GREATSOILS

AHDB

AHDB GREATsoils Programme

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AHDB

AHDB is a statutory levy board, funded by farmers, growers and others in the supply chain to help the industry succeed in a rapidly changing world


BEEF & LAMB


CEREALS & OILSEEDS


DAIRY


HORTICULTURE

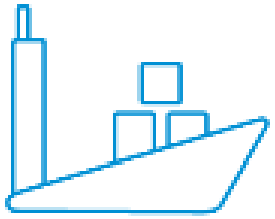

PORK


POTATOES

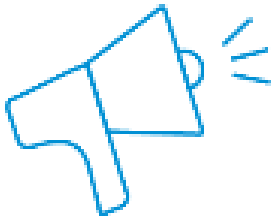
What we do at AHDB

Research & knowledge exchange

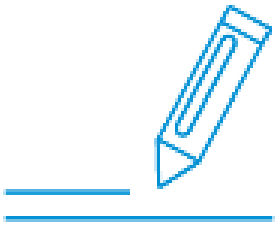
Market intelligence



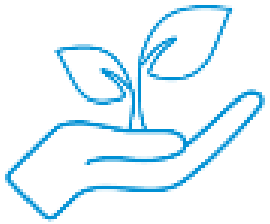
Exports



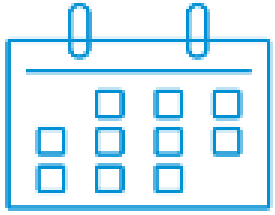
Marketing



Education

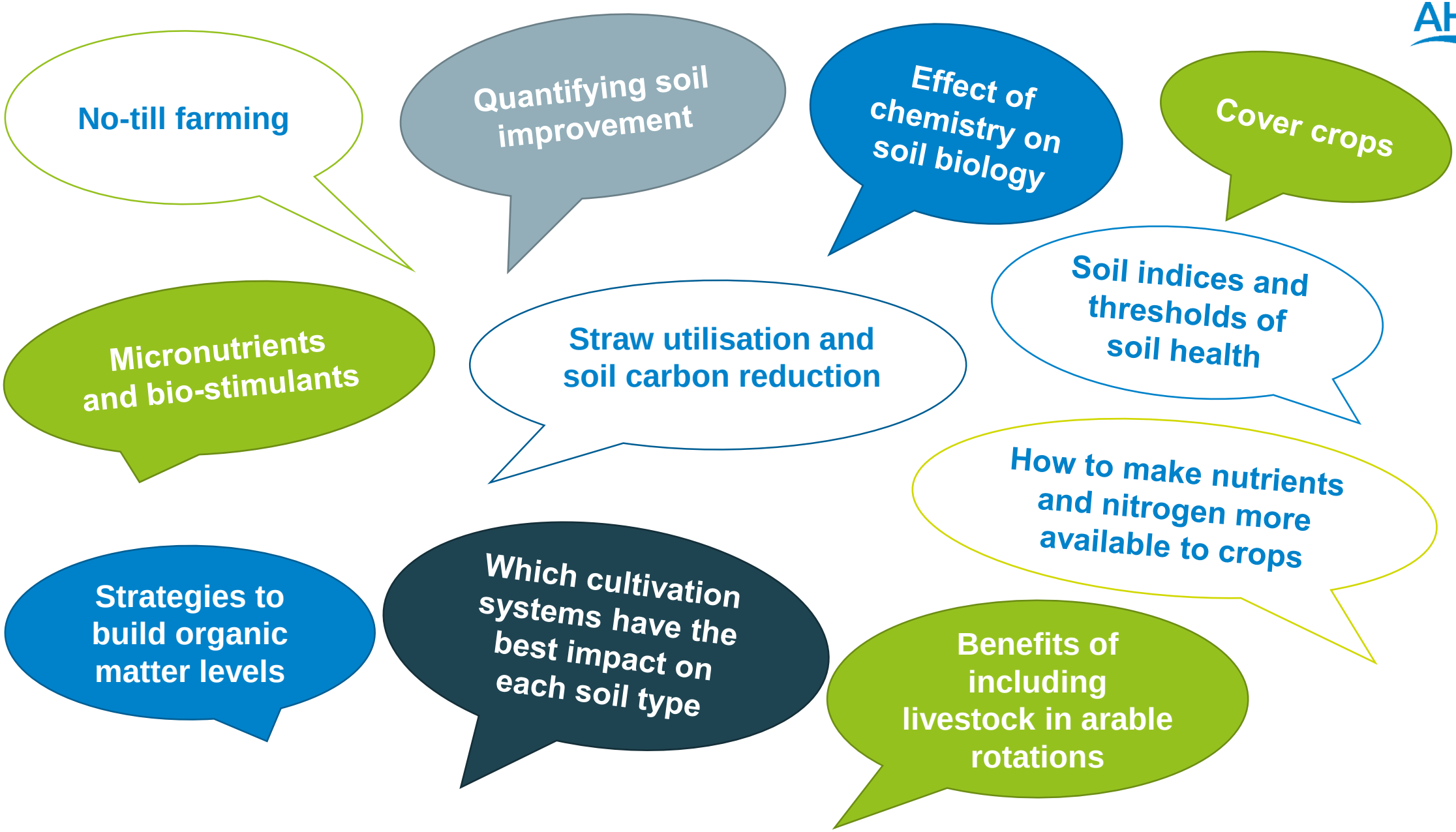


The environment



Events

Skills programme


No-till farming
Quantifying soil improvement
Effect of chemistry on soil biology
Cover crops
Micronutrients and bio-stimulants
Straw utilisation and soil carbon reduction
Soil indices and thresholds of soil health
How to make nutrients and nitrogen more available to crops
Strategies to build organic matter levels
Which cultivation systems have the best impact on each soil type
Benefits of including livestock in arable rotations

