Strategic Plan 2016-2020

Vision 2030

INIA

National Institute of Agricultural Research

URUGUAY

Strategic Plan 2016-2020

Vision 2030

National Institute of Agricultural Research
URUGUAY

Edited by INIA's Communication and Technology Transfer Unit

National Institute of Agricultural Research

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INTRODUCTION

This document presents the Institutional Strategic Plan (ISP) defined by the National Institute of Agricultural Research Uruguay (INIA) for 2016- 2020, which is based on a medium-term vision to 2030. Each instance of the ISP development is in itself a performance review, an opportunity to reflect on the future and a formal commitment that the institution makes before its stakeholders to redesign and adjust the institutional strategy. However, planning itself is a permanent and dynamic process that constitutes a critical tool to face uncertainties and adapt to constant changes in the global and national context.

These ambits promote instances of co-planning and prioritising, as well as problem identification and opportunities to develop, allowing the Institute to focus on its R&D+i actions. Strategic planning is conceived as a continuous and flexible process of permanent consultation and reflection that defines the general focus of the organisation and its goals, incorporating the design and implementation of specific action plans for short, medium and long terms, granting the incorporation of new topics.

In relation with prior years, in the process of developing this new Strategic Plan, special emphasis was placed on achieving a high level of precision and focus on the definition of proposals, presenting objectives and what goals to achieve, both regarding research, technology transfer and institutional development, as well as the identification of instruments that may achieve institutional goals. The ISP is thus transformed into a powerful tool, permeating through the entire organisation, making its management more efficient and dynamic.

> Plan Development Process

The discussion phase was organised around seven production systems that define INIA´s research agenda: (I) Agriculture-Livestock Production System, (ii) Extensive Livestock Production System, (iii) Intensive Plant Production System, (iv) Dairy Production System, (v) Family Farm Production System, (vi) Forestry Production System and (vii) Rice-Livestock Production System.

This process involved all INIA staff through their participation in internal workshops to discuss the identification of demands and define objectives and goals to prioritise in the agenda (Figure 1).

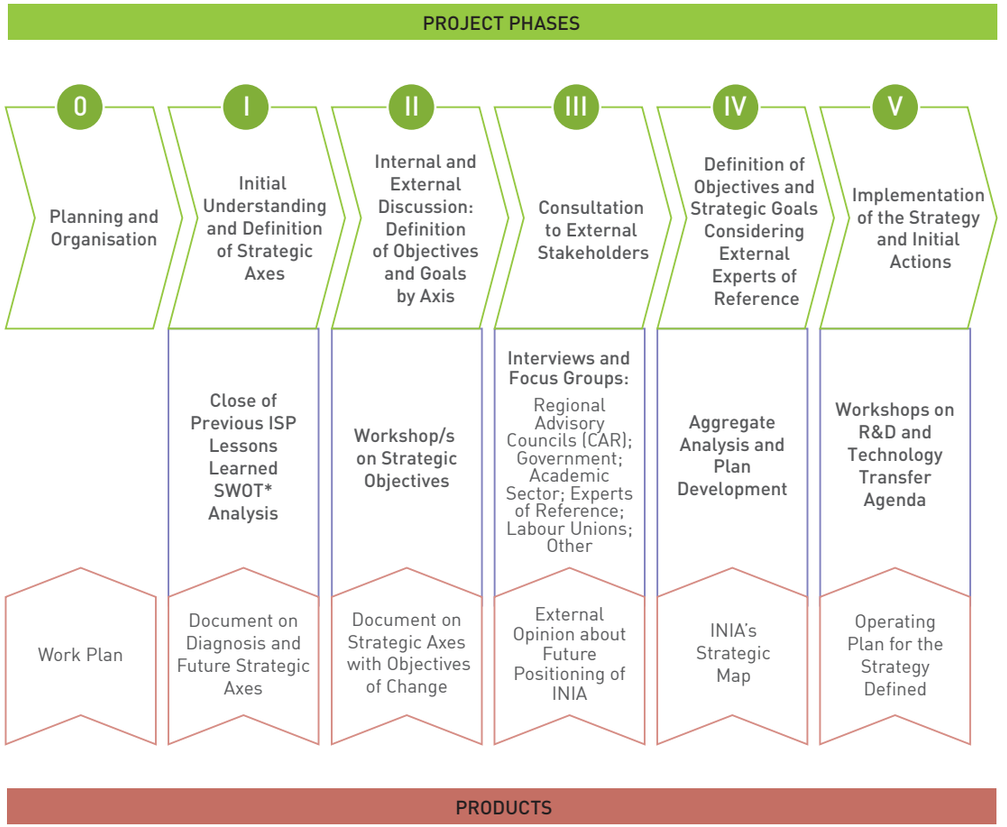


Figure 1: Schedule and planned phases in the development of the Institutional Strategic Plan.
*SWOT: strengths, weaknesses, opportunities, threats.

Additionally, external experts of reference in the public and private sector were summoned to share their visions (Figure 2).

External Stakeholders Appointment

Exchanging ideas and suggestions with institutional stakeholders important to the organisation about strategic objectives and major institutional lines of work defined in the previous phase.

