

# Ecological intensification of livestock production in native grasslands: operationalizing "win-win" opportunities in South America's Pampas and Campos grasslands.

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Organización de las Naciones  
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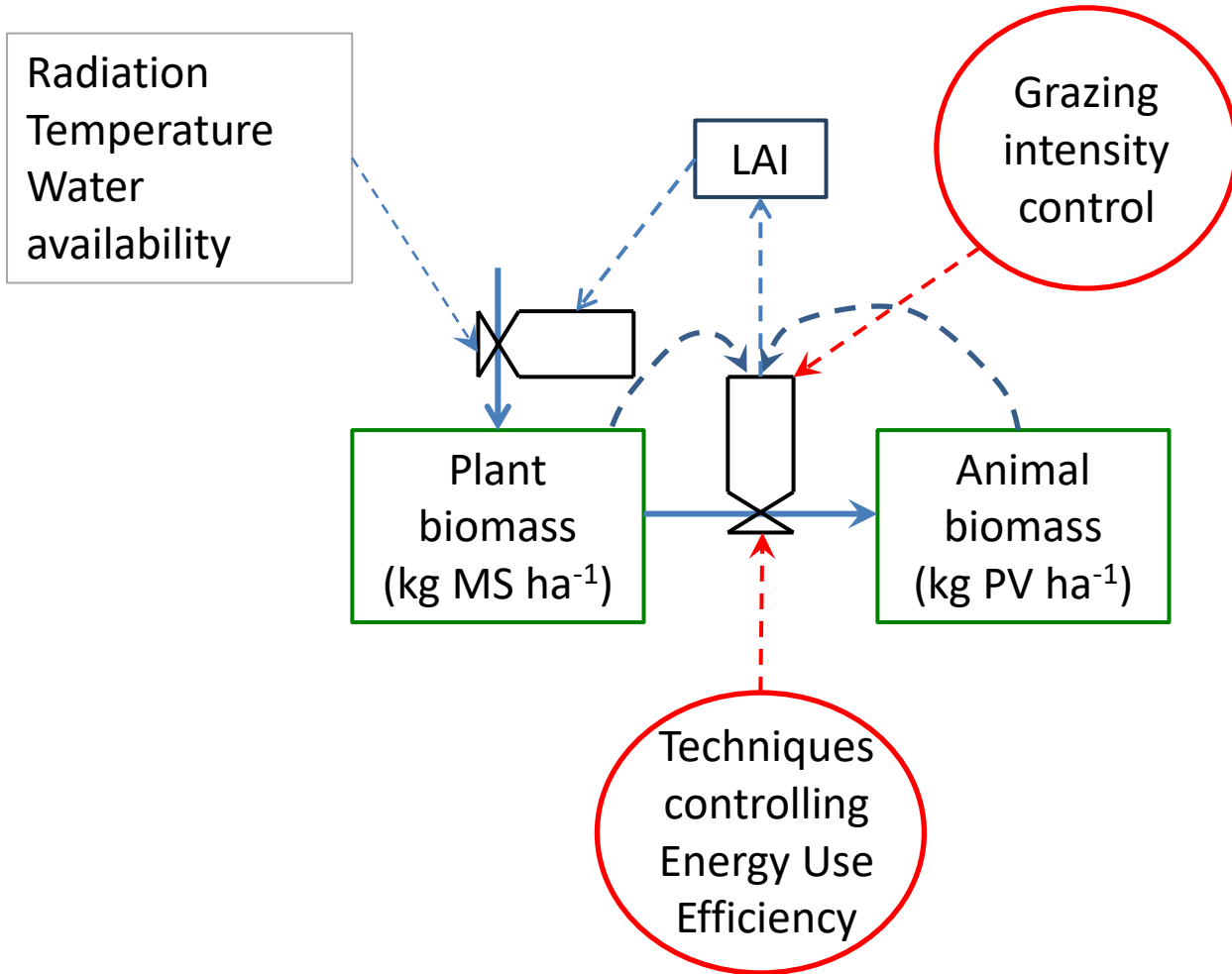
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# Introduction: problem situation

- Pampas and Campos grasslands: hotspot of biodiversity, carbon sink, food production and other ecosystem services
- Extensive livestock production (beef and sheep) allows grasslands conservation and ecosystem services provision at higher rates than conversion to crop land or forestry plantations
- However,
  - Livestock sector is the main contributor to GHG emissions in Uruguay
  - Over-grassing causes grassland deterioration
  - Low profitability and farmers' income reduces competitiveness with alternative land use options