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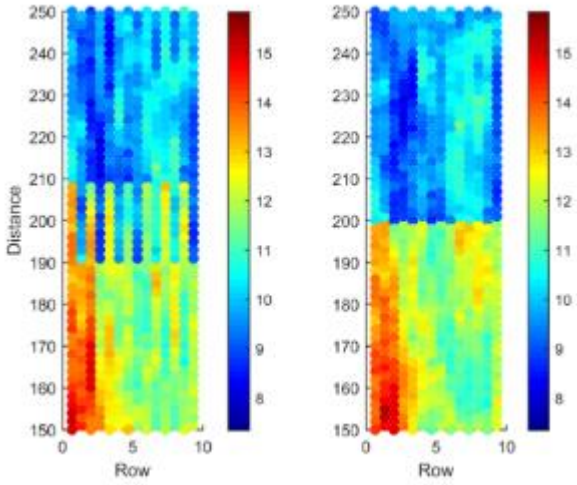
Integrated programme of research and knowledge exchange

- Rotations
- Cultivations
- Compaction
- Organic matter
- Soil nutrients
- Cover crops
- Soil biology
- Soil health
- Precision farming



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GREATSOILS
Field drainage guide
Principles, installations and maintenance
GREATSOILS
Healthy grassland soils Four quick steps to assess soil structure
Step one: Surface assessment
Good
Moderate
Poor
Step two: Soil extraction
GREATSOILS
Soil pH – how to measure and manage it based on an understanding of soil texture
GREATSOILS
Compost is good news for soil health
FACTSHEET
GREATSOILS
Soil structure and infiltration
FACTSHEET
GREATSOILS
How to count earthworms
FACTSHEET
GREATSOILS
Soil assessment methods
GREATSOILS
Testing soil health
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Soil management information system

- Developed by Cranfield University and PGRO with funding from AHDB
- Cloud-based software package
  - draws together data on soil management from growers (anonymously), research projects and literature
  - presents information that helps farmers and growers make decisions on soil management
- Software and user manuals will be published by AHDB in 2019
- AHDB is looking to develop the software in partnership with other organisations

