The North Wyke Farm Platform

ROTHAMSTED RESEARCH

A unique national and global research facility linked to real-world farming

The North Wyke Farm Platform 'farm lab' is a large-scale, highly instrumented farm-system research facility designed to assess the sustainability of farming systems and management interventions at scale. It has the unique capacity to assess and compare the system-scale co-benefits and trade-offs associated with the management of grazing livestock or arable systems.

The platform is composed of three self-contained small farms, each of which is managed under a different operational philosophy. Within each, every relevant input from fertiliser to manpower, and all key outputs, including pollutants in runoff from fields, greenhouse gases, and ultimately profits, are monitored.

This internationally unique facility allows research outputs to be relevant to real-world food producers and makes the platform an excellent venue for knowledge exchange events.

Particular areas of expertise include:

- ✓ Soil science
- ✓ Grazing systems
- ✓ Greenhouse gases
- ✓ Ruminant health & nutrition
- ✓ Trade-off analyses for farm management and interventions
- ✓ Hydrology and water-based emissions

The facility is used by national and international collaborators from a wide spectrum of scientific disciplines, with particularly strong capability to accommodate studies on pasture-based livestock production systems.

Research is helping identify land management strategies to optimise the transfer of essential nutrients from soil to crops, livestock, and then into food, thereby contributing to a healthy diet and cleaner natural environment at the same time.

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Technical specification

- The Farm Platform provides three farming systems in farmlets, each consisting of five component catchments comprising approx. 21 ha in total per farmlet. A fourth housed system for cattle has also been in operation since 2019 when one farmlet transitioned to an arable system.
- Currently two of the farmlets are managed using alternative approaches to livestock production from grassland. In all three farmlets, measurements on water, air and soil are recorded in situ.
- Each of the grazed farmlets carry their own herd of yearling cattle and flock of ewes and lambs. All animals are weighed on and off the grazing to determine live-weight gain. During winter housing, the animals are fed silage from the farmlet they were grazing.
- Rainfall, soil water content, runoff, water quality and soil temperature are monitored in-situ in each of the 15 catchments. There are also two meteorological stations situated at the centre of the platform providing a full suite of measurements. One is an existing Met Office station (circa 1982), the other a Farm Platform station (circa 2013).
- There are three sets each of 12 LiCor automated chambers, one set for each farmlet. These are operated at regular intervals to determine greenhouse gas (GHG) fluxes. Eddy covariance towers sited in each farmlet and Greenfeed systems in the cattle housing also monitor GHGs.
- Remote sensing is applied to monitor vegetation health and growth over the farm platform via drone imagery. This is complemented by NIR sensing from a forage harvester.
- Data relating to the farm management is extensive, such as animal movement (field to field), field FYM, fertilizer, lime and pesticide applications, and tractor/machinery hours.
- A John Deere self-propelled forage harvester (8100) with a harvest lab NIR sensor provides in-field mapping of dry matter, crude protein, fibre (NDF and ADF) and sugars.

Robert Orr Small Ruminant Facility

The Robert Orr Small Ruminant Facility is an integral part of the Farm Platform. It can house 400 or more ewes and up to 60 goats, with group and single pen facilities for feeding and behavioural research trials, including 24 automatic feeding pens.

The flocks reared on the Farm Platform's different farming systems are separated over winter to examine and compare the environmental and efficiency benefits of each.

Nutrients taken in, animal growth, urine and faeces produced, and the greenhouse gases being emitted by the sheep, individually or in groups, are measured during housing.

The facility can develop tailor-made research trials to address critical industry needs including:

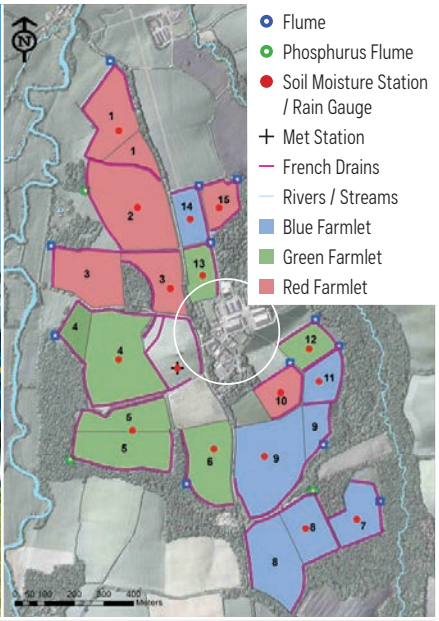
- Effect of various forage types and protein supplements on the performance of ewes during pregnancy and early lactation
- The effect of supplemental minerals on the performance of ewes and lambs
- The effects of sire breed on lamb performance and carcass quality
- Effect of feed supplements on the health and wellbeing of ewes, and potential impact on ecto-parasites
- The fate of water during rumen metabolism in goats and sheep

The facility can also play host to farmer groups interested in sheep production systems and as a tool to demonstrate recent research findings to help improve on-farm management.