Figure 2

At the same time, 74 in-depth interviews were conducted on government representatives, the academy and private sector institutions, both domestic and international.

Finally, the research agenda for each production system was defined with these inputs.

The internal environment analysis provides information about the internal dimensions of the Institute to identify its strengths, weaknesses, opportunities and threats.

In regard to human capital, INIA had a total of 664 staff members (permanent and non-permanent) on 31th December 2016. The staff is distributed as follows: 202 staff members are university professionals (UP), 7 are university interns and 462 are support staff (SS).

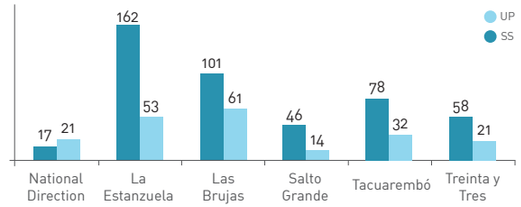


Figure 3: Distribution of INIA´s staff by Experimental Station.

Of all university professionals 125 are researchers. Their distribution by research area is shown in Figure 4. Their presence in the territory allows close interactions with the production sector thus being able to identify its problems and opportunities.

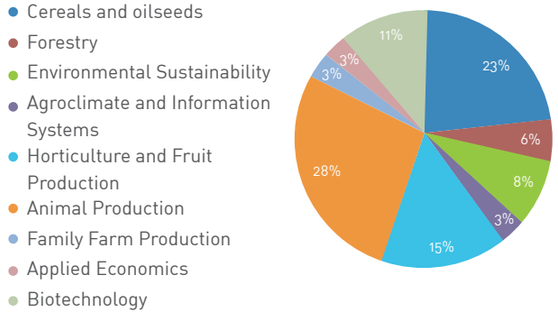


Figure 4: Distribution of researchers by research areas


National Direction


INIA La Estanzuela

INIA Las Brujas


INIA Salto Grande

INIA Tacuarembó


INIA Treinta y Tres

> Internal Environment Analysis

Regarding educational level, 80% of INIA's university professionals have taken or are taking post-graduate courses.

Specifically regarding researchers, 57% have a Doctoral Degree or are in the process of obtaining it, while 28% have a Master's Degree or are in the process of obtaining it. In summary, 85% of INIA's researchers have a postgraduate degree or are in the process of obtaining one (Figure 5).

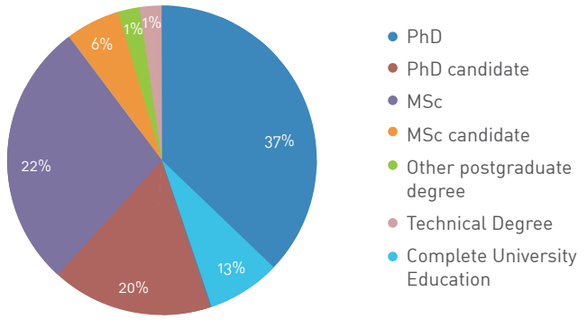


Figure 5: Distribution of researchers according to educational level

In terms of finances, the greatest revenue comes from the private sector through the tax on the first sale of agricultural and livestock assets (additional portion of the Imeba tax - Tax on the Transfer of Agricultural and Livestock Assets) and the Government´s counterpart. This amount represents approximately 82% of the resources managed by the Institute (Figure 6).

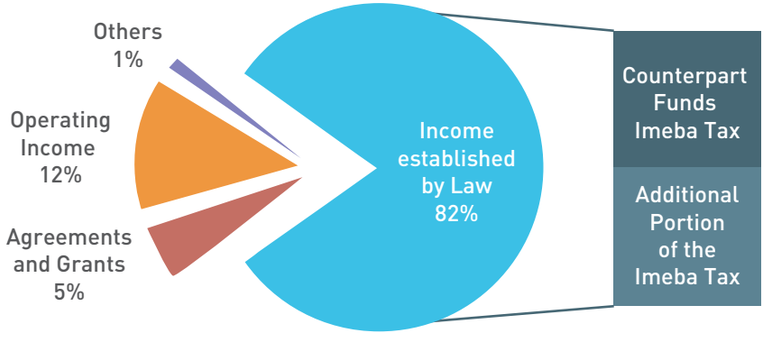


Figura 6: Financing Structure 2016

This financing model, which is directly linked to the sector´s production and marketing has proved to be an appropriate mechanism to associate the activities and output of the Institute with its beneficiaries and their potential contribution. The model has followed a positive spiral path with mutual strengthening (product - technologies - contribution).

> Análisis de ambiente interno

Finally, as a basis for the critical analysis of areas of improvement in the internal processes of the Institute, a review was made of the reports and recommendations resulting from a set of diagnosis exercises previously carried out by external consultants and INIA's internal teams.

