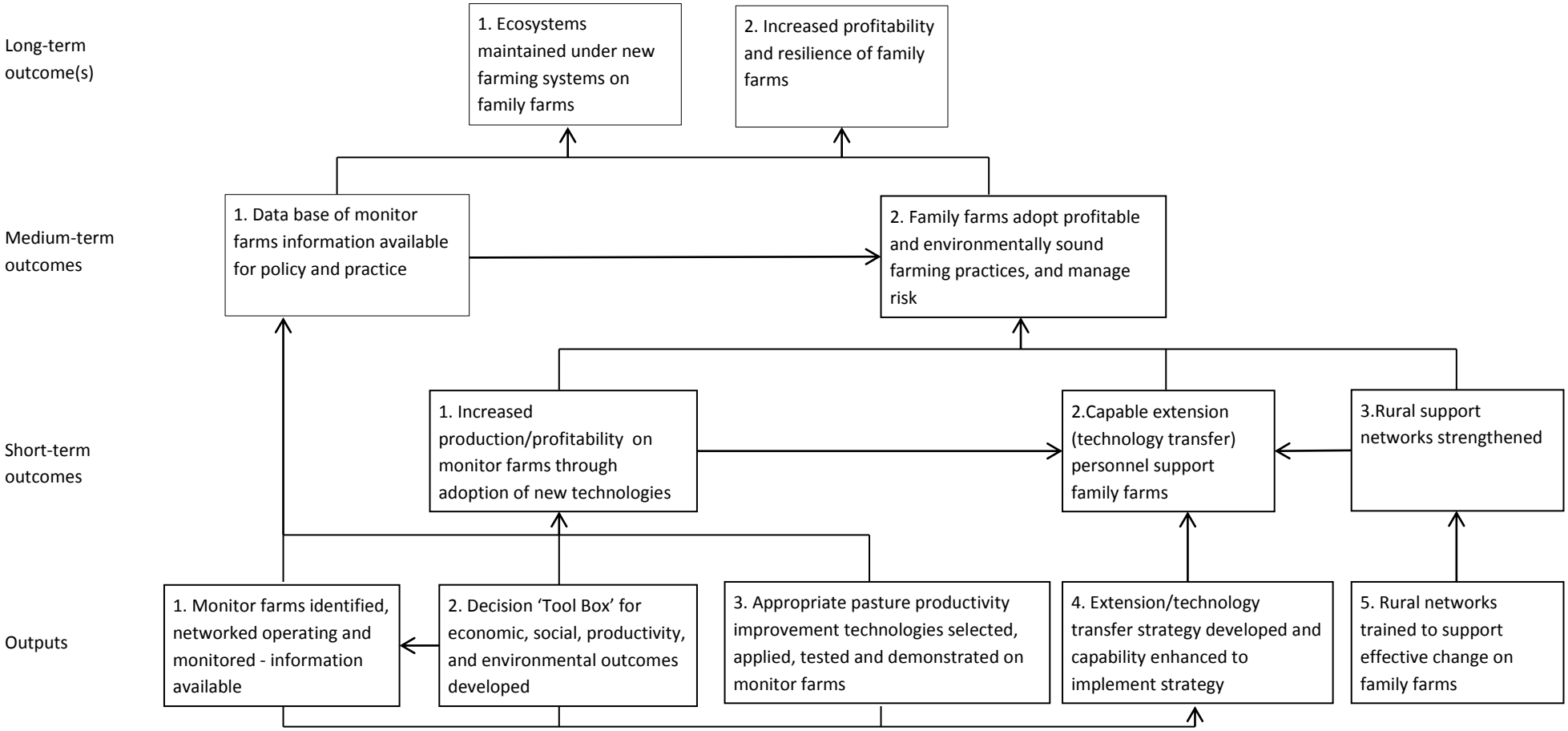


Fig1. Relationship between the three project themes and the biological business & social environments within which this project will operate

Results Diagram

Goal of the Activity: Improving the profitability and viability of Uruguayan Family Farms without compromising the environment



Activity and inputs

This programme stems from long-term collaborations between the New Zealand and Uruguayan partners and we are fortunate in knowing each others' organisations and systems well. There have been three official Uruguayan Government visits (including INIA and PA) to New Zealand in the last 5 years and at least 10 visits by NZ scientists to Uruguay over that period.

This means we are well placed to start a programme that will include analysis and planning, implementation and validation, and detailed evaluation before achievement of the desired outputs and resultant outcomes.

The proposed programme is outlined in this proposal but we intend the partnership to be dynamic using milestones and stage-gating to track progress and allow for re-prioritisation of activities where necessary. The programme for 2013/14 is outlined below in detail to allow full evaluation and budgeting with a broad outline provided for the remainder of the programme which will be refined and modified after evaluation of results and possible reprioritisation in the annual reviews.

Development of the final ADD was preceded by an Inception Tour visit in February-March 2013 by experts from New Zealand with a long history of contact with Uruguay and/or experience in appropriate agricultural development. This allowed targets to be refined and detailed planning to be carried out for modification of the draft ADD (see Inception Tour report submitted separately to MFAT).

The main activities will be carried out from 2013 – 2017 inclusive and are defined by three themes covering five outputs.

A general outline of key tasks to achieve the five outputs is provided below. Annual workplans beyond June 2014 will be developed in line with the overall Activity costed workplan, endorsed by the Project Advisory Committee, and submitted for discussion and approval by MFAT. Anticipated team leaders and members are indicated below, however AgResearch will be responsible for providing the expertise required to deliver on the project outputs.