National Capability

The core data collected from across the Platform are available to all users (researchers and collaborators) via a data portal: www.nwfp.rothamsted.ac.uk

The North Wyke Farm Platform is open to external researchers to conduct their own research upon approval of an access request: www.resources.rothamsted.ac.uk/farmplatform



Schematic layout

> **The North Wyke Farm Platform**

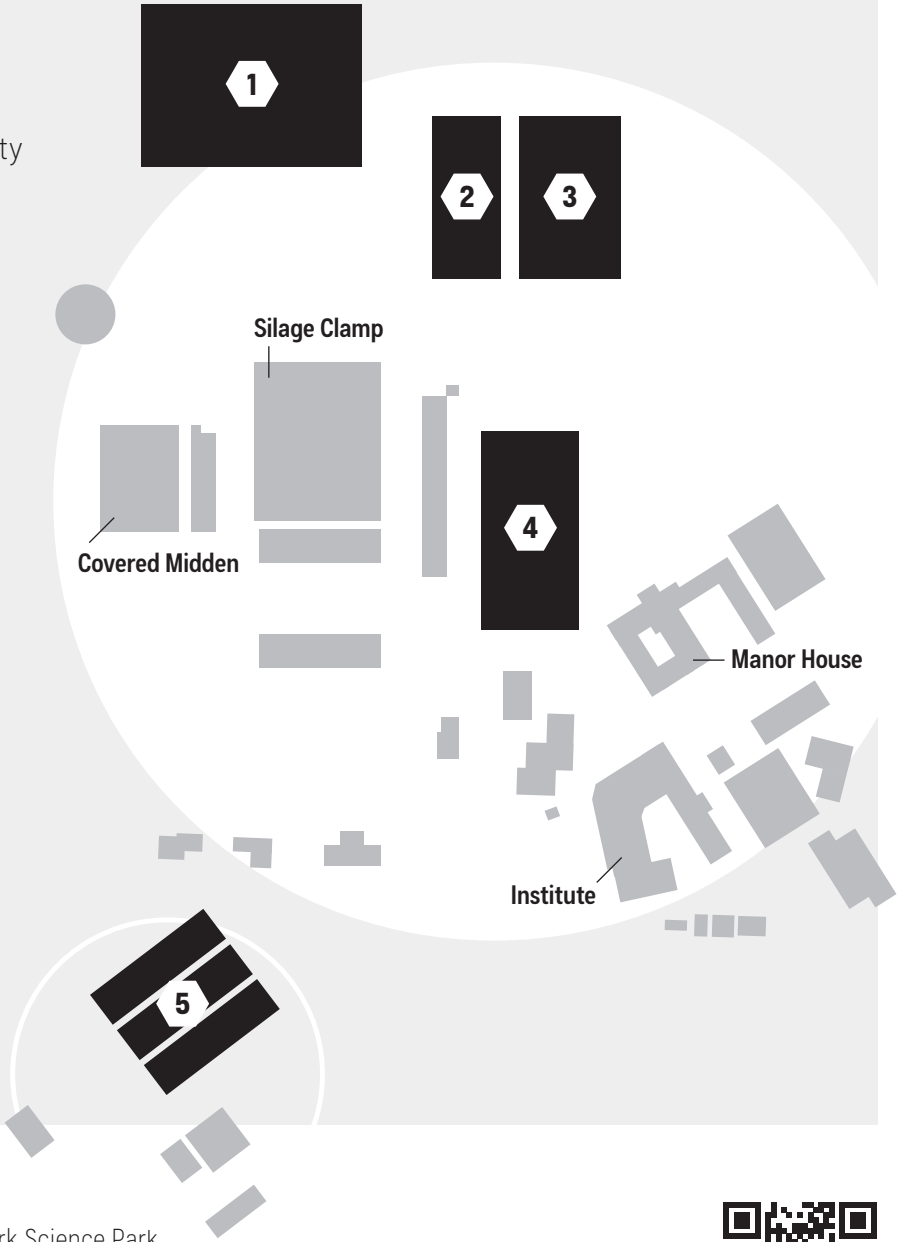
1 Robert Orr Small Ruminant Facility

2 Sheep

3 Cattle

4 Suckler Beef

5 Cattle winter housing with Greenfeed systems



Plan for illustrative purposes only

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