LAND USE *for* NET ZERO >>> HUB

Soil Health and Carbon Dynamics
Topic Advisory Group

# Soils Data and the Land Use Framework for England

## *Expert Workshop*

**31st March 2025, 2.30pm – 4pm**

UK Research and Innovation
Department for Environment Food & Rural Affairs
Department for Energy Security & Net Zero
Department for Science, Innovation, & Technology
Scottish Government Riaghaltas na h-Alba gov.scot
Llywodraeth Cymru Welsh Government
Department of Agriculture, Environment and Rural Affairs

# Agenda

**Welcome**

**Session 1 Introduction** – Ellen Fay

Observations from workshop contributors covering:

- *What kind of soils data (health and type) do you use / generate, at what resolution?*
- *Who 'owns' this data, how available is it (public or private)?*
- *How do you apply / present it (maps, apps, portals etc)?*
- *What decision-making does it enable by whom?*

**Session 2 Introduction** – Pete Smith

How can Government unlock soils data for improved decision-making?

Group Discussion of Consultation Questions 17 - 20

**Observations & next steps:** Ellen Fay and Matthew Orman, SSA

# Speakers

| Name | Organisation |
|---|---|
| Ellen Fay | SSA, LUNZ Soil Health and Carbon Dynamics Topic Advisory Group |
| Professor Pete Smith | University of Aberdeen, LUNZ Soil Health and Carbon Dynamics TAG |
| Matthew Orman | SSA, LUNZ Comms Lead and Policy |
| Professor Steve Hallett | LandIS, Cranfield University |
| Dr. Matt Aitkenhead | James Hutton Institute |
| Graeme Willis | CPRE, the Countryside Charity |
| Crispin Hambidge | Environment Agency |
| Tim Hopkin | Land App |
| Tom Scrope | Soil Benchmark |
| Dave Nicholson | Agricarbon |

# LUF Consultation Questions

*How can Government unlock soils data for improved decision-making?*

**QUESTION 17:** What changes to how Government's spatial data is presented or shared could increase its value in decision making and make it more accessible?

**QUESTION 18:** What improvements could be made to how spatial data is captured, managed, or used to support land use decisions in the following sectors? Please give any reasons for your answer or specific suggestions.

**QUESTION 19:** What improvements are needed to the quality, availability and accessibility of ALC data to support effective land use decisions?

**QUESTION 20:** Which sources of spatial data should Government consider making free or easier to access, including via open licensing, to increase their potential benefit?

# LUF Consultation Question 17

*What changes to how Government's spatial data is presented or shared could increase its value in decision making and make it more accessible?*

a) Updating existing Government tools, apps, portals or websites

b) Changes to support use through private sector tools, apps or websites

c) Bringing data from different sectors together into common portals or maps

d) Increasing consistency across spatial and land datasets

e) More explanation or support for using existing tools, apps or websites

f) Greater use of geospatial indicators such as Unique Property Reference Numbers (UPRNs) and INSPIRE IDs to allow data to be more easily displayed on a maps

g) Other (please specify)

# LUF Consultation Question 18

*What improvements could be made to how spatial data is captured, managed, or used to support land use decisions in the following sectors? Please give any reasons for your answer or specific suggestions.*

a) Development and planning: such as environmental survey data

b) Farming: such as supply chain data and carbon or nature baseline measurements

c) Environment and forestry: such as local and volunteer - collected environmental records

d) Recreation and access: such as accessible land and route data

e) Government - published land and agricultural statistics

# LUF Consultation Questions 19 and 20

***19:*** *What improvements are needed to the quality, availability and accessibility of ALC data to support effective land use decisions?*

***20:*** *Which sources of spatial data should Government consider making free or easier to access, including via open licensing, to increase their potential benefit?*