# Introduction: “win-win” opportunities



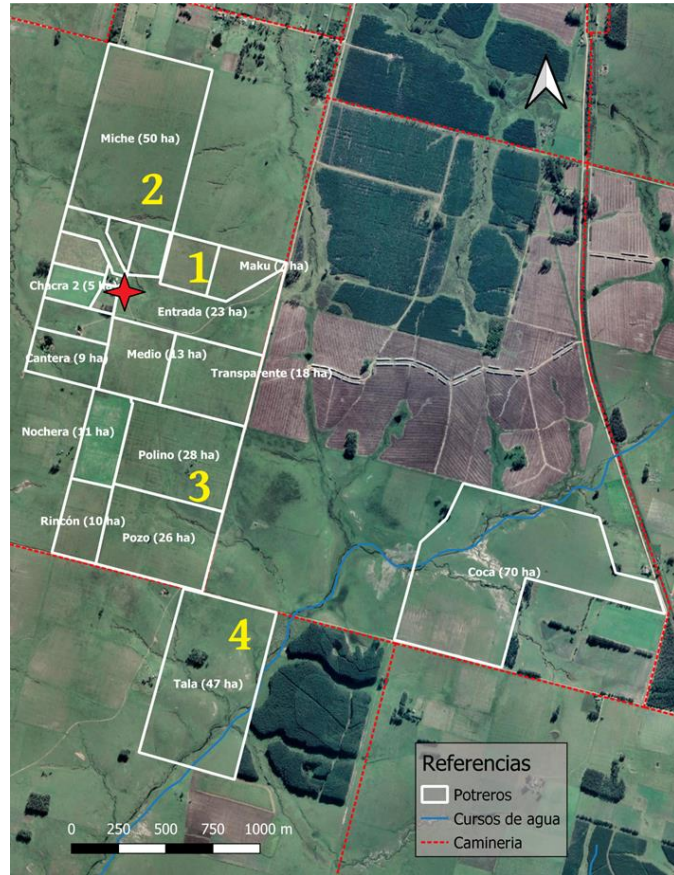
Poor control of energy and mass flows, or control based on increasing inputs and infrastructure

**Estimated productivity gap > 50%**

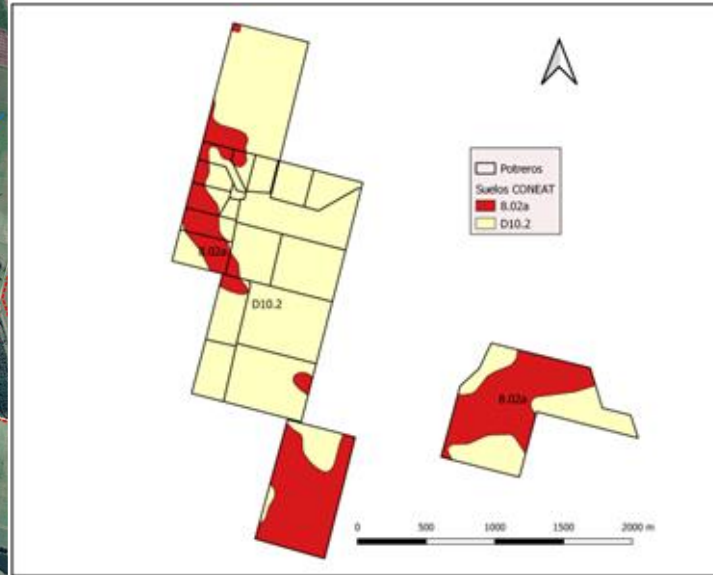
## Ecological intensification

- Increasing herbage height, LAI and forage accumulation rate
- Synchronizing energy requirements by cows with grassland forage availability (mating, calving and weaning periods)
- Increasing forage allowance to increase cows' energy intake and
- Increasing reproductive efficiency applying techniques to control energy use by cows during the mating period (temporary suckling restriction and flushing)
- Increasing biodiversity by reducing grazing pressure
- Reducing soil erosion by increased soil cover
- Increasing C input due to higher standing biomass
- Reducing GHG emissions due to lower stocking rates and higher productivity per animal

# Introduction: translate ecological principles into concrete practices



## Heterogeneity within and between farms



## Requirements

- Whole-farm systems perspective
- Direct involvement of farmers and extension agents to ensure relevance, applicability and adoption
- Regional and National level actors to facilitate scaling out of learning

Transition from current systems to “ecologically intensive” systems requires learning by all actors involved, combining scientific and empirical knowledge to create innovative production systems → COINNOVATION

# Project aim

Promote a sustainable increase in productivity and net income in family and medium-sized beef-cattle farms, reduce GHG emissions and restore degraded lands through a co-innovation process.

