

## PhD Project Advertisement

**Project title:** Enhancing Sustainability Assessment Frameworks for Regenerative Agriculture: Integrating Ecological, Social, and Economic Indicators for Comprehensive Analysis

**Project No:** FBS2024-095-Cain-cr

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### Project description:

Regenerative agriculture is gaining interest, with a key event in the farming calendar being a regenerative farming festival called Groundswell, which has grown from 400 attendees in 2015 to 6500 in 2023. With widespread interest also comes the desire for scientific data to underpin the farming practices. However, scientific studies do not all paint a consistent picture, and it is not clear that specific regenerative practices - such as reducing tillage, or planting cover crops - are universally beneficial. This project aims to fill this knowledge gap in the UK, which will be of wide interest to the food and farming community given that many are currently making plans towards reaching 'net zero'. For example, the UK supermarket Waitrose has pledged to achieve net zero carbon across its whole operations by 2035. The UK's National Farmers Union has an aspiration to achieve net zero in the sector by 2040. In addition to having net zero greenhouse gas emissions and biodiversity net gain targets, the UK government is also in the process of introducing 'environmental land management' schemes, highlighting a policy drive towards reducing the negative impacts farming has on the land, given 70% of the UK is farm land.

In this project, you will bring together the current state of the knowledge for regenerative agricultural practices in the UK, in particular for the environmental impacts (e.g. soil carbon, greenhouse gas emissions, water and air pollution, biodiversity) and the farm business impacts (e.g. yield, fertiliser requirements, profit). This research will be reviewed by industry experts in the agri-food sector to ensure it has real world relevance, as it will be used to make a plan for on-farm data collection.

You will develop a plan with Leckford Estate managers to collect on-farm data from 15 mixed farms (5 each of arable mixed with sheep, beef or dairy) in the UK which have introduced regenerative practices. The plan will be based on an existing framework (the Global Farm Metric, <https://www.globalfarmmetric.org>) which already covers qualitative and quantitative measures of sustainability (including soil health, biodiversity and animal welfare). You will collect and

analyse the data to study the trade-offs and co-benefits. You will spend approximately three months in total at the Leckford Estate in Hampshire over the course of the PhD (accommodation will be provided).

A minimum of three farms will be chosen to perform life cycle assessments of, in order to explore the costs and benefits of regenerative practices in more detail. A range of impacts will be assessed with a range of impact metrics, and an uncertainty analysis performed. This will allow you to test the project's hypothesis that regenerative agriculture produces food with a lower environmental impact than conventional agriculture, using a range of measures.

This project is in partnership with the Waitrose Farm at Leckford Estate, and so will be contributing to the real-world transition of the UK food supply chain towards more sustainable farming practices. The Sustainable Food Trust will provide data and support in working with the Global Farm Metric framework and assessment tool.

This project is sponsored by The Waitrose and Partners Farm, Leckford Estate, who will also support the student with accommodation during field data collection at Leckford Estate.

#### **Training opportunities:**

Cranfield PhD students all receive core, generic training e.g. in project management, data management and security, statistics, academic writing and presentation skills. A wide range of MSc modules are available at CU, including Evaluating Sustainability and Economic Appraisal.

Additional training will be provided by the supervisory team, or through training courses at either Cranfield or Reading, on:

- conducting a systematic review and meta-analysis;
- data collection techniques required for the Global Farm metric, namely: earthworm counts, biodiversity surveys, soil sampling, lab analysis of soil samples for bulk density and soil carbon;
- Life Cycle Assessment, including the use of SimaPro software.

Training opportunities specific to regenerative agriculture will also be identified through knowledge exchange activities planned within a KTP studentship application (in development) involving Waitrose, Reading University, NERC Innovate UK.

In a three month placement at the Leckford Estate, Hampshire, you will develop topic-relevant skills in field measurement, industry data analysis, and transferable soft work-environment skills, and will learn about the farm and its practices - both conventional and regenerative.

#### **Student profile:**

Applicants should hold, or expect to obtain, an upper-second class honours degree or higher in agricultural, environmental or biological sciences or related subjects. Experience in mathematical modelling, sustainability assessment and statistics is desirable. An understanding of the challenges facing the Agri-Food system is desirable but not essential, as is experience of presenting and publishing. We welcome applications from students from all backgrounds who fulfil these qualities.

#### **Stipend (Salary):**

FoodBioSystems DTP students receive an annual tax free stipend (salary) that is paid in instalments throughout the year. For 2023/24 this is £18,622 and it will increase slightly each year at rate set by UKRI.

#### **Equality Diversity and Inclusion:**

The FoodBioSystems DTP is committed to equality, diversity and inclusion (EDI), to building a doctoral researcher(DR) and staff body that reflects the diversity of society, and to encourage applications from under-represented and disadvantaged groups. Our actions to promote diversity and inclusion are detailed on the [FoodBioSystems DTP website](#).

In accordance with UKRI guidelines, our studentships are offered on a part time basis in addition to full time registration. The minimum registration is 50% FT and the studentship end date will be extended to reflect the part-time registration.

**For up to date information on funding eligibility, studentship rates and part time registration, please visit the [FoodBioSystems website](#).**