Theme 1. Profitable, resilient family farming systems

Leaders Trevor Jackson, Oscar Montes, Phil Rolston (AgRe), Geoff Mavromatis (Cons), Alfredo Alvin, Fabio Montossi, Raul Gomez (INIA)

Uruguayan team; INIA family Farm team, PA Knowledge integration team

Under this theme the farm systems required to meet product requirement, and environmental integrity will be designed and implemented. A farming systems approach integrates farmer decision making with animal and pasture performance to meet farmer goals. Information to guide decisions comes in many forms and requires to be integrated at a system level for all benefits and synergies to be realized. Adoption of singular technologies is successful when farmers see the "fit" within their system. During the inception phase we have ascertained that there is little formal training in farm business management and little use of business systems in extension and technology transfer programmes. In order to fully identify and implement farming practice change farm business capacity will have to be strengthened. We identified a focus to integrate technologies developed by INIA into a farm system context to demonstrate performance improvement and to identify what other support is required to ensure the technology gains are fully attained. Information from theme 2 Productive and persistent forage systems will be integrated with this theme as will relevant existing technologies sourced from a range of suppliers e.g. fertiliser, and genetics. Practices employed will include introduction of new pasture systems within natural grassland to match with desired animal product traits; improved resource efficiency and introduction of monitor farm type concepts to monitor progress towards financial, biological and social targets identified by individual farmers in group settings. Critical to success will be good decision making and all work in this theme will target enhancing the relevance and effectiveness of on- farm decisions. Both PA and INIA have a range of tools they have been developing and testing with farmers e.g. MEGanE an extensive beef husbandry simulation model, We will support the use of these models while also introducing the types of decision support tools used in New Zealand related to financial, production (FARMAX or similar) and environmental (OVERSEER) performance, and use these as a base to evaluate the development of similar tools for Uruguay. We will target extension agents in the Plan Agropecuario and INIA researchers for training and work with them to develop material that will assist them to train others in their organizations and in related rural networks such as private consultants, vets, etc.

We will also introduce processes to enhance individual and group learning to assist planning, monitoring and implementation of new farm systems. Here we will link strongly to the Plan Agropecuario's Knowledge Integration programme and the interactive learning platforms they have developed. AgResearch's Rural Futures programme has been collaborating with Plan Agropecuario as it develops interactive tools and processes that enable farmer and participants in rural networks to learn together. Linkages with new technology development (Theme 2), and effective support networks (Theme 3) are critical to the delivery of the outputs in Theme 1.

Output 1. Monitor farms identified, networked operating and monitored - information available

During the Inception Tour (Feb/Mar 2013) we were able to visit monitor farms established by both INIA and PA. The INIA family farms monitoring project started in 2012 and the PA farms have been operating as focus farms for the knowledge integration programme for two years. The INIA project proposes "To work with organised producers within whole farm systems and to coordinate with development institutions working within the zone. Work is to be centred on representative production systems, working directly with the farmers and their families through a process of co-innovation and collective learning. The selected farms will be case studies used as pilot areas for field days and extension of advances to farmers and technicians in the zone" (Appendix F3). PA also have a series of 15 monitor farms that are used to collect data that informs farming statistics but does not get used at the farm level for learning purposes. We will establish criteria and protocols for working with Monitor Farmers and select farms from both the INIA and PA groups in Rocha and Tacuarembo introducing new concepts, technologies and tools to raise productivity on the monitor farms and demonstrate effect to the wider community. In both regions there are farmer groups associated with the farms and there are opportunities to strengthen the programmes through the encouragement of all group members to share data and allow benchmarking to take place. There is an opportunity to link monitor farms within a network broadening the range of soils, biophysical environments and farm management systems covered. This will allow further potential for benchmarking performance within and between regions. Farmers will see more options, more information and more relevance. The benefits will be that the strengths of each farm programme are available to each organization and to family farmers.

Before embarking on technology change, it will be important to establish farmer goals and define technologies for testing with the farmer through the co-innovation process. Stratification of farms on economic and aspirational goals will assist the process. During the design phase of the project it was clear that major advances can be made with better animal nutrition. Technologies and practices that shorten the time to slaughter will

be useful in increasing resource efficiency as well as farm profitability. Similarly, increasing pasture productivity can raise carrying capacity and reproductive efficiency which will lead to higher farm profits. Together these are the areas where new technologies and practices will be targeted.

Technologies being developed within Theme 2 “Persistent and Productive Forage Systems” and those already available from research will be selected and evaluated through the co-innovation process with the target of improving feed quality, feed availability, and feed utilisation. Reasons for previous lack of uptake of technologies by farmers will be explored. We will help tailor the integrated solutions on monitor farms, at field days, training and information dissemination to improve relevance. Lessons learned on-farm will feed back to Theme 2 to ensure relevance of new technologies under development.

The adoption of these changes by farmers will be supported by investment in extension. Training in design, management and delivery of extension service is the subject of Output 3. The application of those skills will be critical in achieving on-farm change.

General outline for Output 1 delivery	
Date	Key components
Oct-Dec 2013	MF goals agreed with INIA/PA. MF Coordinator appointed and workplan defined. Operational plan and MF operating budget defined
Jan - June 2014	MF selected. Support technician appointed in East. Baseline established for each farm, physical, economic, social and farmer goals defined for each MFer. Baseline review in workshop with Tools, Pastures and Extension (Outputs - Training plan for MFers completed. Assumptions for Headline Results Indicators reviewed and refinements reported). Workshop with external expert(s) to determine indicators of sustainability and define monitoring programme.
2014-15	Technology and tool evaluation on MF. Establishment of national network.
2015-16	Technology and tool evaluation on MF. Reporting through national network

2016-17	On-farm evaluation continues. Reporting through national network. Evaluation of MF approach.