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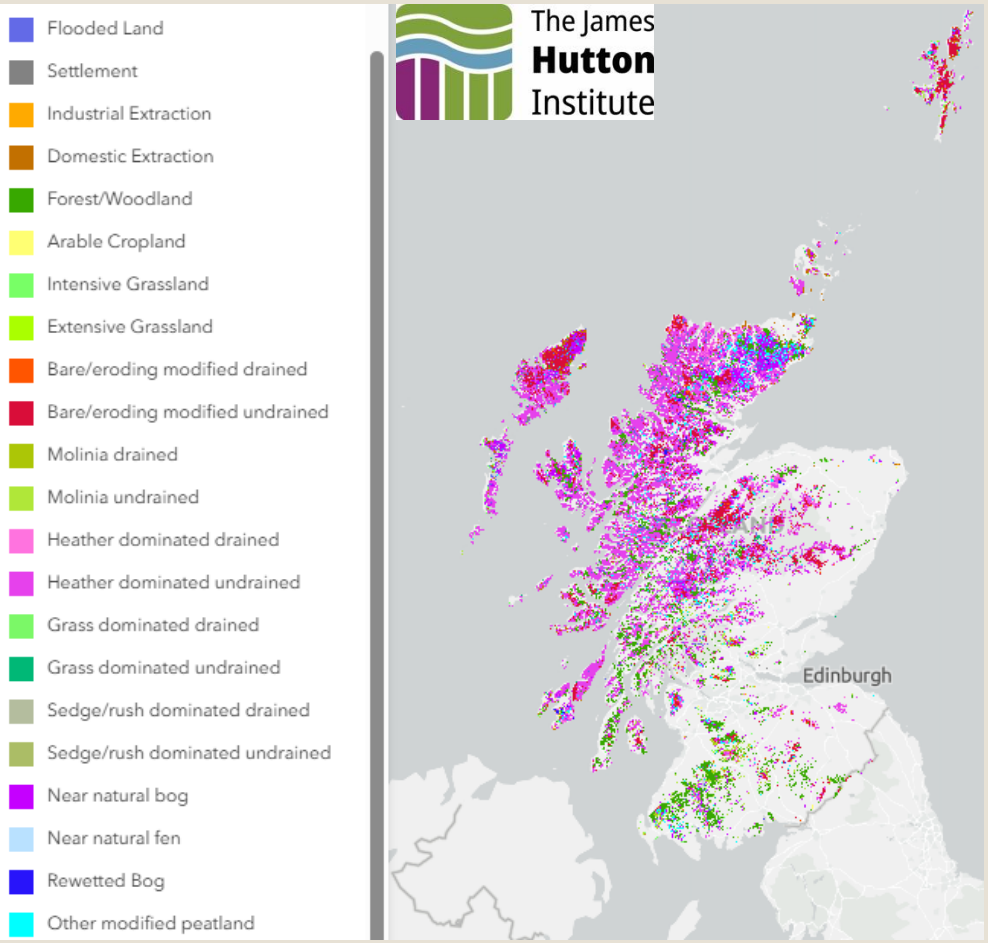
# Matt Aitkenhead, Soil Scientist, James Hutton Institute




- My team develops soil maps for Scotland, focusing on soil carbon and including peatland condition and restoration prioritisation.
- The datasets we generate are publicly available once they have been published and can be emailed or made available for download upon request.
- The datasets are available in standard GIS format, but we also provide them online in storymaps (e.g. at Land Use Transformations) and electronic reports.
- Our outputs and deliverables are used by Scottish Government policymakers and regulatory bodies (e.g. NatureScot) to target landscape restoration and the implementation and development of policy goals.

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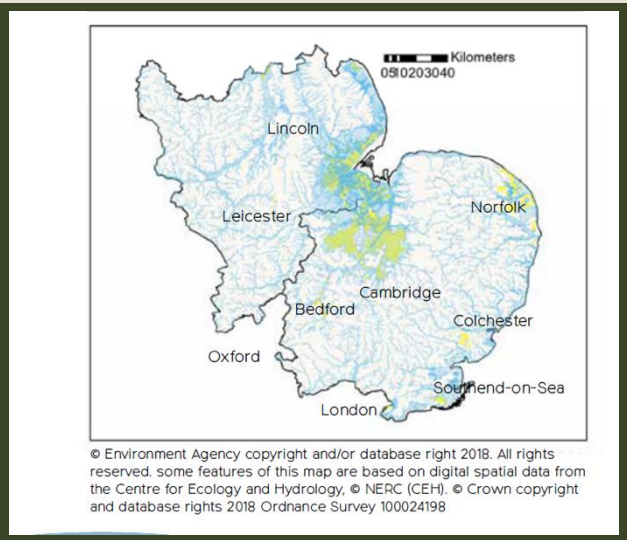
# Graeme Willis, CPRE, Agricultural Lead





