RELIVE

CHALLENGE

The widespread reintroduction of crops and livestock could make a major contribution to the development of the wider circular (agricultural) economy and contribute to sustainable growth, through the more effective recycling of materials and resources, the minimization of waste, and a reduction in external supplies of feed and synthetic fertilizers, with potential biodiversity, environmental and soil health benefits. However, this comes with significant challenges, including the potential for enhanced GHG emissions, particularly methane emissions, from enteric fermentation, land degradation due to overgrazing and water pollution as well as the need to effectively substitute all/most inorganic fertilizers with organic manures. Organic amendments applied to land could conversely result in enhanced GHG emissions, particular nitrous oxide emissions, unless these are managed appropriately and the necessity to store large amounts of organic manures/wastes may also be problematic, given their links to environmental pollution and GHG emissions. Additional complications could arise due to associated modifications in land use, including a shift from a grass-based to a forage/alternative crop-based diet, altered grazing practices and increased competition between food and animal feed or the use of biogas or bio-energy crops. Another key issue is the economic consequences of reintroducing livestock and whether the necessary incentives are available for them to be taken up by farmers. Whilst mixed farming systems were previously common and economically viable, new developments will require them to be matched with current production and market conditions and the availability of suitable value chains and business models to ensure their long-term viability.

APPROACH

The ReLive project will take a holistic approach to the sustainable reintegration of livestock and cropping systems. Particular attention will be directed at livestock type and management, the appropriate use and storage of manures crop choice, including direct grazing of crops and/or their residues, the use of afforestation/agroforestry as an alternative grazing option and to increase soil carbon, as well as and how this information can be integrated into decision support tools for identifying the best options for farmers. Importantly, ReLive will assess the use of alternative livestock dietary feed sources that have the potential to reduce enteric methane production coupled with novel investigations on a mechanistic assessment of the ability of soils to oxidise methane, and how this information can be utilized to improve whole farm methane budgets. Critical to this approach is an ability to monitor and validate any management options on the net GHG budgets and their economic consequences, as well as the effective dissemination of the results for practical implementation by policymakers, stakeholders, farmers and other end users.

FIRST RESULTS

- As part of the sustainability assessments, interviews with farmers and sustainability indices are being examined and the economic impacts of different farming practices investigated.
- Modelling approaches and a farm wide GHG calculator based on the Cool Farm Tool (CFT) are being developed.
- The underlying reasons for significant variations in the ability of soils to take up methane, a critical issue associated with the reintegration of livestock into farming systems, is being examined as this gas dominates the GHG budget.
- Work continues on ways to reduce emissions from manure storage and management and revising existing emission factors.
- Surveys are being conducted to obtain information on the environmental impacts of different agricultural practices, including traditional and low input systems in Chile. These data will also be important for adapting the HOLOS model.
- Information on possible validation tools and how they can be implemented is being reviewed, together with the collection of information on livestock emissions, and a database is being developed. Assessing the effects of regional land use changes is being investigated using remote sensing techniques.

Consortium

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- IRELAND: Teagasc - Agriculture and Food Development Authority

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