Detailed activities (2013-14)

(Oct - Dec 2013). Workshop on Monitor Farms with INIA/PA. Discuss purpose of MF and define operational objectives. Develop criteria for baseline definition and stratification on economic status and innovation potential. A MF Coordinator will be appointed and their workplan defined. An operational plan and MF operating budget will be defined.

Jan- June 2014. Monitor farms INIA/PA will be selected from stratified groups to form a group of 15 farms that will form the focus of the project. A local technician will be appointed to support the monitor farm team and carry out project initiatives in implementation and evaluation. Meetings will be held in both regions to establish baselines for each farm with physical, economic, social and farmer goals defined for each MFer Training plan for MFers completed through workshop with Tools, Pastures and Extension. Workshop with external expert(s) to determine indicators of sustainability and define monitoring programme.

July 2014 – June 2015. Establish a national network of family farms centred on the MFs (INIA and PA). Provide technical and business development training and monitor progress. Review and adapt as necessary.

Output 2. Decision 'Tool Box' for economic, social, productivity, and environmental outcomes developed

The monitor farm network can provide an environment for farmers to compare goals and monitor performance. Setting targets for animal production, monitoring progress and determining the feasibility of proposed changes to the system depends on good information to inform strategic and tactical decisions. Tools are available to assist with measured accurate information gathering that will enhance the confidence of the decision maker that the farm operations are delivering the expected outcomes. The information gleaned from the use of the tools allows for greater response times and thus lessens the risk of unforeseen outcomes. This therefore enables greater accuracy in meeting target pasture and animal targets as well as financial and social goals. s. We identified a range of existing decision support tools (e.g. financial budgets, farm system simulation, weighing scales, scanning, pasture growth meters etc.) that are a being

tested by PA and INIA. There is also the opportunity to enhance the capability of both PA and INIA staff to operate and use these tools with farmers. We identified the opportunity for the introduction of business planning tools such as farm economics and for increasing the effective use of tools in learning and decision making. Interest is in tools similar to the New Zealand model Farmax that matches pasture profile to animal requirements and optimizes the farm system; feed budgeting tools, farm economics, soil nutrient and Green House Gas budgets. We have identified a gap in tools that integrate the impact of changes in farm practice on farm economics, productivity and environmental outcomes so that the consequences of hitting one target does not compromise the reaching of the others. Effective use of tools is very determined by the data available and therefore as we identify and implement tools we will also have to ensure ease of data collection and this is tied in with output 1.1 where development of a network of monitor farms will greatly enhance the richness of data availability.

General outline Output 2. Decision support toolkit	
Date	Key components
Jan-Jun 2014	Undertake a stock take and analysis of tools in use appropriate for MF. Selection of 3-5 decision support tools to develop for MF and extension (list to be provided to MFAT in progress reporting). Establish development and evaluation programme (Mar 2014). Develop farm business plan template and run demonstration workshop to train INIA and PA in the use of the template on MFs.
2014-15	Tools/models identified above under development with Uruguayan counterparts. Toolkit development and implementation integrated with Monitor Farms. Adoption strategies developed for different farmer groups.
2015-16	Evaluate tools on Monitor Farms and design a decision-making toolkit for family farms
2016-17	Evaluation and improvement of decision-making toolkit for family farms

Detailed activities (Jan – Dec 2014)

Undertake a stock take of tools and data and use and tool selection to undertake enterprise analysis. Interviews with INIA and PA to develop criteria and inventory. Develop farm business plan template and run a demonstration workshop to train INIA and PA in the use of the template (Mar 2014).

Initiate links with GRA methods for application on Monitor Farms; Group monitoring towards the business plan goals put in place in monitor farms for review twice yearly (June 2014); Design a suitable module (e.g. Feed budget) for monitor farms for improved animal productivity from family farms (June 2014);

Design a family farm decision support toolkit with implementation plan, applying lessons learnt from PA Knowledge Integration 2 to tool development and implementation (Dec 2014).

Theme 2: - Productive and Persistent Forage Systems

Leaders: Trevor Jackson, Phil Rolston, Alison Popay (AgRe); Nora Altier INIA

Uruguayan Team: Federico Rivas, Elena Beyhaut, Marco Dalla Rizza, Noelia Casco, Stella Zerbino, José Terra (PSA), Miguel Sierra (GVT), Monica Rebuffo

Under this theme, the causes of poor establishment and persistence will be identified, and options to overcome these limitations developed for farmer evaluation on monitor farms to reach the target of raising average pasture production by 700 kg/ha/yr (Appendix F3 and F6). Achieving establishment and persistence of improved pastures to provide quality livestock feed at the right time has proven difficult in Uruguay, but overcoming these problems will have major benefits for the family farm and Uruguayan economy. Projects within this theme will develop and assess new methods and technologies for Uruguayan farmers to overcome constraints and achieve sustainable, high quality pasture production. INIA has established that pests and diseases, plant vigour through lack of symbionts, soil fertility and drought are all factors limiting the introduction of new, productive, varieties/species of forage plants into the native pastures and into new cultivated areas.