GREATsoils Partnerships

Research and Knowledge Exchange

Rotations Partnership

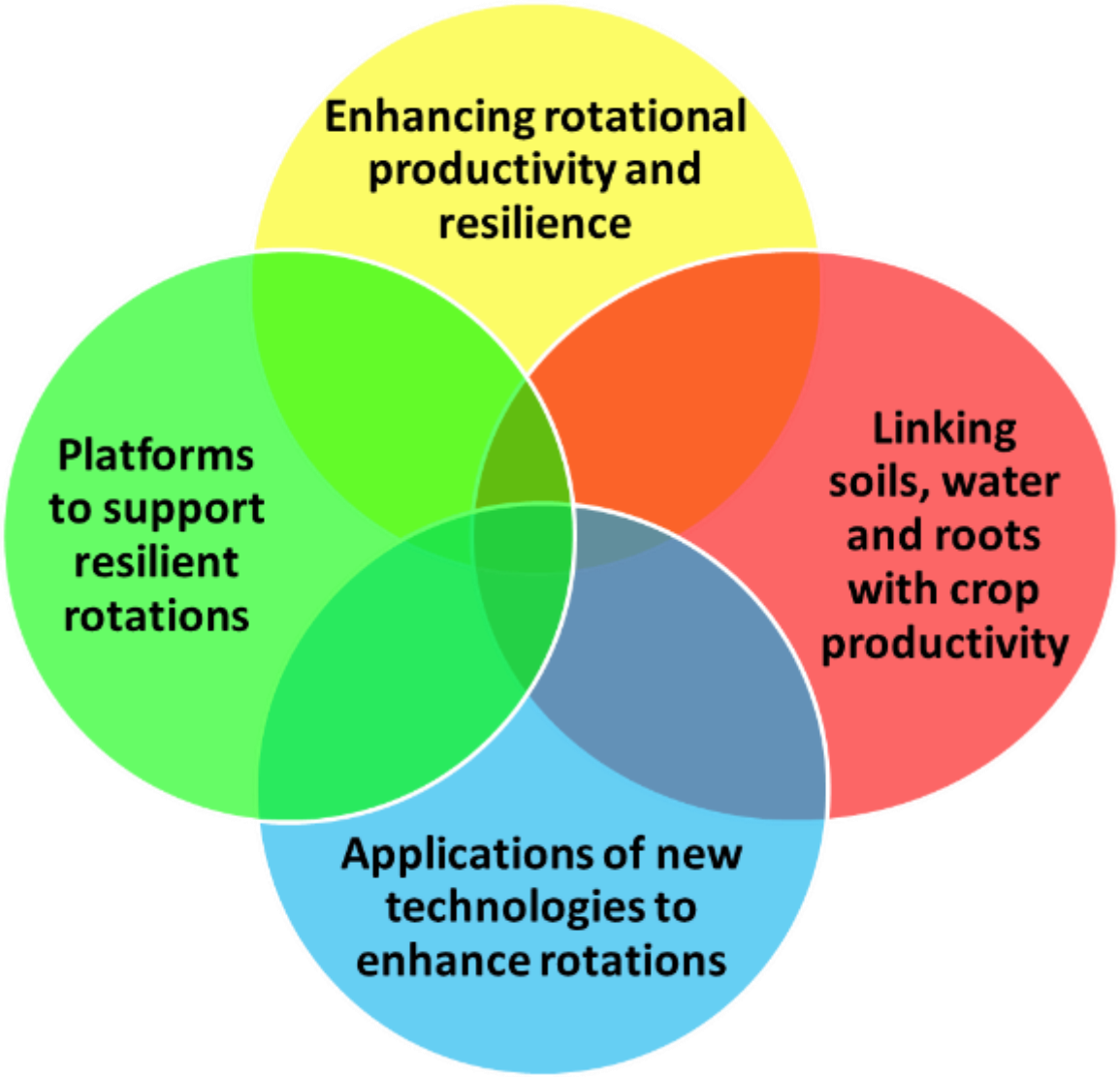
NIAB CUF

Potato Crop Management

The James Hutton Institute

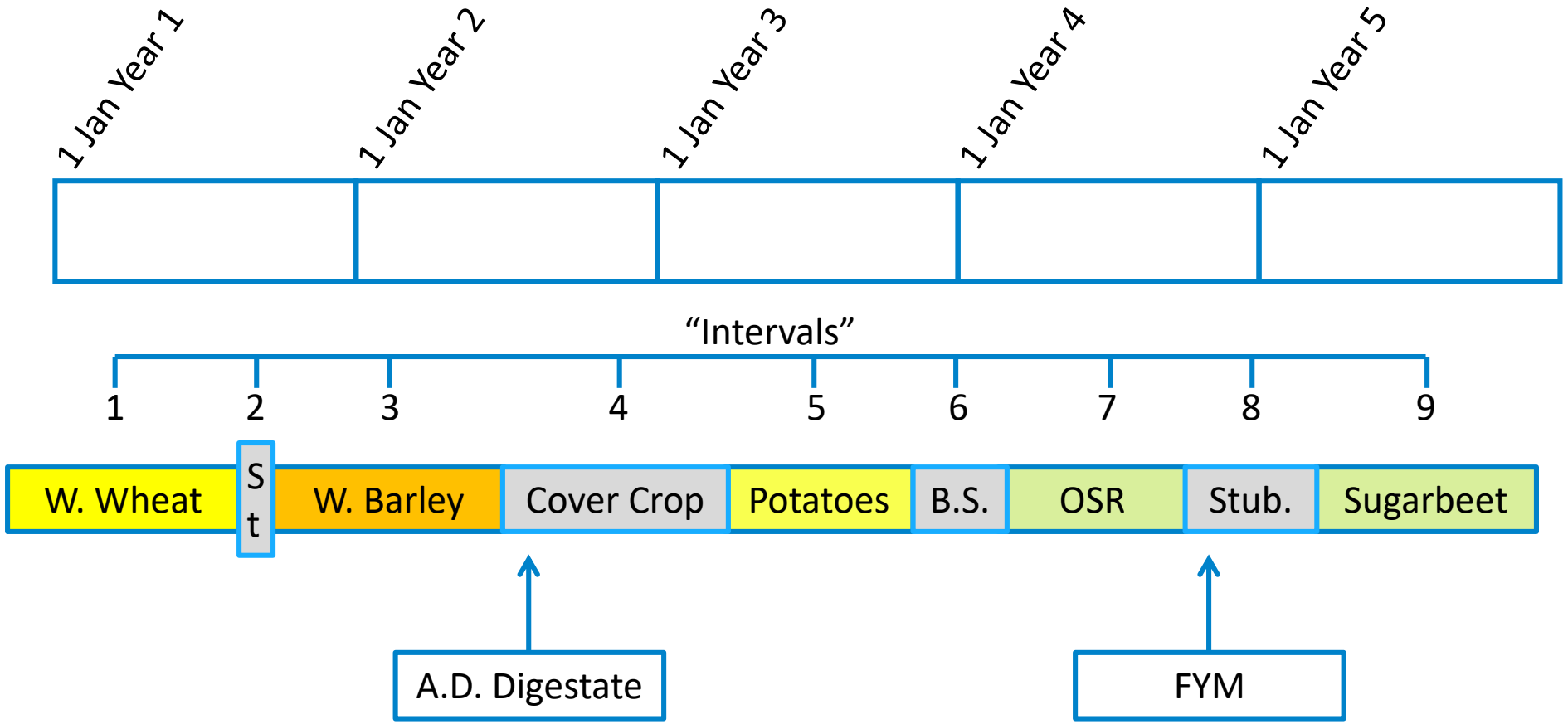
Lancaster University

Rotations partnership: research projects



Grower survey

Objective is to understand how soils are utilised for the whole rotation



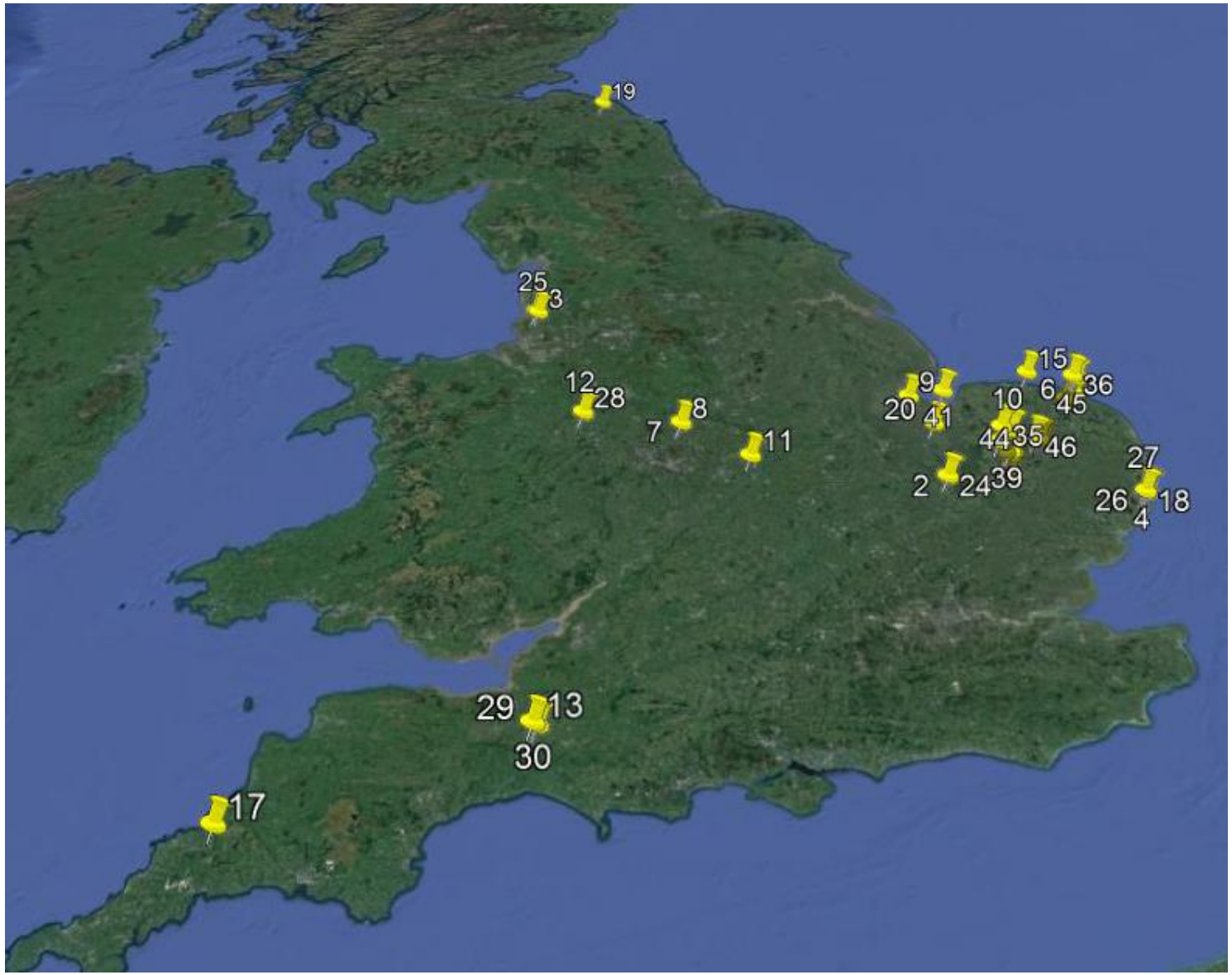
An "Interval" is a distinct period of land use = is one sheet of an excel file

An "Interval" of less than seven days can be ignored

Various trials and experiments

- Cultivations
- Wheel track experiment
- Cover crops
- Organic matter inputs
  - Compost
  - Poultry manure
  - Duck manure
  - Farm yard manure

Location of trial sites – 2016-2018



No	Location	Type	Test Crop
2018-23	Broom's Barn Brome Pin	FYM (in 2016)	Spring barley
2018-24	NIAB F24	Compost (in 2017)	Spring barley
2018-25	Webster	Cover Crop	Potatoes
