Grazing on the North Wyke Farm Platform

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http://www.rothamsted.ac.uk/farmplatform
Three approaches to sustainable grassland management:

• Permanent grassland

• Increased use of legumes

• Planned reseeding
Management on each farmlet

Beef and sheep - continuously stocked

- 75 ewes and their lambs
- 30 yearling beef cattle

First silage cut (late May/early June)

Second silage cut (July/August)

FYM applied after cutting
Grassland systems can be designed and managed to deliver optimal sustainable production per unit area, whilst minimising negative impacts on other ecosystem services.

Our vision is to make the Farm Platform a globally recognised model for systems research in sustainable food and farming.
Topography and hydrology

- slightly stony clay loam topsoil (36% clay)
- impervious mottled stony clay (60% clay)
Soil
- % Moisture
- Temperature
- pH
- Bulk density
- N, P & C status

Atmosphere
- Rainfall
- CO$_2$ and N$_2$O

Farm Management
- Field inputs/outputs
- Liveweight gain
- Farm activities
- Labour hours
- Machine hours

Water
- Temperature
- Conductivity
- Turbidity
- pH
- Dissolved O$_2$
- Ammonium
- Nitrate
- Dissolved organic C

15 flume laboratories
Flow cell & sensors
Sequential/composite sampler
Other instruments

- 15 soil moisture stations: Precipitation, Soil temp (15 cm), Soil moisture (10, 20 & 30 cm)
- Met site: Air temp, RH, Wind speed and direction, solar radiation, ETo
- 3 automated gas sampling systems: CO₂ and N₂O
Other instruments

3 Eddy Covariance towers; 1 in each farmlet

Measure carbon dioxide, water vapour (evapotranspiration) and energy flux at each tower
(Plus one roving methane flux unit)
Other instruments

COsmic-ray Soil Moisture Observing System UK

North Wyke COSMOS probe soil moisture content on filtered counts

Volumetric Water Content (%)
Dedicated cattle housing, silage clamps & FYM middens for each farmlet
Dedicated GreenFeed units for each farmlet

System offers a small amount of pelletized bait attractant to entice the animals to visit multiple times per day

GreenFeed – Large Animals

Measure methane and carbon dioxide fluxes
To be built 2016/2017 – dedicated sheep housing for each farmlet, with CRFI (Controlling and Recording Feed Intake) system.
### Sustainability metrics for beef and sheep

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measure</th>
<th>Units</th>
<th>Permanent pasture</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Animal performance</strong></td>
<td>Liveweight gain from weaning to sale</td>
<td>(kg per day)</td>
<td>0.75 (cattle)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>0.165 (lambs)</td>
</tr>
<tr>
<td><strong>Annual carrying capacity</strong></td>
<td>Animals per ha</td>
<td>(kg live weight per ha)</td>
<td>271 (cattle)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>164 (ewes)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>58 (lambs)</td>
</tr>
<tr>
<td><strong>Nutritional provision</strong></td>
<td>Human edible nutrients per ha</td>
<td>Energy (MJ ha(^{-1}))</td>
<td>4365</td>
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<tr>
<td></td>
<td></td>
<td>Protein (kg ha(^{-1}))</td>
<td>77.4</td>
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<tr>
<td></td>
<td></td>
<td>Fat (kg ha(^{-1}))</td>
<td>68.7</td>
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<tr>
<td></td>
<td></td>
<td>Omega-3 (kg ha(^{-1}))</td>
<td>3.8</td>
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<tr>
<td></td>
<td></td>
<td>Vitamin B12 (mg ha(^{-1}))</td>
<td>10.6</td>
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<tr>
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<td>Haem iron (g ha(^{-1}))</td>
<td>7.5</td>
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</table>

Fibre analysis at North Wyke

- Crude fibre (CF)
- Neutral detergent fibre (NDF)
- amylase treated Neutral detergent fibre (aNDF)
- acid detergent fibre (ADF)
- acid detergent lignin (ADL)
Meat analysis at Langford

Analyse meat samples from 5 CHX steers per farmlet

- pH
- colour (shelf life)
- TBARS
- vitamin E
- total carotene in fat
- fatty acid
- texture (mechanical)
- sensory attributes
Farm Platform Data Portal

Register and/or log in if you want to download data.

Click on the map below to select catchments.

Start Date: 2012-10-17
End Date: 2013-09-17

Data Preview for 15 min time series data only

Flow (l/s) [Catchment 2]
Flow (l/s) [Catchment 4 Prior to 2013/08/13]

Series are scaled to fit plot. Hover to see unscaled values.

The above preview plot is restricted to 6 months of data from the selected start date and 5 individual series. This limitation does not apply to downloaded data.