The forage and pasture development programmes of INIA and WrightsonPas have selected and tested varieties of grasses and legumes which show improved performance and indications of better persistence in the target zones. These will be introduced into the monitor farms and performance monitored under farming conditions. The Biological Inputs (Bioinsumos) group will contribute elements that will rapidly be brought into use with local agri-business companies (e.g. Legume inoculants and pasture endophytes) and some more fundamental elements, such as use of seedling protective and growth enhancing microbes which will require longer development, but promise a very high return to the pastoral sector. The NZ team will assist the Uruguayan Sustainable, High Quality Pasture team to select, develop and prioritise new varieties or technologies for introduction into farming systems through the monitor farm programme. The project team will also work with INIA regional field teams to assess impact and benefit of new technologies and recommend validated technologies for uptake by Uruguayan farmers.

Sustainable pastures programme. Key elements:

1. Determine the importance of limiting factors in pasture establishment and persistence (e.g. pests and diseases). Establish appropriate environmental indicators for environmental sustainability. Link with surveys of monitor

farms in development areas (PA, INIA Family Farms). Development of methods for assessment and plans for evaluation.

2. Evaluate new technologies (endophytes, microbial amendments) to improve establishment and increase pasture persistence on family farms.
3. Evaluate pasture species, forage and conservation crops for productivity and persistence in farm systems and development of integrated systems for management

These elements are combined into project Output 3; Appropriate pasture productivity improvement technologies selected, applied, tested and demonstrated on monitor farms.

Activities for Output 3 are divided into two, related subgroups; 3.1 Improvement of natural pastures and 3.2 Introduced forage improvement. The background and rationale for the activities is provided in Appendix F 2.

Date	**3.1. Review, prioritise and test new technologies for introduction of legumes into natural pastures**
Oct-Dec 2013	Define plan. Appoint seed technologies technician (STT) and technician cofunded with WPAS.
Jan - Mar 2014	Review of technologies and previous results for oversowing appropriate to FF systems with external expert and prioritise and establish experimental programme.
Apr-June 2014	Study tour to NZ by INIA scientists on advances in seed technologies
2014-15	Testing of new technologies on MFs - Evaluation of trial results
2015-16	Continued experimentation and evaluation of proven technologies against current standards on FF properties
2016-17	Continued experimentation and evaluation of proven technologies against current standards on FF properties

Date	3.2. Review data and implement forage improvement programmes in the family farm focus zones
Oct-Dec 2013	Define plan with pasture team
Jan Mar 14	Review of technologies and previous results for pasture establishment and performance appropriate to FF systems with external expert. Prioritise and establish experimental programme.
April-June 14	Establish methods and determine sampling plan on existing INIA (and Wrightson) trials
July - Sept 14	Pest monitoring and management workshop.
July - Sept 14	Workshop on endophyte technologies (with WrightsonPas and AgResearch Endophyte programme) (Time to be determined)
2014-15	Field testing of “persistent” species in FF (From Spring 2014).
2015-16	Evaluate persistence and performance of selected species on family farms
2016-17	Continued evaluation

Theme 3. Effective Rural Networks and Extension Systems

Leader: Geoff Mavromatis, Hermes Morales, PA

Uruguayan Team: Verónica Aguerre INIA, Lic. Guaymirán Boné *Alejandro Saravia Alvarez Francisco Dieguez, Nicolas Scarpitta Carlos Molina Riccetto* PA

Effective rural networks and extension systems, are required to support successful adoption and practice change on-farm. They include all those who will assist and encourage family farmers as they consider and adopt change on the farm and the processes they will use. During the inception phase we identified the following types of networks: other farmers, suppliers, buyers, private consultants, UdeLaR FUCREA, INAC, CNFR, DGDR, PA, INIA and NGOs. The programme of rural development run out of the DGDR, is acutely aware of the influence of rural networks in attempting to reach their outcomes. They are using community boards to identify the dominant issues within local communities and are strengthening existing networks to build capacity for change. We will work closely with these networks in the departments (regions) where the monitor farms are located. These networks will be enhanced through increased collaboration farmer to farmer, and between farmers and organisations along the value chain. DGDR have also been training and accrediting private consultants to work directly with farmers to improve performance. This theme will address four areas that will influence the theme success. i) Extension/TT and strategy development capability; we will work directly with PA to develop their organization strategy with a focus on their role in innovation networks. ii) Evaluation design; we will build capacity in the ability to evaluate technology transfer programme success in achieving targets. iii) Decision making; we hope to raise farmer confidence in making change through better informed decisions and we will build capacity within PA and INIA in how and why farmers make decisions and how you ascertain this for use in targeting messages and designing extension programmes. iv) Network analysis; This was a need identified by PA staff who want to build their capability in knowing the people farmers seek assistance from and to identify how farmers want and receive information.

Output 4. Extension/technology transfer strategy developed and capability enhanced to implement strategy

The World Bank report noted limited extension services available to the family farm sector. This has been recognized by MGAP who are putting in place accreditation

programmes for technicians operating in rural communities and they have indicated that they will be supportive of the project interacting with these technicians in areas where our Monitor farms will be located. INIA have also acknowledged that they have to improve their technology transfer processes to ensure that their knowledge and technologies are adopted and contribute to impact. INIA see the Family Farm programme as a means to enhance their capability to be more effective in technology transfer. PA are an extension agency and they wish to update their role in Uruguay's innovation system to ensure effectiveness in a dynamic environment. The New Zealand project shares our partners' vision for effective adoption and practice change through collective (co)-innovation between agribusiness, farmers, researchers, extension, and policy partners. The New Zealand project can assist to facilitate this co-innovation.