2018-26	Greenwell Middle Walk	Pig FYM	Potatoes
2018-27	Greenwell Orford	Compost/ Duck manure	Potatoes
2018-28	Tern Farm	Cover crop	Potatoes
2018-29	SPot SW Dillington Meads	Cover Crop	Potatoes
2018-30	SPot SW Dillington 9 Acre	Digestate	Potatoes
2018-31	NIAB F29	Compost/Water/Compaction	Potatoes
2018-32	NIAB F29	Cover Crop	Potatoes
2018-33	WO PO Jolly Abbey Shed	Compost/ Poultry Manure	Potatoes
2018-34	WO PO Jolly 1SE	Compost/ Poultry Manure	Potatoes
2018-36	EG Harrison Hungry Hill	Cover Crop	Potatoes
2018-37	B&C Oxnead 2	Compost	Potatoes
2018-38	Elveden Self Sets	Compost	Potatoes
2018-39	Elveden Four-Score	Compost	Potatoes
2018-40	Greenwell Farms Orford	Compost and traffic management	Potatoes
2018-41	Stevensons Missen	Wheel-track	Potatoes
2018-42	Hiams BR 6 (VCS)	Cover Crop	Sugar beet
2018-43	Hiams BR32 (VCS)	Cover Crop	Onions
2018-44	Hiams BR15 (VCS)	Cover Crop	Parsnips
2018-45	EG Harrison South Reps	Cover Crop	Cereal TBC
2018-46	Wrentham (VCS)	Cover Crop /Compost	TBC

