

## Economic Evaluation of Agroecological Measures to Reduce Nitrogen Surplus in Dairy Farming Systems

**Walsh Scholars Reference Number:** 2024227

**University:** South East Technological University (SETU)

**Funding:** Teagasc

**Research Institution:** Teagasc

**Location:** Teagasc Moorepark, Co. Cork

**Proposed Start Date:** September 2026

### Project Description

Reducing nitrogen surplus while maintaining productive and economically viable dairy systems is a central challenge for European agriculture. The HEAL (Holistic Evaluation of Agroecological Measures on Farm) project examines the role of ley cropping and alternative forage systems as agroecological measures to reduce nitrogen inputs and associated environmental pressures across dairy farming systems in Ireland and Europe.

Across much of Europe, dairy production systems incorporate annual cropping, where ley crops can improve soil structure and nutrient cycling over multi-year rotations. In contrast, Irish dairy systems are predominantly based on permanent pasture. Introducing annual or ley crops into these systems offers potential to increase annual feed production, diversify conserved forages, and reduce reliance on external inputs while maintaining output. However, the economic implications of adopting these systems under Irish and European conditions remain insufficiently quantified.

The aim of this PhD project is to evaluate the ecological, environmental, and economic performance of novel and conventional forage systems within dairy farming systems. The research will assess the use of legume crops in rotation with annual crops, intercropped with annual crops, or as alternatives to long-term grass-only swards in both grazing and forage conservation scenarios. Bioeconomic models will be developed using data generated in Ireland and across European case studies to quantify impacts at farm level. The project will generate evidence to support sustainable nitrogen management, contribute to improved water quality outcomes, and inform policy and farm-level decision-making.

### Supervision

The project will be supervised by Dr Hazel Costigan at Teagasc, whose research focuses on nutrient loss, efficiency, and enteric methane emissions in pasture-based dairy systems. Her work includes research on water quality, methane-reducing feed additives for grazing dairy cows, and improving the efficiency of replacement heifer rearing. Co-supervision will be provided by Dr Ciaran Hearn, Lecturer in the Department of Land Sciences at South East Technological University, contributing university-based expertise in land sciences. Together, the supervisory team integrates applied Teagasc research in dairy system sustainability with academic oversight from a land-use and systems perspective.

### Research Environment

You will be registered at South East Technological University and based at Teagasc Moorepark, a major centre for dairy, grassland, and agri-environmental research. The project provides access to experimental farm data, research infrastructure, and an interdisciplinary research environment supporting systems-based analysis of agricultural sustainability.

As a Walsh Scholar, you will engage with national and international research networks and collaborate with researchers working across agricultural economics, environmental sustainability, and farming systems analysis.

### Career and Training Opportunities



The Teagasc Walsh Scholars Programme provides a structured four-year training and development framework designed to support both academic excellence and long-term career readiness. Scholars develop advanced scientific and analytical expertise alongside transferable skills in communication, project management, and stakeholder engagement through expert-led training, workshops, and tailored professional development.

Opportunities are provided to present research at national and international conferences, supporting professional networking and active engagement with the wider research community. Dedicated final-year career supports focus on preparing scholars for impactful roles across research, industry, advisory services, and policy, in Ireland and internationally.

Through the Teagasc International Training Awards, scholars may undertake an international research placement of up to 12 weeks aligned with their PhD project. Outstanding achievement may also be recognised through the Walsh Scholars of the Year and Gold Medal Awards.

### **Candidate Profile and Eligibility**

Applicants should ideally:

- Hold a First or 2.1 Honours degree (or Master's) in agricultural science, economics, modelling, or a related discipline
- Demonstrate strong data handling and analytical skills
- Show the ability to apply multidisciplinary approaches to hypothesis-driven research
- Demonstrate understanding of Irish and European dairy farming systems
- Possess good written and verbal communication skills and the ability to work effectively as part of a research team
- Be willing to travel for fieldwork and engage with farmers and stakeholders
- Hold a full, clean driving licence valid in Ireland
- Meet SETU postgraduate entry and English language requirements

### **Funding Details**

This is a fully funded four-year PhD funded by Teagasc, including:

- €25,000 annual stipend
- University fees covered up to €6,000 per annum

### **How to Apply**

Applicants should complete the [online application form](#) by **5:00pm on Wednesday, 18 March 2026**.

Applications must include a curriculum vitae and a 1–2 page statement of motivation submitted as part of the online application.

### **Interviews**

Shortlisted candidates will be invited to interview in **early to mid-April 2026**. Online interviews can be accommodated.

### **Further Information**

Informal enquiries are welcome and may be directed to: Dr Hazel Costigan – [hazel.costigan@teagasc.ie](mailto:hazel.costigan@teagasc.ie)

Further information on the Walsh Scholars Programme is available at:

<https://www.teagasc.ie/about/research-innovation/the-walsh-scholars-programme/about-the-programme/>