This project will apply a new systems approach to technology transfer where webs of participants form innovation networks to co-develop solutions to issues. Problems are addressed through a mix of technologies, practices, policies and price changes. A well-functioning innovation system characterized by learning among organizations, strengthened collective capabilities to innovate, demand and supply driven science, knowledge brokers that foster dynamic interactions and networked based dissemination of all forms of knowledge. We will take a participatory action approach as it enables collaboration between all participants to work together to evaluate and optimize the innovation system. Through our inception phase we have identified those players who would participate in an innovation system i.e. PA, INIA, MGAP's community boards, and Agribusiness (MARFIG GROUP, WPAS).
The project will expose our partners to the co-innovation approach as it is being used in New Zealand across a range of primary production cases. We will use the principles to design the system in Uruguay and to identify and develop capabilities and the associated behaviours and knowledge sets required to act as levers to gain maximum system effectiveness. We will then develop and implement metrics that will allow evaluation of the impact of the activities. We will apply the approach as a case around each of the monitor farms and the principles that emerge will be disseminated within and out to other regions.

For an innovation system to be effective we have to understand the decision making of the participants and what motivates their actions. This project will provide guidance on identifying decision making styles and using segmentation to target the development and delivery of innovative solutions that will be adopted and evaluated. During our inception visit we identified a good range of data available from PA, INIA and the University of Uruguay that will be helpful in developing a framework to segment farmers to enable information sharing.

Date	Output 4. Extension
Oct-Dec 2013	Extension planning and development will be built around the Monitor Farm Programme. Review extension activities within PA, technology transfer activities within INIA and extension contracts being managed by MGAP. Prepare report and recommendations.
Jan-Mar 2014	Uruguayan extension technician appointed (0.5 FTE) and work programme developed. Analyse strategy, and develop program with each organisation to enhance achievement of extension/ tech transfer targets. Development of Farm Business Planning template. Pilot workshops with extensionists and farmers. Establish Monitoring and Evaluation framework for extension/ technology transfer activities.
Apr-Jun 2014	Tour for 6 Uruguayan counterparts to NZ to study Monitor Farm approach for beef and livestock development. Training for extension/ technology transfer agents in application of farm business planning tools. Evaluation of the role of vocational skill development in facilitating the uptake of new practices and technologies
2014-15	Ongoing development of extension/ technology transfer methodologies and agent capabilities. Possible pilot application of “farmer-to-farmer” training using accredited farmers. Strengthening capabilities of private sector (processors, input suppliers, banks) representatives in extension methodology. Evaluation of adoption of new practices and technologies, and the results achieved from the use of those practices. Establishment and trialling of methodologies to disseminate extension/ technology transfer capabilities from the Monitor Farms to other staff within INIA, PA and MGAP.
2015-16	Review, with INIA and PA, of extension/ technology transfer training and support provided by UdeR to new graduates. Review of wider dissemination of Monitor Farm results to other family beef farms. Development of strategy to optimise the use of relatively small resource in INIA and PA to benefit all family beef farms
2016-17	Evaluation of extension/ technology transfer strategies and capabilities, and the sustainability of Uruguayan structures to maintain the level of competence needed for effective ongoing uptake of new practices and technologies

Output 5. Rural networks trained to support effective change on family farms

Formal and informal rural support networks play a key role in supporting the family farm to meet its goals. Under a decentralization process the Uruguayan Government has encouraged local committees (Mesas para Desarollo) whose role it is to identify the priorities for their communities. We met with three such groups during our inception visit; Rocha and Tacuarembo. At one meeting in Tacuarembo the group there had been involved in a sheep project funded through MGAP where a farm plan had been developed for 16 properties over an 18 month period, but no means of evaluation was being implemented. Ensuring family farms are viable and profitable for the long term is a priority for these groups. Major concerns are around retention of young people in the community and giving them access to land through the colonization programme is seen as a means to assist retention. These people will need support to be successful.

These rural support networks fit into the innovation system described in output 4 and the work activities identified in output 5 will be integrated into 4. The rural support network activities will be embedded in the cases developed in output 4.

Date	**Output 5. Rural Networks**
Oct-Dec 2013	Evaluation of two existing rural networks based around the Monitor Farms to identify possible programme of training and support needed. Identification of possible M&E indicators for use in evaluating the impact of rural networks on farming performance.
Jan-June 2014	Rural Network programme for the first two pilot networks agreed by stakeholders and initiated.. Training plan developed with PA/INIA/MGAP and technician (Ur) appointed to assist decision making training (0.5 FTE). Initial training workshop completed on network governance and M&E of network activities). Linkages (roles and accountabilities) established between extension/ technology transfer; applied research; and rural networks within the project.
2014-15	Continuation of support and monitoring for rural network workplan in pilot networks. Evaluation of achievements with pilot networks and development of programme for wider application to other networks. Evaluation of Monitor Farms to assess state of rural networks around each farm, and opportunities and impedances to establishing more networks.

2015-16	Continuation of rural network workplan. Training for wider rural network personnel in key aspects of effective networks (as identified from pilot and from evaluations, including governance, communication skills and M&E. Training to be provided by Uruguayan counterparts, who have completed recognised train the trainer programme and demonstrated effective work in the field.
2016-17	Review of rural networks established and/or supported to build strategy to sustain these networks beyond this project. INIA, PA, MGAP, UdeR, and key farming stakeholders would be involved. Implementation of transition/ exit strategy.

Form(s) of aid proposed

The aid modality of a joint project has been selected as the most appropriate for the nature of this project.

This project is a contributor to the wider agriculture development programme being undertaken by the Uruguayan Government, through MGAP. Technical assistance has been requested from New Zealand in the areas where NZ is seen to have expertise, including pastoral farming systems, business-oriented family farming, agricultural research capability and farm extension services. The Uruguayan Government will provide staff, and research, extension and educational resources into this project, hence the need for the partnership agreement.