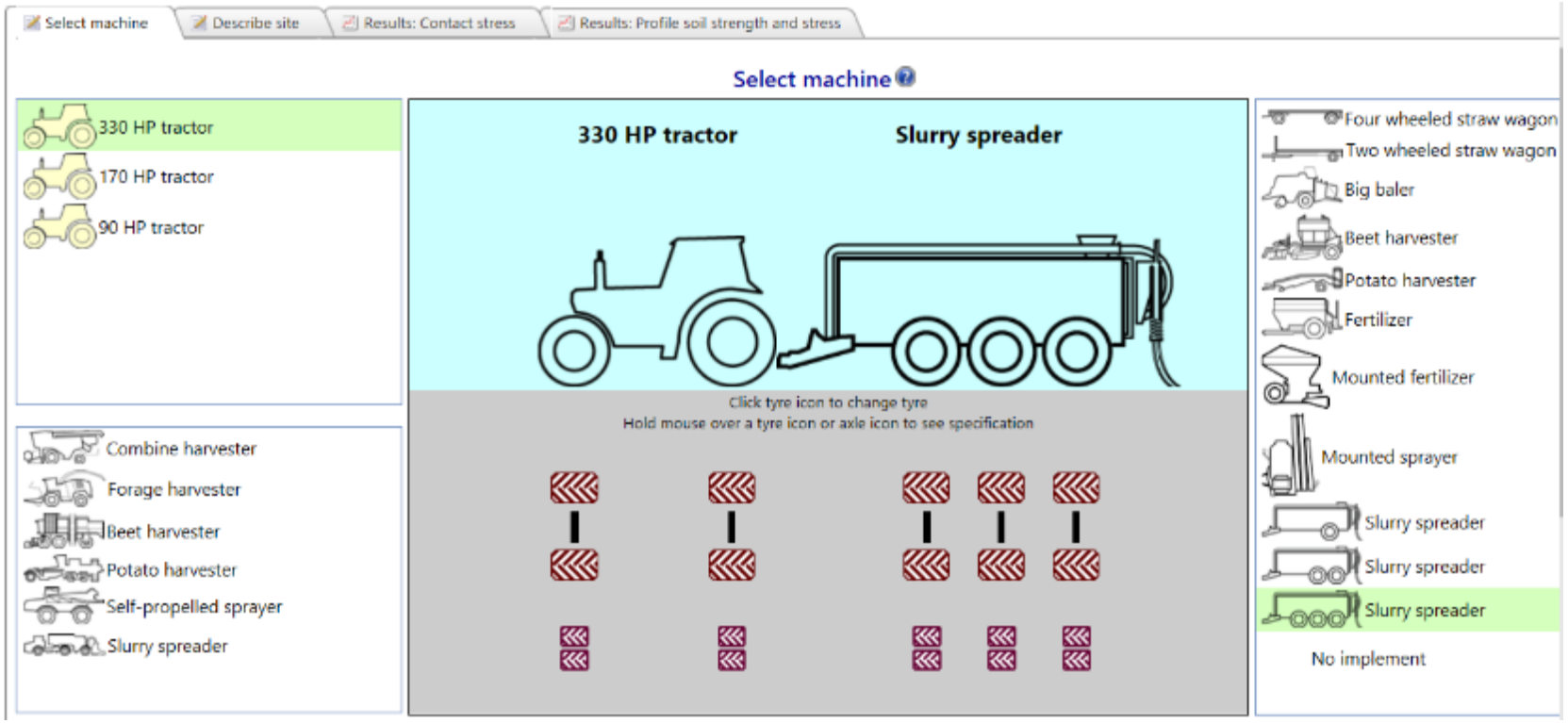
Summary of amendment comparisons in 2017 & 2018 – potato yields

Expt	No amendment	With amendment
Expt 1-2017	69.6	75.3
Expt 2-2017	58.8	62.6
Expt 4-2017	55.9	55.7
Expt 8-2017	66.5	72.5
Expt 10-2017	28.5	29.9
Expt 14-2017	72.0	77.7
Expt 16-2017	31.8	52.7
Mean 2017	**54.7**	**60.9**
Expt 26-2018	49.3	42.5
Expt 27-2018	35.2	32.0
Expt 30-2018	53.1	62.4
Expt 31-2018	44.9	48.7
Expt 34-2018	71.2	62.6
Expt 35-2018	45.7	56.0
Expt 37-2018	75.0	70.5
Expt 39-2018	71.4	69.6
Mean 2018	**55.7**	**55.5**
Mean 2017-18	***55.3***	***58.0***