CPRE The countryside charity

- Provisional ALC 1:250,000 dataset
- Public open access (available at www.magic.gov.uk)
- For policy advocacy in maps in reports e.g. Building on our food security, ad hoc maps for local CPRE network
- National and local government for strategic and local land use decisions ; by developers to avoid ALC land ; by activists

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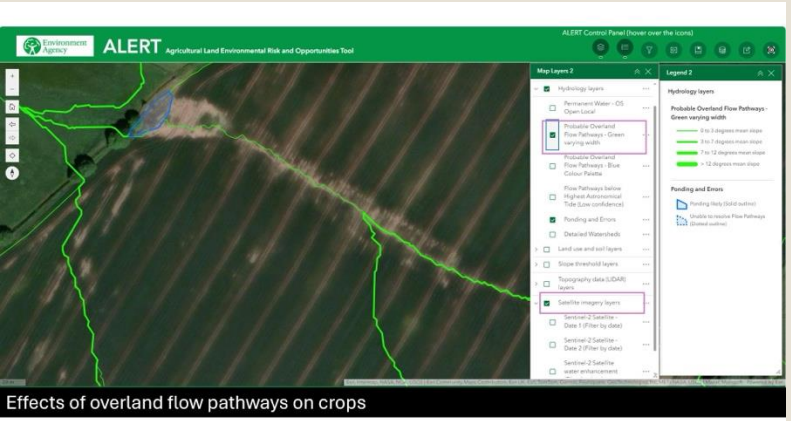
# Crispin Hambidge, Earth Observation Specialist, Environment Agency



Effects of overland flow pathways on crops

- The ALERT tool
- Combination of data ownership that is in the public domain, including Environment Agency LIDAR data and derived products e.g. detailed Overland Flow Pathways, Slope, potential ponding areas.
- Web mapping system to help users understand field and landscape scale risks relating to agricultural pollution.
- Farm advisors, consultants and land managers can use the system to view high resolution earth observation and other geospatial datasets to help target landscape and in-field interventions to reduce soil erosion and agricultural pollution.

Environment Agency

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# Tim Hopkin, Founder, CEO, Digital Land Solutions Ltd

Land App

| | | |
|---|---|---|
| Name | Soil organic carbon for 10-30cm depth (tonnes/ha) | Visual inspection of soil structure bottom |
| Description | Soil organic carbon for 30-50cm depth (tonnes/ha) | Number of worms |
| SOM for 0 -10cm depth (%) | Phosphorus concentration (mg/l) | Aggregate stability after 5 minutes |
| SOM for 10 -30cm depth (%) | Potassium concentration (mg/l) | Aggregate stability after 120 minutes |
| SOM for 30 -50cm depth (%) | Magnesium concentration (mg/l) | field id |
| Bulk density for 0 -10cm depth ($g/cm^3$) | Phosphorus index | sheetid |
| Bulk density for 10 - 30cm depth ($g/cm^3$) | Potassium index | parcelid |
| Bulk density for 30 - 50cm depth ($g/cm^3$) | pH | Created at |
| Soil organic carbon for 0-10cm depth (tonnes/ha) | Visual inspection of soil structure top | Updated at |