As a result of this analysis, the following critical areas where INIA must implement improvement actions in the new Strategic Plan were identified:

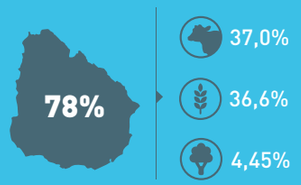
> Institutional development
> Strengthening the current R&D+I capabilities
> Development of new research capabilities
> Training and development of human resources (HR)
> Strengthening of capacity-building in Planning, Monitoring and Evaluation (PM&E)
> Strengthening of technology transfer (TT)
> Knowledge management and institutional learning

Figure 7 shows graphically the suggested actions in each of these areas.

Institutional development	Promoting creativity Promoting scientific quality and relevance Foresight capacity Contributing to public policies	Globalisation and network integration Incorporating new strategic areas Focus on specific goals Multidisciplinary and multi-institutional approaches
Strengthening of current R&D+I capabilities	Sustainability of natural resources Production systems Prioritisation processes and tools	
Development of new research capabilities	Modelling Social sciences Environmental indicators Promoting technological innovation Informatics and bio-informatics	Socioeconomics Animal health Statistics Environmental impact of commercial agriculture Genomics and quantitative genetics Digital agriculture
HR development	Induction process Strengthening teamwork Profiles of UP	Continuing career plan Leadership development
Strengthening of capacity building in Planning, Monitoring and Evaluation (PM&E)	Development of high-quality projects Focus on the production sector Solving technological issues Prioritisation and selection of projects	Definition of clear goals Strategic focus of the FPTAs Evaluation culture
Strengthening technology transfer	Strengthening the articulation role Incorporating business models to R+D+i projects Promoting technological innovation Defining the scope of the role of INIA Quality and impact of TT	Social research Identifying barriers to adoption Representativeness of Working Groups and CAR Integration Intellectual property management Incorporating sectoral technical experts
Knowledge management and institutional learning	Strengthening learning culture Making accumulated knowledge available Strengthening policies of publication of results Ex-post evaluation and learning Peer-reviewed academic publication	

Figure 7: Review of previous diagnoses - Summary

AGRO-INDUSTRIAL EXPORTS



MAIN PRODUCTS

- Beef **22%**
- Cellulose **19%**
- Soybean **13%**
- Dairy Products **9%**
- Rice **7%**

MAIN DESTINATIONS

- China **28%**
- Brazil **15%**
- Netherlands **9%**
- Germany **7%**
- United States **5%**

PROJECTION OF EXPORTS FOR 2017 **6%** ⇧

Information developed on the basis of studies of Uruguay XXI (www.uruguayxxi.gub.uy)

In the process of the discussion of a new Institutional Strategic Plan, it is important to identify global trends, and how these impact on the development of the agricultural sector in the future.

In our region, in recent years there has been a firm growth of the sector through the marketing of commodities and biological products with varying degrees of knowledge and technology incorporation. A key element of this growth has been the presence of China, which has become an important importer of food, with soybean being the main product. Moreover, in countries with great purchasing power, there are some very different requirements regarding the consumption of food with high added value and different attributes, which implies the possibility of development of future market niches.

Thus, quality assurance and safety of environmentally friendly and socially responsible produced food become increasingly important.

According to FAO forecasts, the world's population will reach 8,400 million people by 2030, with a global demand for food that would increase by 50%, with a growing consumption of animal protein and a higher percentage of the population with access to higher quality food. The perspective is to find increasingly demanding consumers who aim at a better life quality, with greater awareness of environmental and social issues, food and human health.

> External Environment Analysis

On the other hand, this population increase and its access to more food with better quality by new sectors of the population requires the development of technologies to increase the production of food with an efficient use of resources. The opportunity to provide solutions from the agricultural production through eco-systemic services should also be emphasised. It is critical that these should be measured and incorporated into the value of the products.

Some technologies in the agri-food sector are envisioned to be upgraded for widespread use and could have a great impact and cause important changes in the medium or long term. These developments intend to face some of the current problems or disputes that affect traditional production, such as input availability, production paces, environmental, logistical, social and ethical aspects, amongst others, and can surely become competitive production alternatives.

At a political level, Uruguay has set the goal of producing twice the food it is producing now by 2050, considering population growth and the projected demand for food in the future. These objectives are included within the concept of "Sustainable Intensification" that is being promoted by government policies, particularly by the Ministry of Livestock, Agriculture and Fisheries (MGAP). Obviously, these efforts must be underpinned by technological development in order to achieve these objectives. In this context, Uruguay must strengthen its commitment to science so as to develop new technologies that will allow us to obtain better crop yields, to adapt and mitigate the effects of climate change, to improve efficiency in the use of inputs derived from non-renewable sources and to ensure the quality, health and safety of our products, so as not to lose competitiveness.

In this same line, at the beginning of 2015, facing the definition of a new Management Commitment, INIA agreed with the Ministry of Livestock, Agriculture and Fisheries a set of strategic areas for the next few years. As a general framework, INIA focused its actions on three main objectives:

Sustainable Intensification	Family Farm Production	Scientific Quality
Developing knowledge and appropriate technologies for the process of sustainable intensification of production systems in Uruguay	Developing technologies and non-technological innovative skills that allow to incorporate and add value to small-scale and family farm production	Participating directly in the expansion of high-quality scientific knowledge, always focused on problems and in tune with the institutional mission.