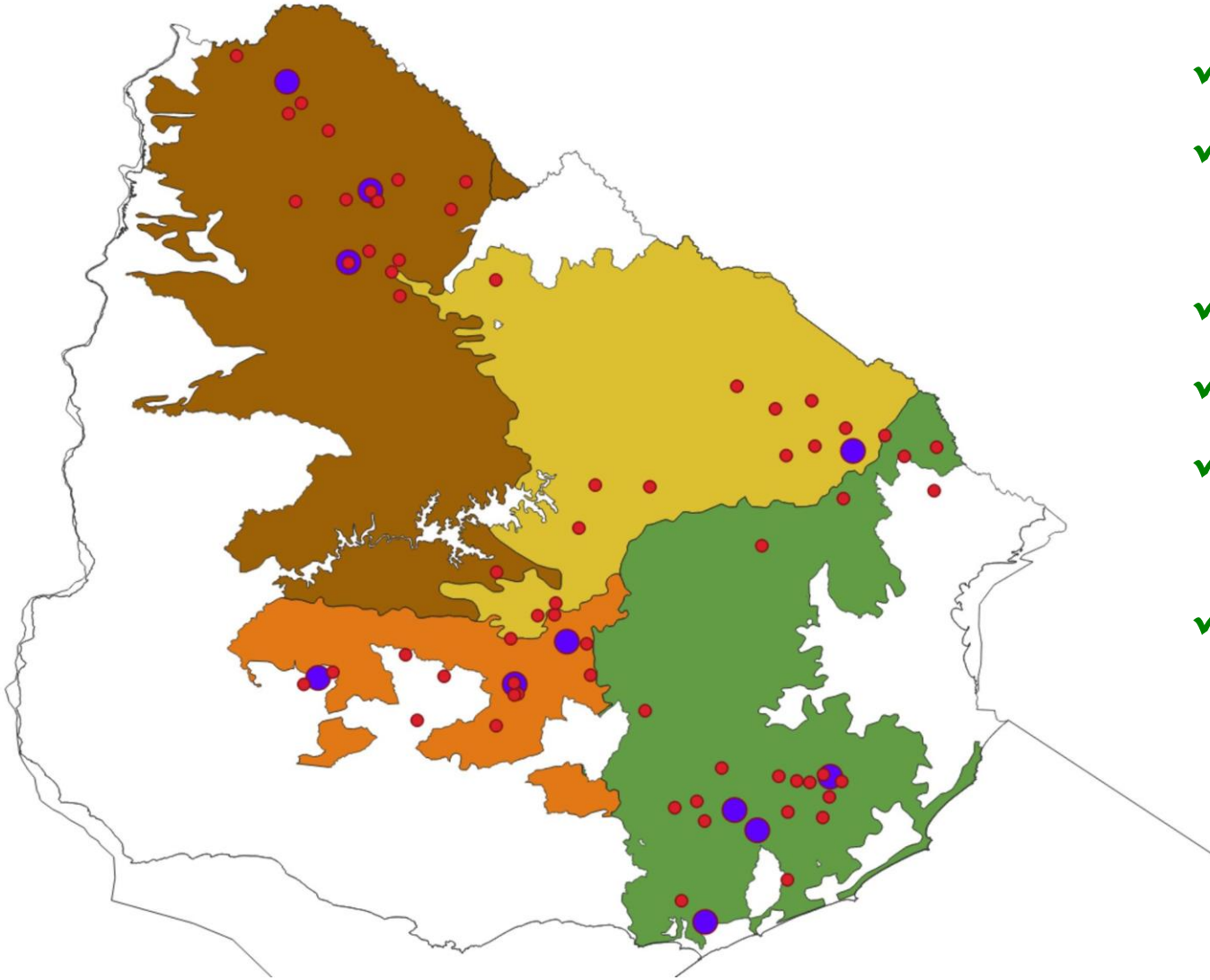
The project was an initiative from the **Uruguayan government** funded by the **Global Environment Facility (GEF)** and local counterparts.