# Tim Hopkin, Founder, CEO, Digital Land Solutions Ltd

Land App

FARM DATA SAFE


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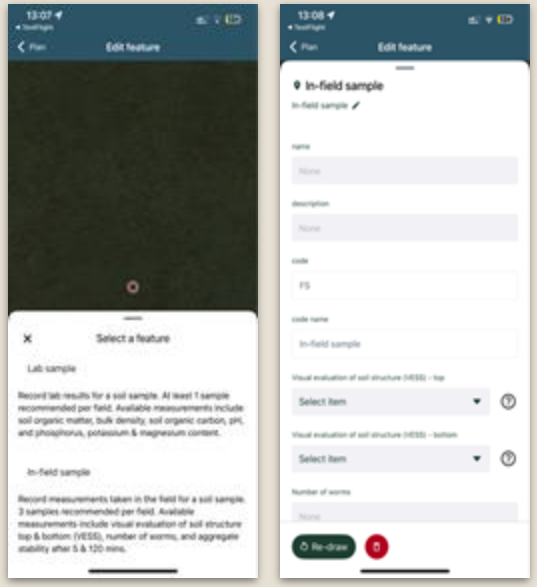
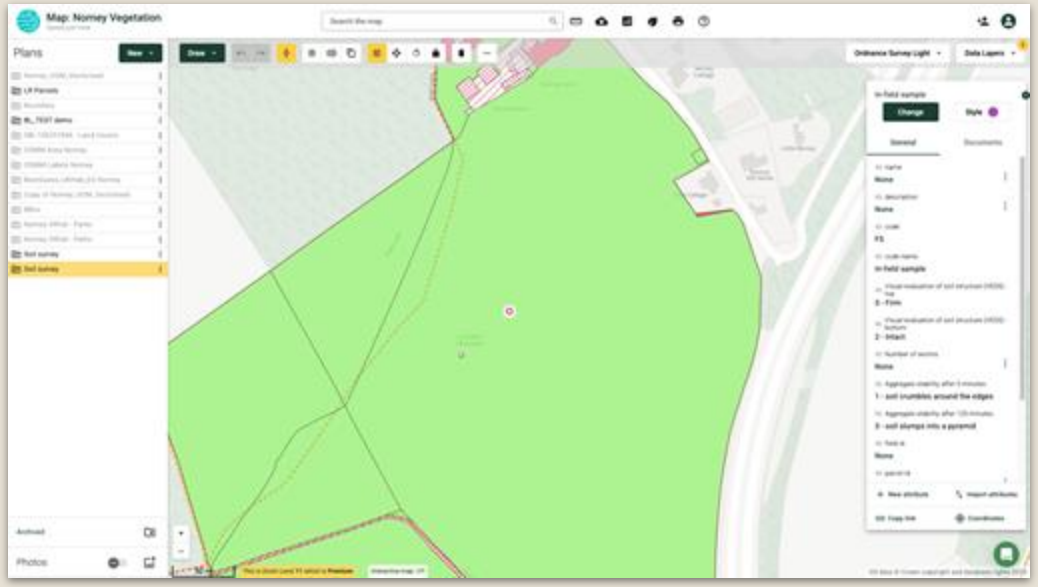
# Tim Hopkin, Founder, CEO, Digital Land Solutions Ltd

Land App

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# Tim Hopkin, Founder, CEO, Digital Land Solutions Ltd

Land App

- **Farmer** - tracked record keeping, self verification
- **Advisor** - support best practice, verify baseline, monitor contracts
- **Food Retail** - quality of soil in relation to farm resilience

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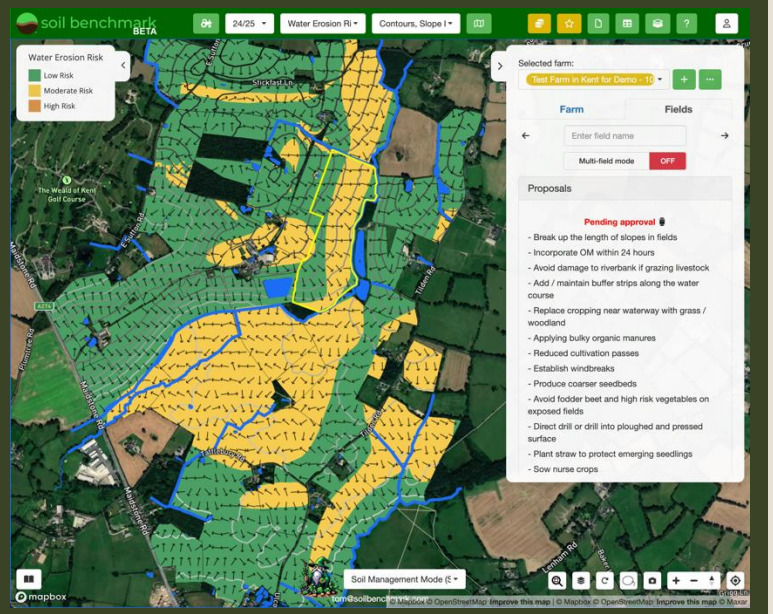
# Tom Scrope, Co-founder & CEO, Soil Benchmark