Figure 8: Major objectives agreed upon

Taking these analyses into account, the guiding principles of the positioning of our Institute in the global and national contexts were defined (Figure 9).

Global Framework

Larger population with increased demand for food and quality requirements.

Greater restrictions of entry to high-value markets and greater demand for food origin information.

National Context

1. Promotion of competitiveness
2. Sustainable intensification
3. Adaptation to climate change
4. Rural development
5. Strengthening of interinstitutional articulation

We achieve greater and better integration into global markets.

We build confidence by producing more with fewer resources and better quality.

INIA

We collaborate with the design of public policies for the development and international insertion of the agricultural sector.

We develop, document and transmit scientific and technological significant knowledge for the agricultural sector and the society as a whole.

We develop science and technology to improve the productive performance, life quality and the sustainability of farmers.

We are forward thinkers, we plan and coordinate with others and evaluate with strategic intelligence.

We efficiently manage the resources rendered by society.

We cooperate with highly qualified partners at national and international levels.

Figure 9

To underpin this positioning, a set of Strategic Axes was defined, to serve as the basis of INIA's activities in the period 2016 - 2020, with projection to 15 years.

I. Scientific and technological excellence without losing closeness and transfer to farmers

II. Greater focus on research and transfer efforts, with a nation-wide vision (reorientation, review and decision processes)

III. More and better articulation, focusing on strategy: interinstitutional and interdisciplinary

IV. Promoting and managing an anticipation culture and forecasting with both local and international visions

V. Valuing the contribution of INIA by improving the communication of R&D + I achievements

VI. Diversifying funding sources

VII. Contributing to training scientists and technicians of excellence in the agri-food area

VIII. Scientific and technological contributions to the development and implementation of the "Sustainable Intensification" concept in the agricultural sector

On the basis of these guidelines, the Institutional Strategic Map (Kaplan and Norton, 2000) was defined, which reflects, in addition to our Mission and main processes, the main objectives to achieve INIA´s proposition, as well as the development and strengthening of the strategic processes and resources of the Institute (Figure 10).

Mission	**Generating and adapting knowledge and technologies to contribute to the sustainable development of the agricultural sector and the country, considering State policies, social inclusion, and market and consumer demands**					
	We develop science and technology to improve the productive performance, life quality and the sustainability of farmers (SG 8).		We collaborate with the design of public policies for the development and international insertion of the agricultural sector (SG 1).		We develop, document and transmit scientific and significant technological knowledge for the agricultural sector and the society as a whole (SG 2).	
Value Proposition	Focusing the institutional actions on problems solving and detecting opportunities for the production sector (SG 3).	Developing and validating products and significant technological processes for the agricultural production systems (SG 1).	Developing scientific - technological information to support to the design of public policies (SG 8).	Training excellent researchers in the agri-food area (SG 7).	Generating knowledge of scientific excellence (SG 1).	Valuing the contribution of INIA by efficiently managing the knowledge and communication of the R&D+I achievements (LE 5).
Main Processes	Demand articulation		Research		Development, adaptation and validation of technologies	Technology transfer and innovation promotion
Strategic Processes	**Dynamic management of the institutional strategy**					
	Promoting an anticipation culture , long-term thinking, prospective and strategic intelligence (SG 4)					
	Strengthening strategic planning, monitoring and evaluation to promote an efficient management of the Institute (SG 4)					
	Strengthening the focus of the Institute's actions on the fulfilment of goals and key performance indicators (SG 4)					
	Focusing on research and transfer efforts with a nation-wide vision (SG 2)					
	Efficiently managing the resources that society renders and diversifying the sources of funding (SG 6) (LE 6)					
	Increasing and focusing on interdisciplinary and interinstitutional articulation at national and international levels (SG 3)					
	Training and developing human capital (SG 1)					
	Improving knowledge management as well as information and communication systems (SG 5)					
	Improving communication, dissemination and marketing of results and technology products (SG 5)					
Tangible and Intangible Resources	Working with highly qualified human capital	Ensuring R&D+I infrastructure, equipment and platforms	Promoting a strong commitment of collaborators with the institution and service vocation	Maintaining a governance model of public-private funding with a high degree of flexibility to encourage efficient management	Maintaining decentralisation in the national territory with a strong connection and closeness to stakeholders in the production sector	Strengthening further links with national and international R&D+I stakeholders

Figure 10: Institutional Strategic Map. Note: (SG) Strategic Guidelines

In addition, the goals for the strategic institutional objectives were defined, as described in Figure 11.

Figure 11: Some proposed goals

:: Institutional Management

Regarding the strengthening of institutional management, six main objectives were identified in the new institutional strategy.