The governance structure proposed will ensure that this project remains aligned with the wider national initiative.

MFAT will enter into a Contract for Service (CFS) with AgResearch. The CFS will outline:

- The outputs and outcomes of the Activity, including the Results Framework and how these results will be measured
- The governance structure of the Activity, including the role of the Project Advisory Committee and the role of INIA *vis a vis* a separate agreement with AgResearch.
- The purpose of the Independent Assessment and the process for MFAT and AgResearch to take forward the recommendations, following mutual agreement
- The reporting and payment schedule.

- AgResearch will be responsible for the overall delivery of the Activity. AgResearch will sub-contract INIA to contribute towards the delivery of a number of components of the Activity, via a partnership agreement under the existing AgResearch/INIA Heads of Agreement. INIA may in turn sub-contract certain functions to Plan Agropecuario.
- AgResearch will also enter into a sub-contracting arrangement with WrightsonsPAS for the appointment of a jointly funded technician to support the delivery of components of Output 3.

This partnership agreement between AgResearch and INIA will articulate the following:

- **Specific outputs and activities** INIA and PA will deliver or contribute towards, the timeframes for delivery, and the resources required. All outputs are to be delivered in accordance to the summary of the activities in this ADD.
- Reference to **agreed targets, indicators and reporting methods for all outputs** that INIA and PA will contribute towards.
- INIA's and PA's annual **in-kind contributions** to the project

The sub-contracting agreement between AgResearch and PGG Wrightson Uruguay will articulate the following:

- **Specific outputs and activities** PGG Wrightson Uruguay will deliver or contribute towards, the timeframes for delivery, and the resources required. All outputs are to be delivered in accordance to the summary of the activities in this ADD.
- Reference to **agreed targets, indicators and reporting methods for all outputs** that PGG Wrightson Uruguay will contribute towards.
- PGG Wrightson Uruguay's annual **contributions** to the project.

Estimated programme budget and timing

The budget below has been developed using a 21 October 2013 start date resulting in an initial detailed plan and budget for 9 months, from Oct 2013 to 30 June 2014. The budgets align with the New Zealand financial year with budgets for 2014/15, 2015/16 and 2016/17 indicative and subject to confirmation after annual consultation with MFAT.

Overall the project has been budgeted to run from 21 October 2013 to 30 June 2017.

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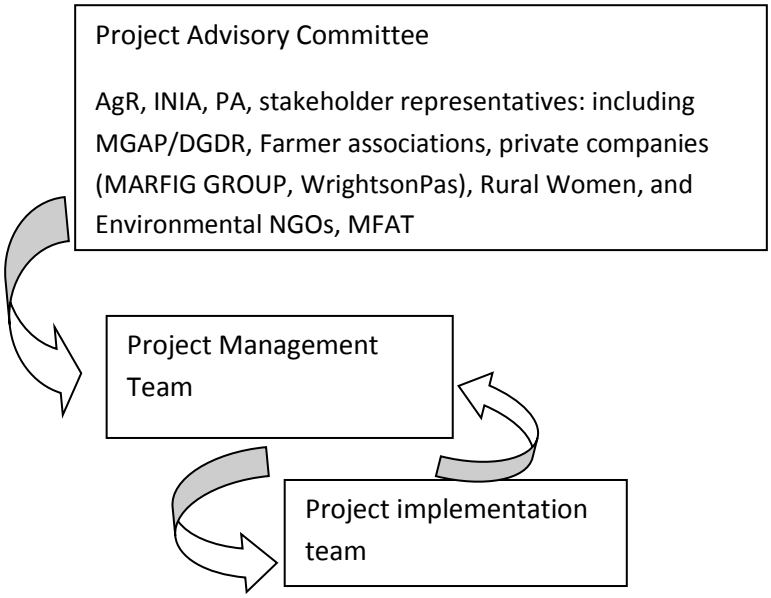
4: Implementation Arrangements

Management and governance arrangements and structure

Details of project management and governance are provided in Appendix E. The project will be managed by AgResearch and involve AgResearch led consultants working in collaboration with our Uruguayan project partners, INIA and PA. The project will be advised by a Project Advisory Committee consisting of AgResearch and local stakeholders. Management will be achieved through a Project Management Team of AgResearch, INIA and PA. AgResearch as MSC will be responsible for contracting and managing sub-contractors in the programme, and ensuring that work schedules are agreed and delivered. Budget management and reporting are also the responsibility of AgResearch.

AgResearch will develop an agreement with INIA through a schedule attached to the existing AgResearch/INIA Heads of Agreement (signed 2009). PA activities will be set out in a sub-agreement between INIA and PA. For details see Appendix E.



Implementation plan

The project will be implemented over a period of four years. Topics prioritised by our Uruguayan partners will be developed into sub units for action. The general process will

include problem analysis, identification of key constraints to progress, training, project implementation, results evaluation and recommendations for technology adoption.

The project will be developed within a systems framework. Best fit farming systems will define the project framework and identify appropriate intervention areas. Field problems may be addressed through tapping into the collective experience of the farmers, in on – farm trials, or by being transposed to the greenhouse or laboratory for development of tools and technologies to enhance productivity. New technologies will be tested in monitor farms to and evaluated for community uptake.