Project duration: July 2019 – June 2023





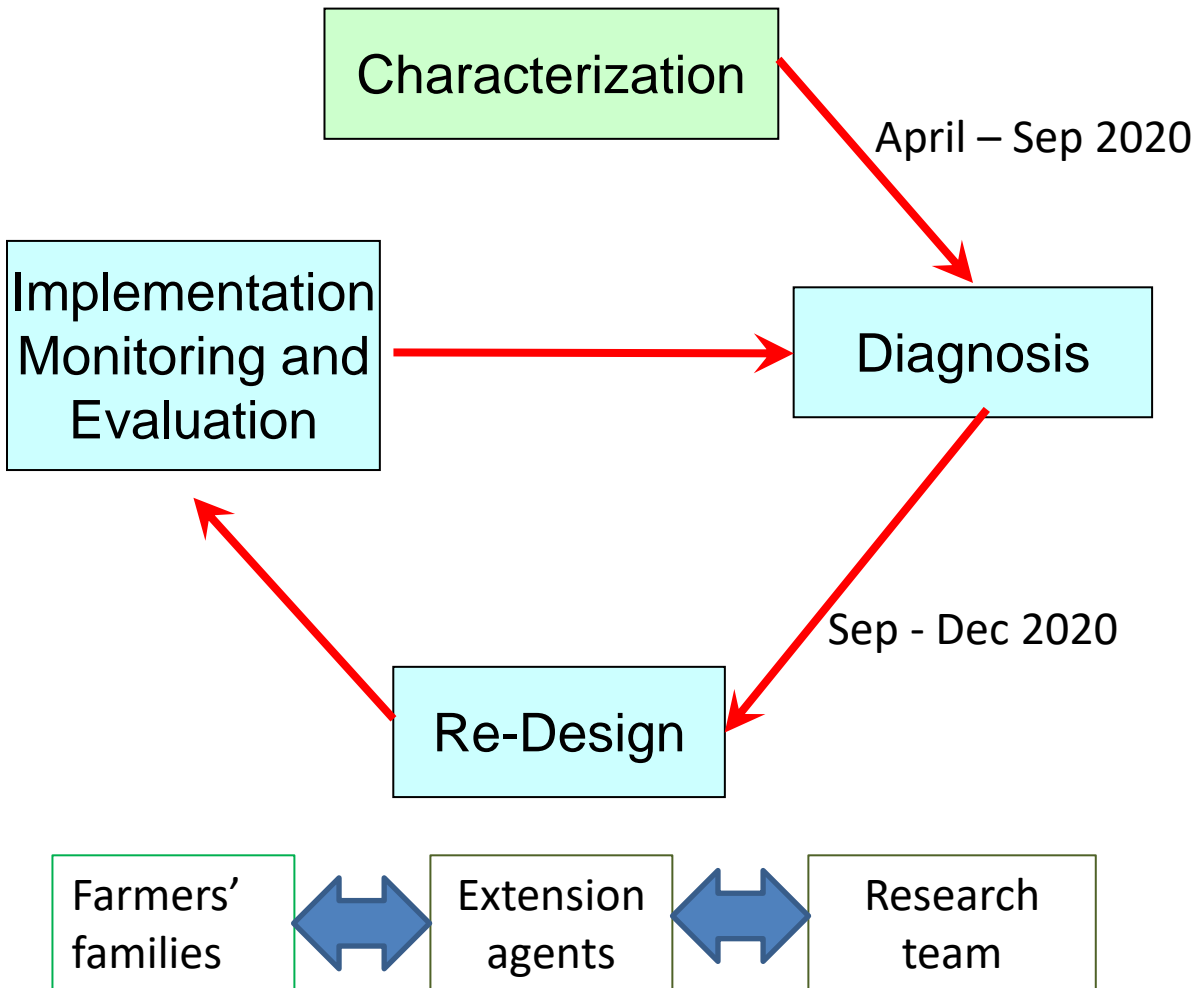
# Co-innovation project participants



- ✓ 60 farms, 174 people, 33000 ha
- ✓ 2 national farmers' organizations (CNFR y CAF)
- ✓ 11 local farmers' organizations
- ✓ 11 Extension agents
- ✓ Faculty of Agronomy and INIA
- Interdisciplinary Research team (10)
- ✓ Ministry of Agriculture, Ministry of Environment and FAO coordination team (7)