I. Promoting the development of human capital

II. Strengthening the national and international cooperation strategy

III. Promoting agricultural bio-business and improving the intellectual property valorisation process

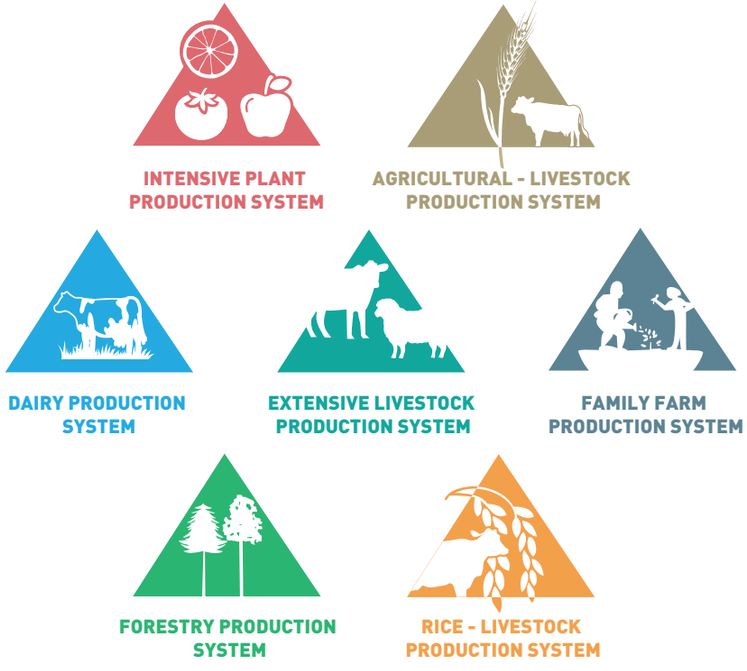
IV. Developing an Institutional Strategic Intelligence with a nation-wide vision

V. Updating the management system of projects executed by INIA

VI. Developing a system of performance indicators

:: Research and Development

The research and development agenda is distributed in seven production systems:



In turn, the research agenda will be structured in five Major Issues

1 SUSTAINABLE INCREASE OF PRODUCTIVITY
It involves all research problems or opportunities that focus on the production system under a systemic approach, taking into account environmental, economic and social sustainability.

2 PRODUCTIVE EFFICIENCY
It focuses on maintaining high efficiency levels in the production process, measured by the input-output ratio and the diversification of production.

3 QUALITY, SAFETY AND DIVERSIFICATION OF PRODUCTS AND PROCESSES
It refers to the appreciation and competitiveness of the end products in the target markets based on their safety, intrinsic and extrinsic quality, their transformation into alternative products, the product development processes and on the overall value-adding process.

4 MANAGEMENT OF NATURAL RESOURCES AND ENVIRONMENTAL IMPACT
It clusters all problems and opportunities related to natural resources and the environment, their management and efficient use, as well as the impact of production processes on them.

5 ECONOMICS AND MANAGEMENT OF PRODUCTION SYSTEMS
It covers economic efficiency, modelling, management and decision-making in production systems. It implies the development of economics and production measuring systems as well as systems to support the decision-making process focusing on the economic rationality of the production systems.

For each of these systems, we defined visions, challenges and problems/opportunities, with a horizon scope of year 2030.

EXTENSIVE LIVESTOCK PRODUCTION SYSTEM

Main challenges

- Increase and stabilise forage production, especially native grasslands.
- Productivity increase (kg "equivalent meat" /ha and gross margin/ha).
- Competitiveness and added value: environmental, social, animal welfare, quality, safety, among others.
- Mitigation and adaptation to climate change: control of GHG emissions and resistance to diseases.
- Animal health: maintaining the health status of Uruguay, reducing losses due to diseases of various origins.
- Interinstitutional coordination for research and technology transfer.

Goals

Major Issue	Objectives	Goals	Year
Sustainable productivity increase	Improvement in the adoption of available tools and technologies.	Validating a production system capable to generate 160 kg/ha with a gross margin (direct production costs) of at least US$ 100/ha/year.	2020
		Achieving an average national production of 130 kg/ha.	2030
	Improving the productivity and management of the forage basis, as well as its stability and predictability.	Increasing by 30% the average production at an experimental level.	2020
		Decreasing by 20% the annual variability of forage production and increasing by 20% the production of DM/ha at an experimental level.	
		Increasing by 10% the current conversion efficiency of bovine and ovine cattle	
Productive efficiency	Reducing the incidence of reproductive and parasite diseases.	• Bovine cattle tick control. • Control of bovine tick fever. • Integrated control of gastrointestinal parasites in ruminants. • Epidemiology and economic importance of the main diseases of ruminants in Uruguay.	2020
Quality, safety and diversification of products and processes	Maintenance of export markets.	Standardisation and grading system of Uruguayan meat quality that may enable the incorporation of intrinsic and extrinsic attributes (e.g. health, animal welfare, food safety and environmental attributes) to support certification systems.	2020
Management of natural resources and environmental impact	Development of local parameters of greenhouse gas emissions in Uruguayan livestock production.	Design of at least one package of management technologies to reduce GHG emissions per unit of product by 10%.	2025
		Environmental footprint (carbon balance, biodiversity) determined with local parameters.	
Economics and management of production systems	Improvement of decision-making efficiency.	Productive, economic and environmental simulation model developed and available to decision-makers.	2020

INTENSIVE PLANT PRODUCTION SYSTEM

Main challenges

- Technological alternatives for sustainable production.
- Minimising environmental impact.
- Adapted cultivars and species.
- Mechanisation and automation.
- Resistance to biotic stress.

