

INTEGRITY



CHALLENGE

Different degrees of integration between the crops and livestock components of a system may have advantages or disadvantages, so trade-offs among economic (efficiency), environmental (nutrient cycling, soil health, greenhouse gas (emissions), and social (work arduousness and organization, household networks) indicators will be identified. Gaps in knowledge regarding impacts of the integration need to be addressed to fully understand the mechanisms that reduce GHG emissions and/or increase soil C sequestration and nutrients (i.e. C, N) use efficiency in mixed production systems and which would be the impact of proposed interventions with a broader and holistic perspective.

APPROACH

These interventions will be specifically designed for each situation and will be evaluated experimentally to quantify their impact, not only through direct and specific effects but also in a broad sense addressing the circularity within the agricultural systems by different modelling tools. Standardized evaluation approaches and procedures across the different partners will allow direct comparison of the relative impact of new management alternatives. Stakeholders' involvement through the process will certainly help to focus on applicable new practices and facilitate their adoption by farmers.

- Will investigate different management practices at diverse agricultural systems to enhance nutrient circularity, production efficiency and reduce C footprint;
- Identify the potential improvement of C footprint by increasing the inclusion of by-products in ruminants feeding programs;
- Will evaluate the management of carbon circularity and climate change mitigation and adaptation in mixed crop ruminant livestock systems through system approach assessment and Information and Communication Technology (ICT) (i.e. design of digital twins of farms based on combining sensor data and modelling that can help the decision-making process of stakeholders on the production chain of different mixed production systems).

INTEGRITY also includes agent-based modelling to understand the decision-making process and other emergent properties of mixed crop-livestock production systems.

A particular characteristic of INTEGRITY is the range of diverse production systems with different agro-climatic and socio-cultural characteristics that will allow observing differential responses of enhanced resource use efficiency and optimize nutrient circularity with the integration of the two systems components at different locations. This project involves cross-institutional and cross-disciplinary cooperation, which will be supported by the consortium's complementary scientific skills, and reinforce and expand a history of mutual cooperative research where new partners will be involved.

FIRST RESULTS

- A report has been developed showing the characteristics of diverse mixed crop-ruminant livestock systems in the participant countries.
- Members from Argentina, Spain and Peru have determined nutritive values of agro-industrial by-products with potential to be used as animal feeding.
- A first review has been done of existing decision-making tools available at farm level in the participant countries
- Local stakeholders in each country member whom will be working with have been identified and listed.

Consortium

Coordinator

- Claudia Faverin, National Institute of Agricultural Technology, Argentina

Partners

- SPAIN: Agencia Estatal Consejo Superior de Investigaciones Científicas
- FINLAND: Natural Resources Institute Finland, Luke
- UNITED KINGDOM: Agri-Food and Biosciences Institute - Queens University Belfast
- NEW ZEALAND: AgResearch
- PERU: Universidad Nacional Agraria La Molina
- URUGUAY: National Agricultural Research Institute of Uruguay, INIA
- FRANCE: French National Research Institute for Agriculture, Food and Environment, INRAE
- IRELAND: Agriculture and Food Development Authority, Teagasc

Duration

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<https://www6.rennes.inrae.fr/lc/rn/PROJECTS/INTEGRITY>