# The coinnovation approach: main activities

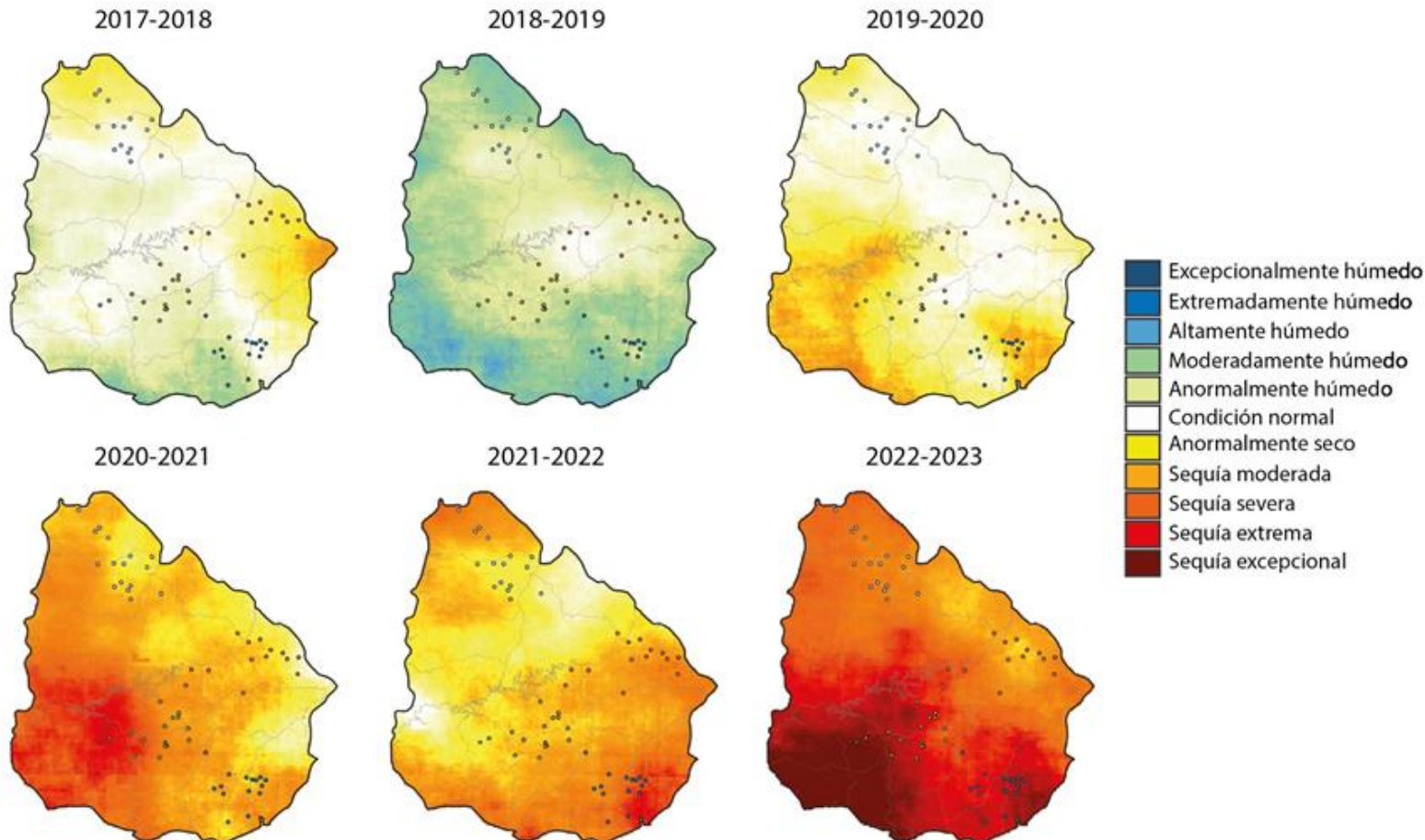
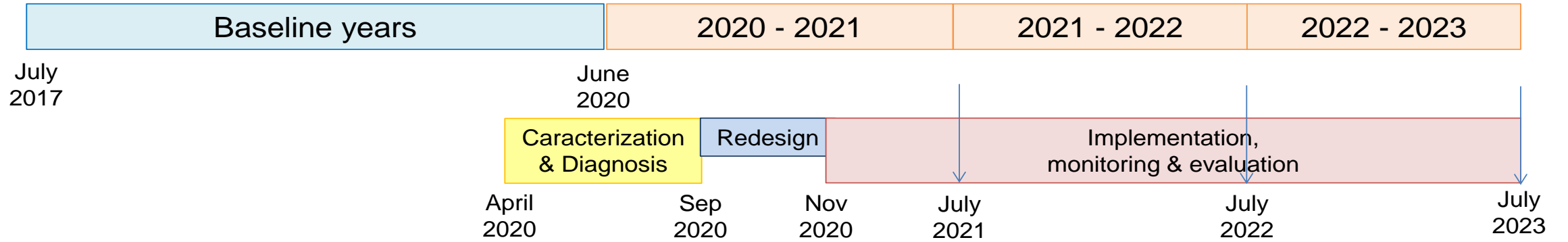
## Farm level