Goals

Major Issue	Objectives	Goals	Year
Productive efficiency	Increasing efficiency and competitiveness of production systems.	Designing three production systems (horticulture, fruit and citrus production systems) that may increase productivity (yield and profitability) by 20%.	2020
Quality, safety and diversification of products and processes	Improvement of product quality and safety.	Increasing superior quality products by 10% with respect to total products.	2020
		Contribution of new varieties with good acceptance index by consumers of internal and external markets Improvement of the organoleptic properties of horticulture and fruit products.	
		Identification and improvement of content of nutraceuticals in fruit products and horticulture products.	
		Reducing agrochemical residues of products by 10% in fruit products and horticulture products in high productivity systems of apple trees, tomato and red pepper in greenhouses, at experimental level.	
		Reduction of 10% in pesticide residues in export citrus fruit by using integrated management concepts.	
Management of natural resources and environmental impact	Reduction in the potential environmental impact of intensive systems.	Reduction of 10% in the use of pesticides at validation level and of 20% at experimental level, while maintaining productivity in protected tomato, apple and citrus.	2020

DAIRY PRODUCTION SYSTEM

Main challenges

- High productivity systems, low cost and high resiliency.
- Labour well-being and labour efficiency.
- Processes automation.
- Documented environmental indicators.

> Strategy Implementation

Goals

Major Issue	Objectives	Goals	Year
Sustainable increase in productivity	Development of high productivity systems in a context of price volatility and increased cost of land.	Production systems designed to: • produce 1,000 kg of solids/ha Total Cows (TC). • harvest 10 tons of forage /ha TC (top quartile in 5 tons). • keeping the cost of a litre of milk produced < 0.25 (constant dollars 2016)	2020
	Development of user-friendly systems that consider generational change, concentration of dairy farms (fewer and larger dairies), automation and information technologies (ICT).	High production systems are highly competitive with: • milking during no more than 2.5 hours (top quartile according to INALE: 3.9 hours). • 8 actual hours of daily work with 3 breaks (current estimate: 11 hours with 1 break). • 750,000 litres or 50,000 kg of solids per Equivalent Unit (top quartile according to INALE: 390,000 litres).	2020
Management of natural resources and environmental impact	Development of environmental parameters related to the dairy system.	Environmental footprint determined with local parameters. Design of at least one package of management technologies to reach productive leaps and: • 0 (zero) estimated impact on water courses. • 0 (zero) impact on the deterioration of the soil (structure, carbon and fertility).	2020

RICE-LIVESTOCK PRODUCTION SYSTEM

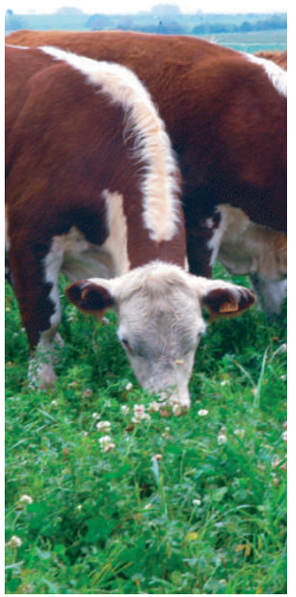
Main Challenges

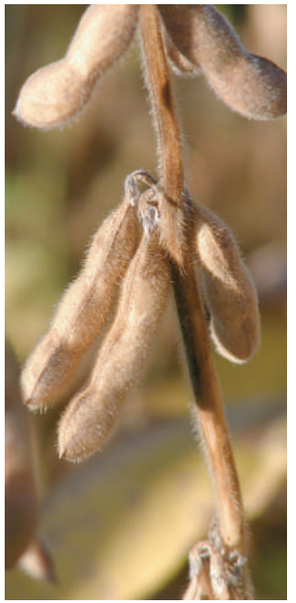
- Increasing the yield potential.
- Integrated management for high productivity.
- Efficient use of water.
- Economic and market efficiency.
- Intensification of rice-livestock production systems.