A suitable specialist will be contracted by MFAT in early 2015 (target March 2015) to undertake an Independent Assessment of work undertaken to date and assess, going forward, proposed:

i) technical activities, for the purpose of helping to ensure maximum farmer benefit; and
ii) approaches/methods for wider dissemination of project outputs to family farmers, for the purpose of helping to ensure maximum farmer uptake in the medium- to long-term.

The Independent Assessment will be done with input from AgResearch, INIA, PA, monitor farmers and associated family farmers, and other key stakeholders. It will help to validate the focus, outcomes and approach of the Activity and to inform the finalisation of work plans and associated resource and cost schedules for the remainder of the Activity. This is a chance to confirm development goals for the continuation of the activity, and any changes needed to the work plans/resource and cost schedules for the remainder of the Activity

The draft Independent Assessment report will be provided to AgResearch and the Project Advisory Committee for comment. The final report will be provided to both MFAT and AgResearch. MFAT and AgResearch will discuss the incorporation of the report's recommendations into the Activity in future years.

Results measurement & monitoring and evaluation

The Results Measurement Table and Monitoring and Evaluation Framework are provided in Appendix A.

The Results Table shows the outputs that the project will deliver and the outcomes that can be expected as the outputs are applied by farmers, researchers, extension agents and members of the value chain.

Not shown on the project Results Table is the contribution that this project will make to the wider agricultural development initiative that is being undertaken by the Uruguayan Government. The Ministry of Agriculture has been charged with ensuring that the funds available are used as effectively as possible to achieve national goals. The Ministry has

indicated that they will be using the processes and achievements from this project as models for their other initiatives.

The results will be reported as the completion of the outputs and as the impacts on outcomes. Adoption of farm practices and improved farm profitability are dependent on much more than this project, and the challenge is to report on changes and the influence that this project may have had. For example if farm profitability rises as a result of increased prices from processors, then that could hardly be credited to the project. Conversely if farm productivity increased yet farm income dropped as a result of lower prices, then a claim could be made that project outputs have reduced the negative impacts of a change in market conditions.

Monitoring and Evaluation on changes on-farm have similar challenges. As a farmer contemplates changing farming systems or practices he or she will go through a number of stages. They will need to be aware of the possible change. They will need to evaluate the change. They may trial the change. If they decide to adopt the change then it may take some time before the changes show up in farm productivity or farm profits, especially if the measurement is of the number of calves born, fattened and sold. Along the way there will be measurable changes to animal growth rates, feed availability, etc. There is no one measurement that can properly reflect these changes across time, unless the measurement period is very long term, or reflect the changes along the way.

Measurement in the M&E Workplan will include both soft and hard data – awareness and attitudinal change, as well as dry matter production and animal performance. Changes in awareness and attitudes will be measured by farmer survey. Similarly changes in farming practices, and eventually changes in farm production and farm profit. These changes will be measured in different groups so that the monitor farmers, the monitor farm community group farmers, and the wider community farmers, can be compared. In that way the effectiveness of community networks can also be assessed.

Unlike many other development projects, this programme is led by scientific research organisations (AgResearch and INIA) where quality control of outputs is maintained by continuous improvement through upgrades of technology and training (e.g. IT) and group and individual performance is measured by internal and external peer review. The quality of outputs, recommended technologies, will be subjected to an internal peer review process at both INIA and AgResearch. External review of science quality is carried out through debate and discussion with peers including formal publication in both technology transfer and scientific publications. In addition, and, in this case most importantly, outputs and recommendations will be evaluated by the farming community through field days and technology publications.

The evaluation will look at the rates of adoption in relation to the degree of contact with the project, and therefore the effectiveness of this investment for the wider family farming sector.

Sustainability issues

The sustainability of the benefits from this project will be determined by the degree of success that this project can demonstrate. Once the donor support provided through this project ceases then the factors that will determine sustainability are:

- The quality of the systems developed. Resilient systems that can cope with drought, and provide reliably satisfactory incomes. Systems that farmers want to adopt, and that are suited to the Uruguayan environment.

- The skills and knowledge of the farmers. Farmers confident and able to make effective farm management decisions, using new technologies and practices, and operating cooperatively. Farmers able to continue to develop their farms.

- The systems in place to develop and manage research and extension programmes. Systems that are flexible enough to cope with changes in the farm business environment, yet still scientifically sound.

- The capability of technology transfer and extension staff. Applied research and associated farm management systems must remain credible, if effective technology transfer is to be achieved. Capable staff can maintain the relevance of programmes as circumstances change. The success of the various initiatives will be directly attributable to the calibre of MGAP, INIA and PA staff.

- The leadership capability of those involved in rural networks. Processes for bringing people together, with shared aims, so as to take advantage of the opportunities that co-operation can bring, requires strong leadership skills within the rural community.

All these factors are addressed in the design of the project. The need for a transition strategy at the conclusion of the project, where responsibilities pass from the project team to individuals and organisations is built into both the project governance and management structures, and the emphasis on building systems and capability. The project is working in partnership with those organisations that already have the mandate for the activities that will be undertaken, and who have requested support to enhance their performance.

In addition the project is adopting a more inclusive approach through the strengthening of the members of the rural network, and encouraging their participation in applied technology priority setting and extension activities. This is a significant increase in the

level of support for the family farmers. This expansion will enhance the adoption of new technologies and practices, and increase the likelihood of successful farm business outcomes from the use of new farming systems.

Finally there is the strength that this project enjoys from being seen as at the core of the national agriculture development programme being adopted by the Uruguayan Government. The project outputs and outcomes are embedded in this 10 year national programme. Provided this project delivers the results that it has promised, the project outputs will be sustained through the national programme.