Summary of cover crop comparisons in 2017 & 2018 – potato yields

Expt	No cover crop	With cover crop
Expt 3-2017	55.7	56.4
Expt 4-2017	55.9	55.1
Expt 9-2017	71.6	69.8
Expt 11-2017	67.0	68.9
Expt 12-2017	44.3	41.6
Expt 13-2017	57.5	59.5
Expt 15-2017	43.5	46.2
Mean 2017	**56.5**	**56.8**
Expt 25-2018	46.3	57.2
Expt 28-2018	52.8	62.6
Expt 29-2018	58.9	65.7
Expt 32-2018	55.7	55.9
Mean 2018	**53.4**	**60.4**
Mean 2017-18	***55.4***	***58.1***

https://terranimo.dk/



Soil Biology and Soil Health Partnership

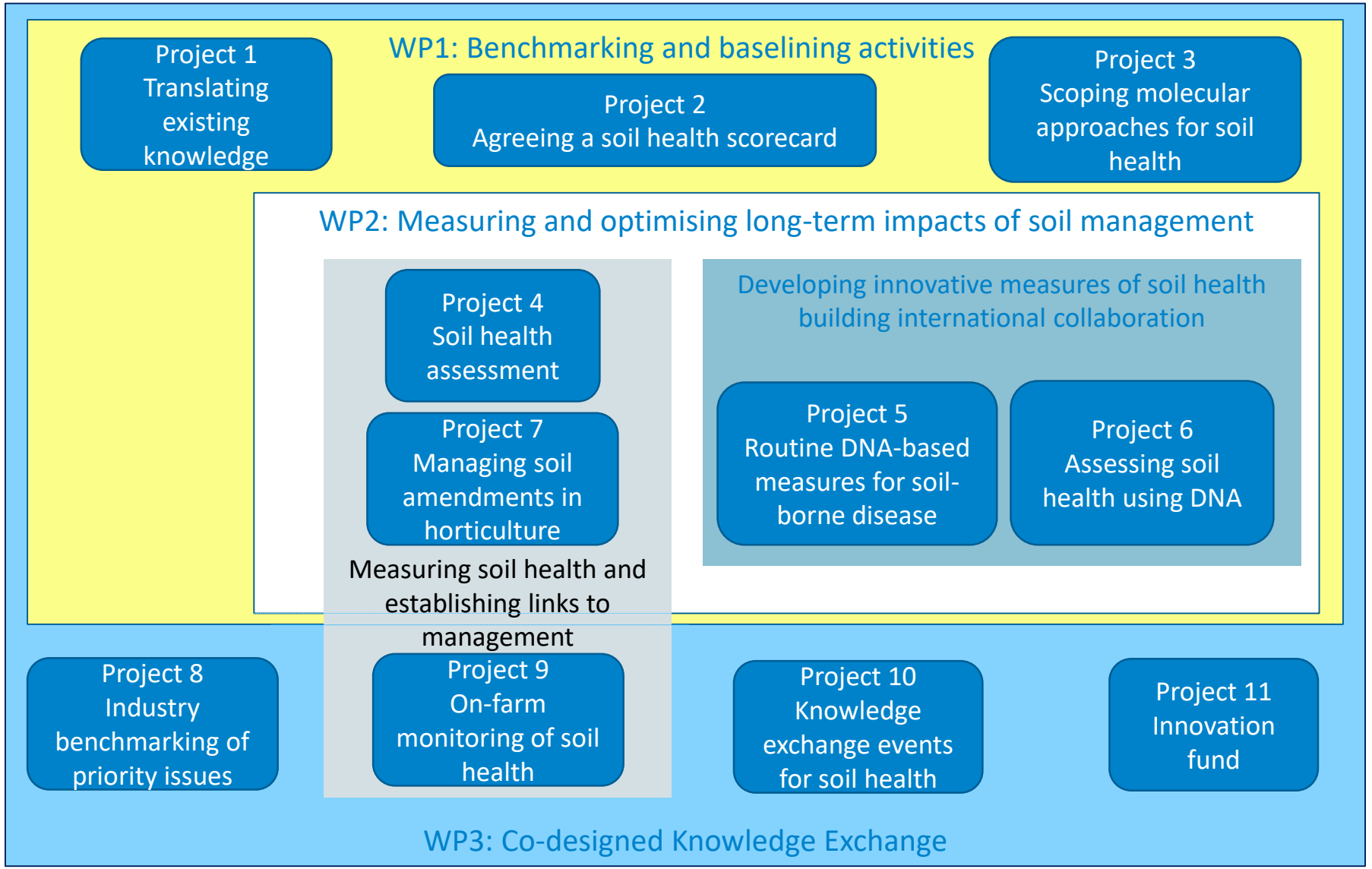
Soil Biology and Soil Health Partnership

- Five years to deliver linked knowledge exchange and research on soil biology and soil health
- Building on work already carried out