soil benchmark

- Using LIDAR data from EA, soil texture data from BGS and watercourse data from OS, we have built GB-scale risk maps
  - LIDAR data served as 10m grids (but could be down to 0.5m), as well as as slope direction arrows, field slope length calculations (for run-off)
  - Soil texture data derived from the BGS Soil Parent Material Model is 1:50,000
  - OS water data is detailed vector data
- Farms are added via SBI number, which crops the GB maps to the farm's field boundaries and brings in watercourses within 10m of any field
- Farms also add in their own soil sample data, which is mapped – primarily this is field level SOM data for SAM1 Soil Management Plans
  - increasingly getting gridded / zoned data
  - also getting more P / K / Mg / pH data – due to Nutrient Management Plans
- Users own their own data and can delete it from the platform at any time. Soil Benchmark have the right to use farm level data to train models, but we cannot (and would never try to) sell/license etc an individual farm's data.

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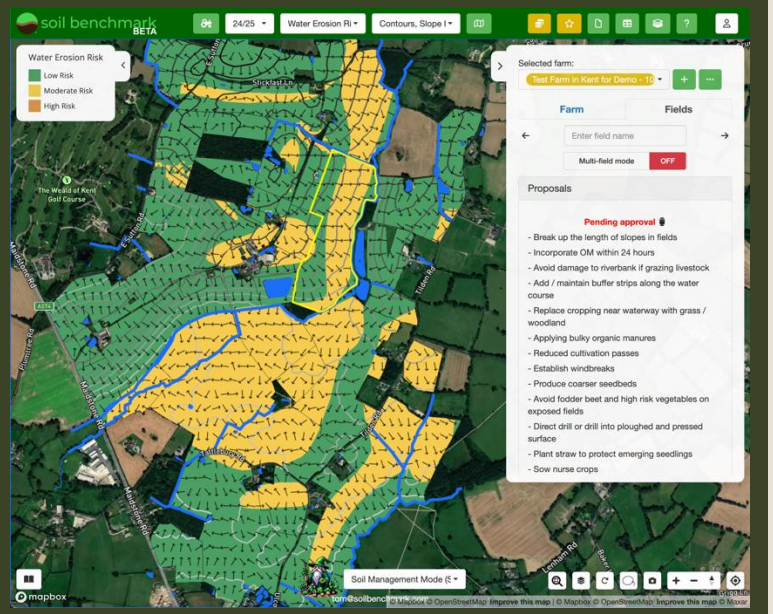
# Tom Scrope, Co-founder & CEO, Soil Benchmark




soil benchmark

- Everything is served through our cloud-based platform which can be accessed at Soil Benchmark.
  - It currently functions in England, Wales and Scotland only.
  - It's free to add as many farms as you like and access all the features described above. We charge only to create the PDF Management Plans required for SAM1 / NVZ etc.

- The platform supports (and makes much quicker) the creation of Soil, Manure and Nutrient Management Plans by pre-populating risk data, and completing a lot of a farmer's (or usually an agronomist's) compliance / reporting requirements.

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# Dave Nicholson, CPO, Agricarbon



Agricarbon

- Agricarbon measure soil organic carbon and bulk density at core depths of up to 1m, and at up to 4 depth layers in each core. Each sub-core sample is independently analysed for both BD and SOC (using the Dumas method of elemental analysis). Sample results are aggregated to field, farm and project level, and are provided with uncertainty information
- All data is exclusively owned by the Agricarbon client, though Agricarbon retain rights to use the data for limited internal purposes (such as statistical analysis, improving existing or developing new propositions, audit etc). The data is not publicly available.
- We have just moved to an online portal for presentation of the data and analysis. Customers can also download their results as a PDF, or as a CSV of the raw data on at per sample level.
- By providing a SOC baseline (and later re-measurement to detect change) we enable decisions to be made about regenerative agriculture strategies to sequester carbon (for insetting and offsetting), ROI calculations for carbon project developers, and asset valuations for natural capital owners. We also enable academic or other research groups to be better informed about the state of soil health for studies and surveys.

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# Thank you

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Scottish Government
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Welsh Government

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