

Title: Farming for soil health: assessing the impact of agricultural practice on soil biodiversity and functioning



Project start date: 1/9/2022 **Project end date:** 30/11/2027

Project Leader: Dr Fiona Brennan, Teagasc, Crops, Environment and Land-Use Programme, Johnstown Castle, Co. Wexford

Abstract:

Soils are home to a staggering abundance and diversity of living organisms that are integral to the health and productivity of our farming systems. Mainly hidden beneath our feet, these organisms are often unseen and forgotten, but there is an increasing awareness that soil life, and the myriad of processes it performs, are critical for delivering a whole range of vital ecosystem functions. Their importance to the sustainability, resilience and functioning of our farming systems cannot be overstated.

These organisms become even more vital in organic farming where the use of synthetic fertilisers and additives is severely restricted. The central role played by soil biota in nutrient transformations, climate regulation and plant health places them at the heart of global challenges around food security and climate change. As international efforts towards carbon neutrality and environmental sustainability intensify, a key focus is on development of climate-resilient agricultural systems that are capable of maintaining food production and farm incomes, while minimising environmental impacts.

Sustaining crop production against the backdrop of restricted inorganic fertiliser inputs and restricted plant protection products, within the context of a changing climate, represents a major challenge for farmers. Steering microbial communities towards nature-based nutrient provision, enhanced climate resilience and pest/disease suppression will be key to maintaining productivity on organic farms.

This project aims to assess the impact of management options on soil biodiversity within Irish grassland systems, providing the knowledge base that will underpin management advice towards enhancing soil health and functioning, and support policy implementation. Furthermore it will also evaluate the impact of management induced gradients of microbial diversity on the delivery of multiple functions within agricultural systems and identify any functional trade-offs under a range of conditions.