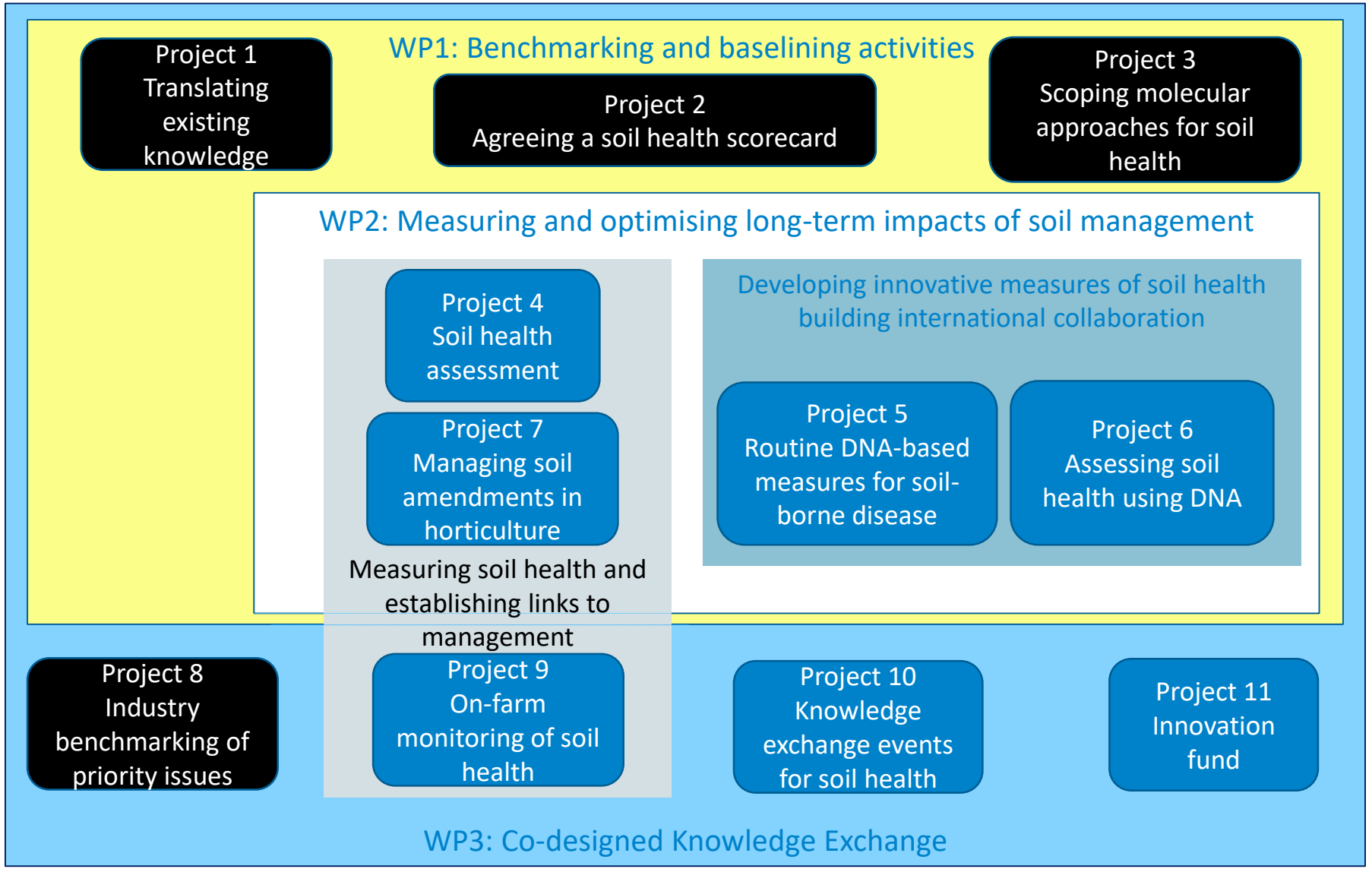
Aims to:

- Improve on-farm understanding of soil health by sharing current academic and industry knowledge in usable formats
- Develop and validate indicators of soil biology and soil health in research trials and on-farm