Goals

Major Issue	Objectives	Goals	Year
Sustainable increase in productivity	Development of efficient rice production systems of high productivity and low environmental impact.	Alternative rotations validated by research with experimental yields of more than 11 t/ha of rice (currently 9.5 t/ha); 600 kg/ha of beef (currently 250 kg/ha); 3,000 kg/ha of soybean and 6,000 kg/ha of sorghum (currently 2,400 kg/ha and 4,700 kg/ha, respectively). Generation of integrated models that allow to develop new scenarios and environmental indicators to monitor the systems.	2020
Productive efficiency	Development of technological alternatives for high productivity and efficiency rice crops.	The genetic progress rate in the rice breeding programme of the advanced material is maintained at 1.5% a year. Management technologies developed from research are available to reduce by 10% the costs of inputs and agrochemicals through efficient use and integrated crop management.	2020
Management of natural resources and environmental impact	Promoting an increase in the efficiency of water use in rice production systems.	Irrigation management technologies that reduce by 20% the use of water/ha are experimentally validated. These, together with the increase in yield potential, will allow to increase the WUE from 1.5 to 1 cubic meter per kilo of rice.	2020
	Quantifying the environmental indicators of the system.	A set of sustainability indicators is available in its three dimensions (physical, economic and environmental) to allow monitoring the performance of the domestic rice production system, as well as testing new practices and recommendations arising from research in this area. These indicators also allow comparisons with other regions or systems used in other countries. Technological proposals are developed to maintain the current satisfactory indicators in soil carbon stability, low or null watershed pollution by agrochemicals, and energy efficiency, while simultaneously achieving reductions of up to 30% in the relative global warming potential of rice production.	
Quality, safety and diversification of products and processes	Creating value in new market niches and with new products.	The quality requirements by different potential export markets are determined and varieties are developed accordingly. Rice safety is ensured, with permanent monitoring of potential contaminants and specific research to mitigate or eliminate emerging problems (arsenic among others).	

AGRICULTURE-LIVESTOCK PRODUCTION SYSTEM





Main Challenges

- Excellent quality cultivars.
- Improvement of competitiveness.
- Management of weed resistance to herbicides.
- Precision crop management.
- Improvement in the management of fattening processes.
- Adjustment in the design of crop-livestock systems.

> Strategy Implementation

Goals

Major Issue	Objectives	Goals	Year
Sustainable increase in productivity	Improving the competitiveness of the agricultural phase.	Achieving productive yields at experimental level of: Soybean: 6,500 kg/ha (25% increase) Wheat and barley: 10,000 kg/ha (40% increase). Implementing a national monitoring system with referent experts (weeds, pests, soil quality evolution) - web tool. Designing agricultural systems that allow increasing water use efficiency (40% baseline) by 60% of the rainfall (more crops per year). Increasing the efficiency in the use of nutrients by 65% (kg N absorbed/100 kg N applied) for winter cereal crops. Increasing the BNF efficiency in soybean. Increasing the efficiency of the use of phytosanitary products validated at commercial level (decrease of 30%/T of product). Baseline: 1.8 fungicides applications /ha/harvest; 1.7 g.a.i.of herbicide per kg of product. Increased performance while maintaining quality parameters in barley and improving them in wheat and soybean Maintaining safety in all three. Increasing the performance genetic progress rate by 25% of these three crops.	2020
	Improving efficiency and agriculture-livestock complementarities.	Increasing by 20% the profitability of the production systems of 500 kg/ha during fattening.	2020
Productive efficiency	Maintaining the capacity of the production system and the quality of the natural resources involved in the process.	Quantifying the productive, economic and environmental performance in at least 5 contrasting productive sequences with different degrees of agriculture-livestock interaction (rained and irrigation). Assessing the impact of a full cycle of the sequence on the quality of soil resources through the balance of C and N.	2020
Management of natural resources and environmental impact	Minimizing the negative environmental impact of technology proposals for crop-livestock systems.	Having an operation system continuously monitored for variables indicating water quality, and setting the baseline at a river basin level.	2020

FORESTRY PRODUCTION SYSTEM

Main Challenges

- Maintenance and improvement of forest health.
- Optimisation of management and sustainability of forest plantations.
- Production diversification and integration with agricultural production.
- Greater knowledge of the dynamics of forest ecosystems and their sustainability.
- Industrial development and development of new products.

> Strategy Implementation

Goals

Major Issue	Objectives	Goals	Year
Sustainable increase in productivity	Improving the competitiveness of forestry production systems through strategies that integrate genetics, pest and disease management and forest management.	• Making new superior genetic material available. • New strategies for integrated management of pests and diseases. • Developing management systems and tools for decision making.	2020
	Promoting productive diversification	• Contributing to the implementation of diversified production systems and the development of new products.	2020
Management of natural resources and environmental impact	Characterizing natural resources and their dynamics in relation with forestry production systems.	• Developing strategies for integrated management of pests and diseases. • Studying native forest dynamics • Estimating the environmental footprint of forest plantations.	2020

FAMILY FARM PRODUCTION SYSTEM

Main Challenges

- Resilience of production systems.
- Integration to export markets.
- Improvement of labour efficiency.
- Income diversification.
- Automation and mechanisation.
- Hive health and nutritional stability.
- Introduction of modern management technologies.

> Strategy Implementation

Goals

Major Issue	Objectives	Goals	Year
Sustainable increase in productivity	Enabling the sustainability of extensive livestock systems.	At least 20% of family livestock farmers of the Basaltic and Eastern Crystalline regions of Uruguay improve their sustainability indicators.	2025
	Improving the socio-economic indicators of dairy famers.	Fostering the participation of at least 200 institutional, private and government stakeholders in the development of a proposal for improvement covering at least ten indicators of sustainability for dairy farmers.	2020
		At least 50% of the 500 most vulnerable family dairy farmers have improved at least three indicators of sustainability while not affecting performance of the others.	2025
Productive efficiency	Improving the socio-economic indicators of apicultural farmers	Decreasing hives´mortality to 20% (currently 29%). Reaching an average production of 30 kg of honey/hive/year validated in commercial systems (current production: 23.5 kg honey/hive/year.	2020

In addition to the definition of production systems and major research issues, strategic areas were defined to structure the Research Agenda, whose cross-sectional approach to the production systems must be strengthened and managed properly in the new ISP.