## Whole project level

- ✓ Monthly monitoring and planning meetings
- ✓ Athenaeum for case study discussions (8 per year)
- ✓ Open field days (8 per year)
- ✓ Annual evaluation & planning workshops
- ✓ Training courses for extension agents (one per year)
- ✓ Policy briefing and press conferences and releases

# Project timeline and climatic context



**Three years of “La Niña” in the “ENSO” climate pattern resulted in the worst drought in Uruguay in the last 40 years**



# Main results at farm level



**28% ↑**

Family income



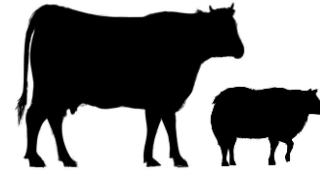
**-2% ↓**

Total Costs



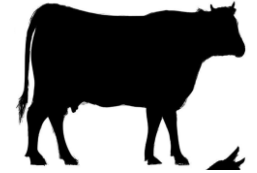
**-9% ↓**

Total Labor



**-8% ↓ -24% ↓**

Stocking rates



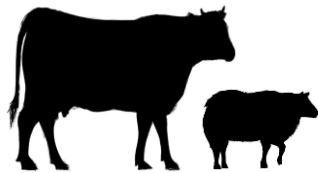
**8% ↑**

Beef meat production per ha



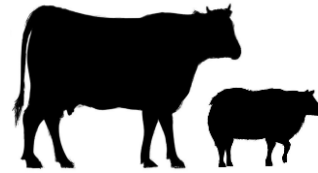
**17% ↑**

Sheep meat production per ha



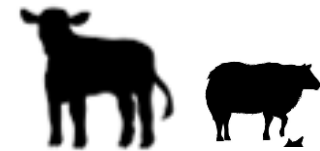
**16% ↑ 57% ↑**

Beef and Sheep meat production per animal



**6% ↑ 13% ↑**

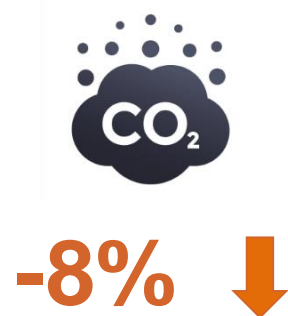
Weaning rates



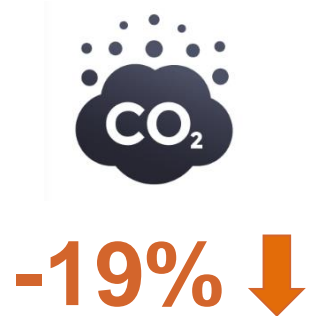
**6% ↑ 26% ↑**

Weaning weights

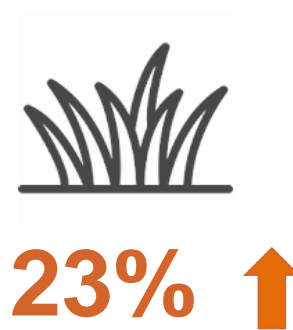
# Main results at farm level



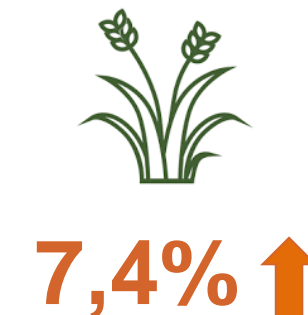
**Total GHG emissions per ha**



**GHG emissions per kg meat produced**



**Herbage height**



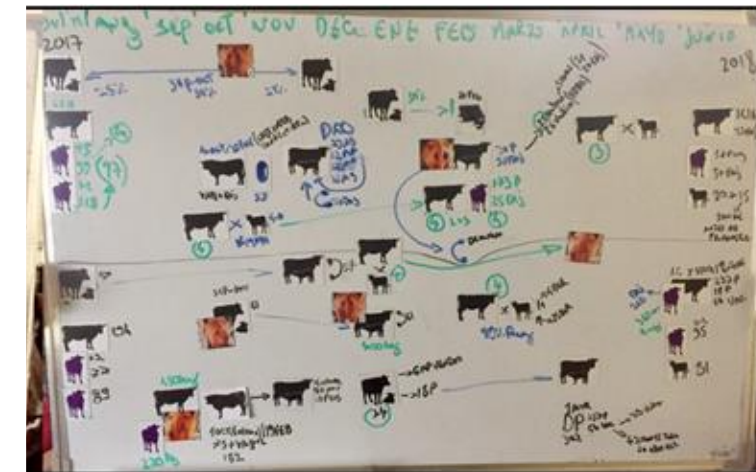
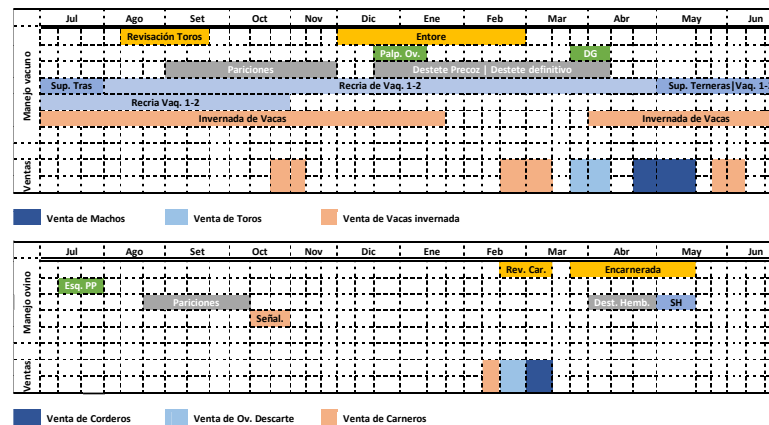
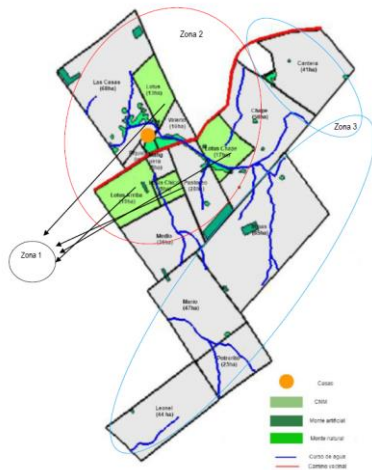
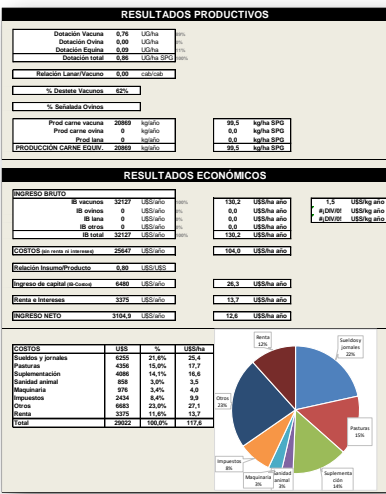
**Plants biodiversity**

The level of application of “ecological intensification” practices (Breeding Index) increased by 64%

70% of participant farms contracted their extension agent after the project subsidy ended to continue the coinnovation work.

# Development of tools to help extension agents work

- Worksheets for diagnosis, redesign, planning and monitoring (calculation of indicators, simulation of scenarios, projections, etc.)
- Tools to ease communication with farmers and learning by farmers
- Information flow and data management





# Significance of the work for policy and practice

- Farmers can improve their ability to learn and adapt. The resulting change in practice by farmers can improve farm systems' productive, economic and environmental performance.
- Coinnovation is a long term process and requires developing of trust between actors that only longstanding relationships can provide. The current policy of extension services and research and funding institutions does not support this.



# Significance of the work for policy and practice

- Coinnovation represents a challenge for extension agents, requiring a change in mindset and new skills. They would need proper training, permanent support, and the time required per farm.
- Scientists have to leave the comfort zone of their labs and research stations and engage farmers and extension agents in farm systems design-oriented research, applying hard and soft systems thinking in a balanced and integrated way