Soil Biology and Soil Health Partnership projects



Soil Biology and Soil Health Partnership projects

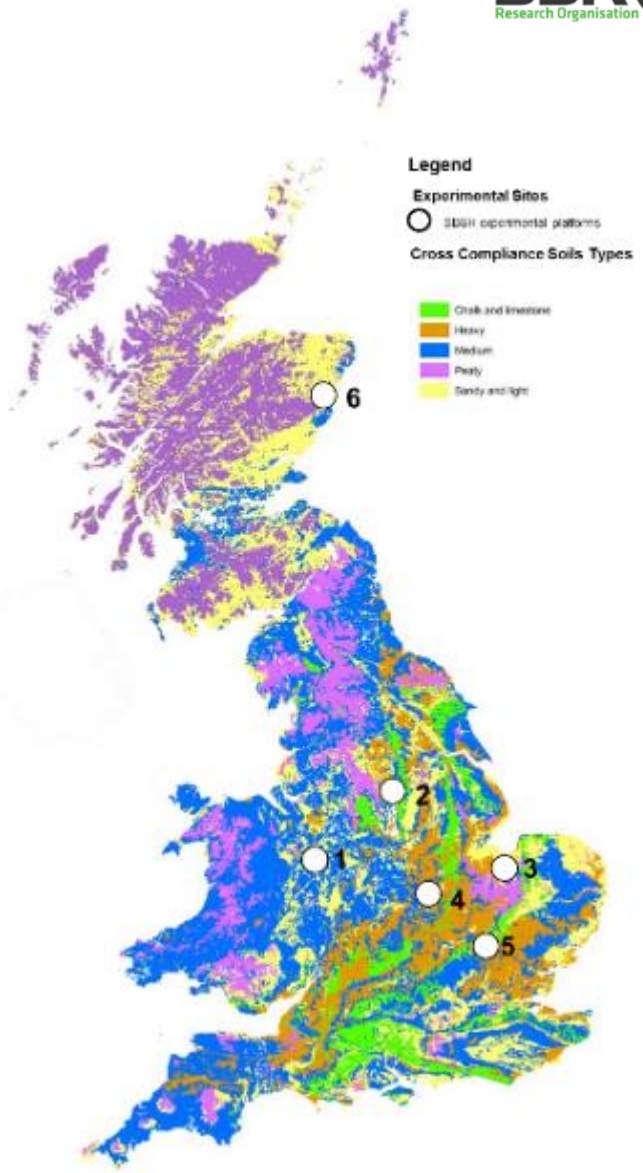


Soil health assessment sites: Arable and ley/arable rotations

1. Harper Adams
2. Gleadthorpe
3. Terrington

10-20 years of repeated organic material additions

4. Loddington - Tillage
5. Boxworth - Drainage
6. Craibstone
   a. Crop rotation x fertiliser; 90+yrs
   b. Crop rotation x pH; 60+yrs.



Soil health assessments

- Timing: post harvest/pre-cultivation
- Bulk soil sample for:
  - Physics: VESS, Bulk density, penetrometer resistance
  - Chemistry: NRM soil health index; SOC and total N; potentially mineralisable N
  - Biology: earthworms, microfauna, nematodes; microbial biomass/respiration
    - DNA/eDNA
  - Archive sample
- Establish relations with:
  - Yield and crop quality
  - Disease and weeds

Testing and developing measures of soil quality: what is on the scorecard?

		Traffic light benchmarks?
Existing indicators included	pH	✓
	Routine nutrients	✓
	Bulk Density	✓
	Penetrometer resistance	✓
Less common indicators evaluated and framework for interpretation developed	Visual assessment of soil structure (VESS)	✓
	Soil organic matter / loss on ignition (LOI)	✓
	Respiration: Solvita test	✓
	Earthworms	✓
New indicators developed and tested	Total N	X
	Microbial biomass carbon (MBC)	✓ partial
	Potentially mineralisable nitrogen (PMN)	✓ partial
	DNA measures of pathogens and soil health	X
	Nematodes	✓ partial
	Microarthropods	X

Initial ‘scorecard’ results

Samples taken October 2017 in 2 year G/C ley before spraying & cultivation for WW in 2018

Attribute	Control	FYM (23yrs)	Slurry (23 yrs)	Green compost (13 yrs)	Green/food compost (6 yrs)	Food-based digestate (9 yrs)	*P*
pH	6.4	7.0	6.4	7.0	6.2	6.5	*<0.001*
Ext. P (mg/l)	56	73	53	60	59	65	*<0.05*
Ext. K (mg/l)	80	311	194	187	140	167	*<0.001*
Ext. Mg (mg/l)	44	87	75	63	66	48	*<0.001*
LOI (%)	3.0	4.1	3.6	4.0	3.7	3.4	*<0.01*
Bulk density (g/cm^3)	1.40	1.34	1.43	1.29	1.46	1.43	*NS*
VESS score	1.2	1.4	1.3	1.1	1.3	1.5	*NS*
PMN (mg/kg)	22.9	90.2	23.8	43.1	37.7	42.5	*<0.01*

High risk – need to investigate urgently

Moderate risk – need to investigate further

Low risk – continue to monitor

On-farm soil health assessment

Where	Main farming systems
York	Arable – mixed with root crops
East Anglia	Arable – sugar beet – veg – pigs
Leicestershire	Arable – mixed
North East	Arable - mixed
Shropshire	Lowland livestock, arable, field veg
Appleby	Grazing systems
Inverurie	Arable, with some veg (carrots) integrated, mixed
Wiltshire / SW	Dairy

Valuing and working with farmer innovation developing locally adapted practices

Managing soil amendments in horticulture

Soil-grown raspberries

- PAS110 crop-based fibre digestate
- Biofungicide

Narcissus

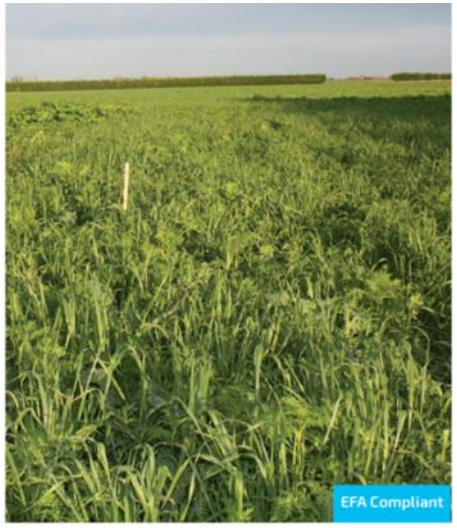
- PAS100 green waste compost
- Mycorrhizae
- FYM

Onions

- PAS100 green waste compost
- Cover crop






Using the sites above … assessing soil health using DNA

- Can we replace many of the biological assays with analysis of a single DNA sample?
- Issues being addressed initially – representative sample size, cost and interpretation
- Sample size and cost being evaluated in a comparative experiment
- Interpretation by analysing the same samples as the ‘traditional’ assays.

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Watch out for your opportunity to interact in the mid-term consultation events in 2019

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