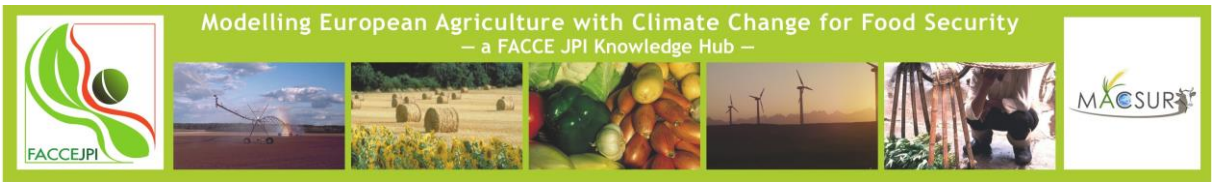

FACCE MACSUR

D-L1.1.1/L1.2.1: Modelling European ruminant production systems: Facing the challenges of climate change

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Abstract/Executive summary

Ruminant production systems are important producers of food, support rural communities and culture, and help to maintain a range of ecosystem services including the sequestering of carbon in grassland soils. However, these systems also contribute significantly to climate change through greenhouse gas (GHG) emissions, while intensification of production has driven biodiversity and nutrient loss, and soil degradation. Modeling can offer insights into the complexity underlying the relationships between climate change, management and policy choices, food production, and the maintenance of ecosystem services. This paper 1) provides an overview of how ruminant systems modeling supports the efforts of stakeholders and policymakers to predict, mitigate and adapt to climate change and 2) provides ideas for enhancing modeling to fulfil this role. Many grassland models can predict plant growth, yield and GHG emissions from mono-specific swards, but modeling multi-species swards, grassland quality and the impact of management changes requires further development. Current livestock models provide a good basis for predicting animal production; linking these with models of animal health and disease is a priority. Farm-scale modeling provides tools for policymakers to predict the emissions of GHG and other pollutants from livestock farms, and to support the management decisions of farmers from environmental and economic standpoints. Other models focus on how policy and associated management changes affect a range of economic and environmental variables at regional, national and European scales. Models at larger scales generally utilise more empirical approaches than those applied at animal, field and farm-scales and include assumptions which may not be valid under climate change conditions. It is therefore important to continue to develop more realistic representations of processes in regional and global models, using the understanding gained from finer-scale modeling. An iterative process of model development, in which lessons learnt from mechanistic models are applied to develop 'smart' empirical modeling, may overcome the trade-off between complexity and usability. Developing the modeling capacity to tackle the complex challenges related to climate change, is reliant on closer links between modelers and experimental researchers, and also requires knowledge-sharing and increasing technical compatibility across modeling disciplines. Stakeholder engagement throughout the process of model development and application is vital for the creation of relevant models, and important in reducing problems related to the interpretation of modeling outcomes. Enabling modeling to meet the demands of policymakers and other stakeholders under climate change will require collaboration within adequately-resourced, long-term inter-disciplinary research networks.

Reference and link for full published paper

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