

Simulating the effect of climatic variations on the long-term performance of different agroforestry systems within field trials using virtual experiments

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Corresponding Author:
klaus.jarosch@agroscope.admin.ch

Klaus A. Jarosch¹, Michelle Allen², Daniele Antichi³, Mickaël Bernard⁴, Lory Boutchakdjian⁴, Paul Burgess⁵, Lydie Dufour⁴, Christian Dupraz⁴, Jonathan Eden⁶, Anil Graves⁵, Marcello Mele³, Gerardo Moreno⁷, Alice Ripamonti³, Rodrigo Olave², João Palma⁸, Victor Rolo⁷, Will Simonson⁹, Colin Tosh⁹, Lorenzo Gabriele Tramacere³, Felix Herzog¹

¹ Agroscope, Switzerland

² Agri-Food and Biosciences Institute, United Kingdom

³ University of Pisa, Italy

⁴ INRAE, France

⁵ Cranfield University, United Kingdom

⁶ Coventry University, United Kingdom

⁷ University of Extremadura, Spain

⁸ Mvarc, Portugal

⁹ Organic Research Centre, United Kingdom

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Abstract

Agroforestry systems can reduce some of the adverse effects of climate change in agriculture by e.g. serving as a windbreak or shade provider to protect crops or grazing livestock and supporting beneficial species for pest control. The prediction of the long-term performance of different agroforestry options is however difficult to obtain through field quantify experiments due to the length of time trees grow for experiments. Numerical modelling can contribute to a better understanding of a system's performance, since the effect of different climatic alterations can be tested using virtual experiments for different periods of time.

Within the Horizon 2020 AGROMIX project, we are analysing the long-term performance of eight different agroforestry trials (Figure 1), using different modelling approaches. The trials are spread over three biogeographic regions (Mediterranean, Continental, and Atlantic) and are of varying age (4 to 33 years). In total, six silvoarable and five silvopastoral farming systems are maintained at the eight field trials. Through the use of different numerical models the effect of changes in temperature and precipitation patterns or the occurrence of extreme events such as droughts or late spring frost on the different agroforestry systems will be predicted. Additionally, experimental data on crop performance

as well as animal behaviour and welfare, in particular under heat stress, are being obtained and will potentially be included in the model predictions.

This poster aims to give an overview on the field trials and the numerical modelling approaches that are being applied to predict long-term system performance.



#	Field experiment	Silvoarable	Silvopastoral	Start monitoring
1	Dehesa of Majadas		✓	2014
2	Tenuta di Paganico	✓	✓	2014
3	Arnino	✓		2018
4	Restinclières	✓		1995
5	Lamartine		✓	2015
6	Elm Farm	✓	✓	2011
7	Wakelyns	✓		1994
8	Loughgall	✓	✓	1989

Figure 1. Field trial location, name, type of tested farming systems(s) and year of initiation