

ClimateCropping (ID 21)

ClimateCropping: Climate Smart Management for Resilient European Cropping Systems

Coordinator

Dr. Magdalena Necpalova, University College Dublin1, Ireland

Project partners

Country	Organization
Ireland	Teagasc
Switzerland	Agroscope
Austria	AGES
United Kingdom	Agri-Food and Biosciences Institute
France	INRAE
France	INRAE
Spain	University of Jaén
Ireland	University College Dublin2
Norway	Ruralis Institute for Rural and Regional Research
Germany	Leibniz Centre for Agricultural Landscape Research (ZALF)

Summary

With the 2015 Paris Agreement (PA), the international community agreed to limit the rise in global temperature to below 2°C. Roughly 30% of Nationally Determined Contributions under the PA include land-based mitigation technologies and practices. However, soil carbon (C), nitrogen (N) and phosphorus (P) responses, economic profitability and social constraints of a large-scale adoption of soil management practices (SMPs) potentially mitigating GHGs still include substantial uncertainties, particularly under climate change. ClimateCropping aims to provide scientific evidence, mainly based on long term experiments (LTEs), on how management of agricultural soils can contribute to climate change adaptation and mitigation, better cycling of N, P nutrients and other associated co-benefits in European (EU) cropping systems and pedo-climatic conditions. Furthermore, the project will contribute to the parametrisation and evaluation of soil C decision support models. We will implement an interdisciplinary approach that includes: field observations, metaanalysis of historical data, C, N and P and life cycle assessment modelling, agro-economic assessment and stakeholder engagement to evaluate the contribution of alternative SMPs: 1) reduced tillage, 2) cover cropping, 3) organic fertilisation and 4) crop residue retention, to climate change mitigation and adaptation in cropping systems along a North-South climate gradient across Europe. Historical data will be complemented with measurements in LTEs in seven EU countries (Austria, France, Germany, Ireland, Spain, Switzerland and UK). The focus will be on studying C sequestration potential, C balance, GHG mitigation, C footprint and effects on N and P cycling under above SMPs at local to regional scales. The soil assessment will be complemented with an assessment of economic and social sustainability including practical feasibility, and socio-cultural factors for social acceptance of a single or a combination of SMPs. Specific objectives are the following:

1. Determine soil C sequestration potential for alternative SMPs considering C, N and P inputs and inherent soil properties: soil C decision support models validation;
2. Evaluate the influence of climate change on soil C sequestration, N and P cycling under conventional and alternative SMPs;
3. Quantify climate change mitigation at field, farm and regional scale associated with the alternative SMPs using ecosystem and LCA modelling;

4. Assess the climate change adaptive capacity and economic profitability associated with the alternative SMPs;
5. Identify a) socio-cultural structural factors that enable or disable the adoption of alternative SMPs and b) policies that could accelerate the adoption of these SMPs in the EU.

The project will involve an international and interdisciplinary research team that will strive towards holistic understanding of the GHG mitigation impacts of selected SMPs, alone and in a combination, in main cropping systems across relevant climate regions and enable their uptake in EU agriculture. ClimateCropping directly addresses Topic B described in the EJP Call Announcement by studying soil management in the context of climate change using data derived from LTEs. The objectives align well with the national priorities related to GHG mitigation in each partner country, the results will contribute to the achievement of the national and international climate goals and will be highly relevant for the climatechange policies.