These areas are:

- Pastures and forages focusing on native grasslands.
- Natural resources and environmental impact.
- Agri-food.
- Applied agricultural economics.
- Irrigation on production systems.
- Animal health.
- Animal, plant and microbial Biotechnology.

:: Technology Transfer and Innovation Promotion

Finally, the Technology Transfer and Innovation Promotion Strategy comprise five main objectives that will guide the actions of the Institute in the next five years.

I. Adapting the strategy to co-existing approaches - from dissemination to co-innovation - according to value chains and territories.

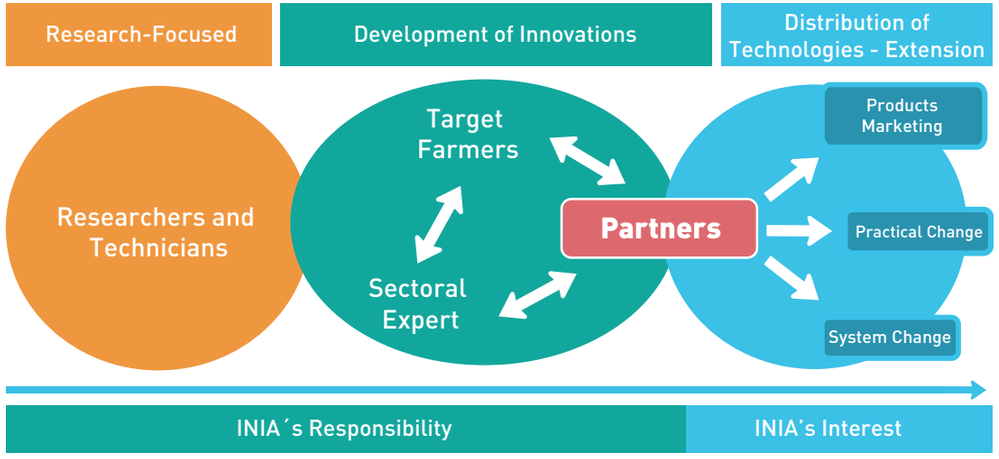
II. Focusing on technology validation together with farmers and in coordination with partners to carry out a wide distribution (extension).

III. Strengthening the Research-Transfer-Validation link through sectoral experts.

IV. Professionalising INIA's marketing of technological products, improving their insertion in the market.

V. Strengthening the recognition INIA as a brand.

These objectives will define the scope of the institutional actions in this area.



> Final Considerations

This document was developed based on a participatory process that involved the contribution of more than 350 national and international referent experts, the private and public sectors and all INIA staff. Over 550 people participated in this collective reflection, where visions were aligned and objectives and goals were defined to address the strategic challenges that INIA and the country have determined to address the Present and, above all, the Future.

This document presents the focus of our strategic guidelines and the research, technology transfer and innovation agenda of INIA for 2016-2020, with a 2030 vision. It defines the objectives, goals and performance indicators of the institution and also by production systems, for scientific production, technological production, transfer and validation of technology, training and development of human capital, addressing management issues and institutional relationships, capturing external resources and strengthening INIA's image. In addition, new cross-sectional research and/or prospecting areas are created to strengthen and build new capacities to address new oncoming challenges.

Our paradigm of research and innovation will be the "Sustainable Intensification" of national agriculture. We have the challenge of producing more food (healthier, safer and with more added value) through sustainable pathways, using resources efficiently and causing the least possible environmental impacts.

We are on a pathway towards INIA focusing on "scientific excellence with closeness to the farmer," within an innovative model framework of articulation and synergies with other research, development and innovation institutions. A strong and articulated Institute contributing with robust science and technology is required, so as to support public policies and the competitiveness of the private sector that will lead to an increasing international integration of the agricultural sector.

We are part of the Future, bringing science and technology for a smart, innovative, competitive and sustainable agriculture at the service of Uruguay.

Glossary

BNF - Biological Nitrogen Fixation
C - Carbon
CAR - Spanish acronym for Regional Advisory Council
DM - Dry Matter
FPTA - Spanish acronym for Fund for the Promotion of Agricultural Technology g.a.i. - Grams of Active Ingredient
GHG - Greenhouse Gases
ha - Hectare
ISP - Institutional Strategic Plan
N - Nitrogen
PM&E - Planning, Monitoring and Evaluation
R&D+i - Research, Development and Innovation
SG - Strategic Guideline
SS - Support staff
SWOT - Strengths, Weaknesses, Opportunities, Threats
TC - Total cows (dry and milking cows)
TT - Technology Transfer
UP- University Professional
WG - Working Group
WUE - Water Use Efficiency

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