FACCE-MACSUR

Inventory of farm-scale models within LiveM

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Instrument:	Joint Programming Initiative
Topic:	Agriculture, Food Security, and Climate Change
Project:	Modelling European Agriculture with Climate Change for Food Security (FACCE-MACSUR)
Start date of project:	1 June 2012
Duration:	36 months
Theme, Work Package:	LiveM 1
Deliverable reference num.:	D-L3.1
Deliverable lead partner:	Aarhus University
Due date of deliverable:	month 16
Submission date:	2014-06-09
Confidential till:	**2014-06-13 (only the abstract may be published)**

Revision	Changes	Date
1.0	Model inventory compiled and shared with LiveM partners	2013-06-01
1.01	Inventory included in formal report	2014-06-09

Abstract/Executive summary

The aim of WP3 is to improve the assessment of the impact of climate change on livestock and grassland systems at the farm-scale. The first step in this process is to understand the current state of the art in farm-scale modelling, and the resources available within the MACSUR knowledge hub. Here, an inventory of the farm-scale models available within LiveM is presented, along with a summary of the types of model represented. Thirteen farm-scale models were identified, three of which focus on environmental aspects of farm systems (GHG emissions etc.) and ten of which focus on management strategies (productivity, economics etc.).

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Table 1. List of farm-scale models identified within LiveM

Model Name	Main livestock	Institute	Country	Contact person	Website
DairyWise	Dairy cows	Wageningen UR	Netherlands	Agnes van den Pol	www.wageningenur.nl/de/Publicatie-details.htm?publicationId=publication-way-333634343436
FASSET	Pigs, beef, dairy cattle	Aarhus University	Denmark	Nick Hutchings	www.fasset.dk
Forage Rummy	Dairy & beef cattle, dairy & meat sheep, dairy goat	INRA, Toulouse	France	Guillaume Martin	www.rami-fourrager.fr www6.toulouse.inra.fr/agir/Les-equipes/MAGELLAN/Membres/Guillaume-Martin
HOLOS_Nor	Dairy, beef and pigs	NILF	Norway	Helge Bonesmo	http://www.nilf.no/english/english_main_page
IRTA	Organic dairy cattle	IRTA	Spain	Isabel Blanco Penedo	es.linkedin.com/pub/isabel-blanco-penedo/42/932/818/en
Melodie	Pigs and dairy cattle	INRA, Rennes	France	Philippe Faverdin	www6.rennes.inra.fr/pegase_eng/Personnel/F/FAVERDIN-Philippe
SpainII	Dairy cattle	IRTA	Spain	Isabel Blanco Penedo	es.linkedin.com/pub/isabel-blanco-penedo/42/932/818/en
FarmAC	Dairy and beef cattle, sheep, pigs	Aarhus University	Denmark	Nick Hutchings	www.farmac.dk
SIMSDAIRY	Dairy cattle	BC3	Spain	Agustin del Prado	www.bc3research.org/en/agustin_del_prado.html
Moorepark	Dairy cattle	Teagasc	Ireland	Laurence Shalloo	hwww.agresearch.teagasc.ie/moorepark/staff_research/shallool.asp
BeefGEM	Suckler cows to beef, dairy calf to beef	Teagasc	Ireland	Paul Crosson	www.agresearch.teagasc.ie/grange/people/pcrossan.asp
Overseer	Dairy and beef cattle, sheep and goats	MPI, FANZ and AgResearch	New Zealand	David Wheeler	www.overseer.org.nz/
Sfarmod	Dairy and beef cattle	Cranfield University	United Kingdom	Daniel Sanders	Description: www.cranfield.ac.uk/research/research-activity/current-projects/research-projects/silsoe-whole-farm-model.html Model: http://86.120.199.106/IAP/

Introduction

Within livestock production systems, there is a complex interaction of bio-physical and management variables at the farm-scale. This complexity makes modelling at this scale vital to gaining an understanding of the impacts of changing environmental conditions and changes in policy on productivity, GHG emissions, economics and ultimately social structures at a regional scale. In turn, farm-scale modelling requires links to good quality experimental data as well as field- and animal-scale modelling outputs to ensure its accuracy. Farm-scale modelling represents the most intuitively relevant level of activity for relating model outputs to the interests of stakeholders in the food supply chain (particularly those of farmers and farm-advisors). Understanding farm-scale modelling resources is therefore a pre-requisite for increasing capacity in the modelling of livestock systems, for closer linkages between crop, livestock and trade modellers, and for producing value-added outputs for stakeholders at the regional and local level. The inventory of farm-scale models presented here is a first step to gaining an overview of the state-of-the-art in farm-scale modelling, to identifying gaps in knowledge and to improving modelling capacity. These further steps are required to meet the demand for policy- and stakeholder-relevant modelling outputs capable of driving management and policy choices and ensuring the creation of sustainable livestock production systems, adapted to be resilient to predicted climate change impacts.

Methods

A simple spreadsheet template was drawn up and distributed to all LiveM partners involved in farm-scale modelling. The template included fields on model aims, scope, approach, inputs and outputs, as well as fields related to model accessibility (contact details for modelling team, availability of model online etc.). The completed forms were collated into a database and a summary of model-types added. Once resources are available at the hub level to share information online, the inventory will be transferred to the online format developed.

Results

Thirteen models were returned from 11 modelling groups (Table 1). The full inventory including details of the models, methods and scope can be found here:

https://docs.google.com/spreadsheets/d/1NCFzgx7UZ5gmmAlcCZfelJpszAnXr1fz789nM9V7NS0/edit?usp=sharing

Discussion

The survey of farm-scale models found that the models varied quite considerably, ranging from dynamic models with time steps of days or hours, to static models that calculate annual budgets. Furthermore, whereas the focus of some models is the prediction of farm management (e.g. livestock feeding, N fertilisation), with a relatively simple treatment of losses to the environment, others require management data to be input but have a more detailed treatment of the losses to the environment. The assembly of farm-scale models involved in a project is therefore much more heterogeneous than is the case for the crop models being considered in CropM. This presents a challenge when comparing the farm-scale models, but also represents a diversity of modelling approaches with a high potential for mutual learning through workshop discussions and other collaborative research efforts, and in turn the opportunity to improve farm-scale modelling capacity for European grassland and livestock systems.

Acknowledgements

We thank the farm-scale modelling teams for sharing information about their models. This paper is a contribution to the FACCE MACSUR knowledge hub