Procurement arrangements

The bulk of this project involves providing technical assistance. Assistance will be given for analysis, training, capacity development and evaluation by the AgResearch team and sub contractors. Terms of reference will be developed for each position in the project team, with specific deliverables defined for each input. The selection of people for these roles will be made against these terms of reference, and against a person specification. This specification will include the skills and experience expected, and criteria describing the development principles expected to be demonstrated. Support for gender equity, commitment to partnership, support for environmental management, and placement of the Uruguayan farming family at the centre of the project, are examples of the principles expected to be upheld by project team members.

Equipment purchases will be relatively minor. AgResearch activities are covered by strict protocols in line with NZ Government policy. Where appropriate purchases will be made in Uruguay to improve access to servicing support, and enhance the sustainability of the equipment. The purchasing policies of the Uruguayan Government will be complied with for these purchases. An asset register will be maintained.

Financial management systems were discussed with INIA and PA and found to be efficient and have worked well in previous contracts.

AgResearch will also confirm to MFAT that it has undertaken reasonable due diligence on INIA and WrightsonsPAS as its sub-contractual partners.

Overarching policy issues including gender, human rights and environment

Climate change adaptation and meeting appropriate environmental management standards are oucomes of this project. The resilient farm systems that are developed

will need to optimise farm income while being able to be sustained through drought cycles. The Uruguayan Government has indicated that it wishes to invest in green labelling as part of the development of Brand Uruguay. Since this project fits beneath the umbrella of this national programme, and since MGAP will be a member of the Project Advisory Committee, there will be accountability for environmental outcomes directly to the Uruguayan Government.

The role of gender has been addressed through three separate paths. Firstly there is the makeup of the project team. INIA has a non-discriminatory policy for hiring and advancement and has a high proportion of women staff in all roles, and AgResearch is represented by men and women. The second aspect is the inclusion of women in project governance. This has been addressed by having a representative from Asociación de Mujeres Rurales del Uruguay on the Project Advisory Committee. Finally there is the need to address issues affecting women farmers, and the women members of farming families. Specific activities will be included that are aimed at improving the farming and business knowledge of the women. The design and implementation of these activities will take account of traditional barriers to women's participation in training, such as timing, location, transport and child care duties. A programme similar to the agribusiness literacy programme recently adopted by Tainui women is envisaged, but will need to be confirmed as relevant by the Uruguayan women. This programme was designed and run by women for women. In addition there are certain farming functions for which the women are currently responsible, or could assume responsibility. Calf rearing could be an example of the former, and farm record keeping an example of the latter. Extension activities will be designed specifically for women around these topics.

Critical risks and risk management strategies

The rate of farmer investment in new technologies or adoption of new practices is always vulnerable to climatic, animal health, and market factors, especially those that affect farm income. A significant drought would affect the ability of farmers to establish new pastures or forage, and the ability to service debt. An outbreak of foot and mouth disease would shift farmers to a survival mode, rather than development and the restrictions on the movement of people and animals would curtail demonstrations and applied trials.

The project has no control over either of these scenarios, and would have to quickly review existing work plans. Research on research stations could continue. Commercial uptake of research results would be slowed. The net effect would be to slow project implementation. Uruguayan farmers have a history of surviving with these situations in the past, and will continue to do so. The project would have to extend its time frame until it was appropriate to resume full activity.

Without a disaster type occurrence the critical risk to the project is that we fail to bridge the gap between the development of new knowledge and technologies and their uptake by the farmers.

We will mitigate this risk through:

- Putting in place monitor farms with participating farmers connected to farmer agencies such as Federacion Rural and including stakeholders who are part of rural extension networks from a range of business that support farmers e.g. banking, agribusiness, private consulting, policy agencies.

- Ensuring that we have a full understanding of farmer needs and that the technologies are presented within a farm system context that demonstrates the potential benefit across a range of outcomes including farm profitability, social implications and environmental.

As mentioned earlier there have been a number of examples in Uruguay where direct transfers of technologies developed in New Zealand to Uruguay have failed to deliver. We will address this by learning from what has gone before and by applying an adaptive management approach aligned with an understanding of farmer decision making criteria.

Other risks to this project could arise if there are non-aligned goals. The Government is keen to see increased production and increased exports to help the economy. Farmers focussed on farm income, may not see this optimised by maximising production. Particularly if farm costs for additional production exceed additional income. Farmers may also have limits on their time as they balance farm business, family and community commitments.

Processors want increased throughput in their plants, but perhaps with different carcase specifications and different times of supply than farmers may believe maximises their farm business profit.

The project design emphasises working with the value chain and strengthening and effective rural networks. If compromise and understanding is needed, and the project remains successful, the key will lie in communication. The vehicles are being established through this design, to facilitate effective communication.

An internal risk is that the project is too ambitious. Too ambitious in the breadth and depth of what it believes it can accomplish, and too ambitious in what it believes can be achieved on-farm and in partner organisations. The capacity of partners and targets in development projects is frequently overestimated.

The topics included in the project have come from INIA and PA, and are part of those organisations' overall work plan. The assumption has been made that INIA and PA will be aware of their capacity and other commitments, and that their expectations of themselves has been properly assessed. The eight months from project inception to the start of the next round of project work planning, will provide INIA, PA and AgResearch to reassess this capacity before research is fully underway. If there needs to be an adjustment then the expectation is that outputs within Theme 2 would be reprioritised, and rescheduled.

The rate of change on-farm will be closely monitored as part of the monitoring and evaluation work plan. The results will be used to set the next year's targets, and to review the methodologies applied in the farm extension and rural networks activities.