

Summary of Workshop Outcomes - Prioritisation of research needs for regenerative agriculture systems in the UK

The workshop was held online on the 7 February 2024, hosted by Julia Cooper (Organic Research Centre), Elizabeth Stockdale (NIAB) and Belinda Clarke (Agri-TechE).

Nineteen people attended; they identified themselves as indicated in Table 1. Almost all

Table 1 Categories of individuals attending the workshop

Stakeholder Categories	
Agronomist/advisor	1
Farmer	1
Plant scientist	5
Social scientist	2
Policy	1
Soil scientist	5
Executive role	3
Ecologist	1
Total	19

were scientists, with only one farmer participating, although farmers had been included on the invitation list. Participants completed a survey during the workshop where they were asked to prioritise knowledge gaps from the list in Table 2. A few gaps were identified to be of critical/high importance.

- **Understanding of the impact (and the factors affecting it) of regenerative agriculture systems on farm livelihoods** was considered critical or high by all respondents to the survey. Most respondents selected applied or KE research as the best approach. Text comments confirmed this importance, e.g. “If there is evidence that farm livelihoods (incomes) are improved through regen ag, then more farmers will take it up. So it is really important.”
- **Better understanding of the main socio-economic factors constraining uptake of regenerative agriculture** was also mainly scored as critical or high in importance, although a few respondents disagreed, scoring it as low

importance. Applied or KE approaches were generally favoured for this gap with socio-economic approaches identified in the text comments, e.g. “Multidisciplinary research platforms including farmers, social and “hard” researchers”, “Qualitative research that leads to policy recommendations”, “Social science research - eg. surveys, interviews into socio-economic barriers and drivers influencing the adoption of regen”

- The lack of a **“clear farmland soil carbon code in the UK”** was considered critical by 7 respondents but another 7 thought it was only of normal importance. Further analysis will determine if the soil scientists in the workshop all prioritised this gap! It was seen as a policy gap although a few respondents (5) felt more fundamental/basic research was needed. It was seen as a barrier to regen uptake “Until farmers can be compensated for building carbon in their soils, they won't be keen to adopt regen ag” and some urgency was noted “Quickly (even if just to say that it won't be adopted). Currently the limbo is causing unintended consequences”

- Most of the gaps were scored as of high to normal importance and applied research approaches were most often identified as the best approach.
- Basic/fundamental research was only identified as the best approach for three gaps: **Breeding of crop varieties with enhanced disease & insect tolerance**, **The impact of regenerative agriculture systems on food quality, particularly nutrient density** and **Evidence of the wider and indirect benefits of working with plant populations rather than single crop varieties or varietal blends** (scored slightly lower on the importance of this research).

During the breakout sessions participants highlighted a number of other areas that they felt should have been included in the survey, including:

- Tillage and questions around impacts of no-till versus occasional/strategic tillage
- Agroforestry and other multifunctional land uses
- Several attendees felt that a clear definition of regenerative agriculture is needed
- The impacts of increased herbicide use in regenerative agriculture systems (noting that there has been work done in other parts of the world on this) and/or how to reduce reliance on herbicide in reduced tillage systems
- Work on supporting system change by farmers; understanding antagonism of some farmers and barriers to change
- Need for really long-term studies to understand impacts of regen ag on soils and ecology
- Need for more fundamental science on how soils function
- Root crops/horticultural crops not really covered in the questions
- Payment schemes/incentives to drive system change

There was a general feeling from many of the participants that not all gaps were covered and that a systems approach to research on regen ag is needed. It was also duly noted that the participants were very much skewed towards scientists; another group of stakeholders would have prioritised the gaps differently.

Overall, the workshop provided extremely valuable insights and areas for further discussion and development. These will be pursued through more review of literature and project outputs as well as further targeted interviews with key stakeholders. A more detailed analysis will be presented at the conference in March.

Table 2 List of knowledge gaps included in the workshop survey with preliminary analysis of type of research needed and priority of that research gap. P=policy, KE=knowledge exchange, A=applied, F/B=fundamental/basic, HN=high/normal, NL=normal/low, CH=critical/high

		Type	Priority
1	There are no/few metrics that can be used to define regenerative agriculture systems	P	CH/HN/NL
2	Implementation of regenerative agriculture practices is underpinned by agreed principles, but there is no locally tailored independent information to support a farm implementing regenerative agriculture	KE	HN
3	How to integrate root crops e.g. potatoes, carrots into regenerative rotations	A	HN
4	How to grow intercrops (i.e. two or more crops grown together and both harvested) effectively	A/KE	HN
5	How to grow varietal blends effectively	A	HN
6	How to use companion planting (two crops sown together; only one taken to harvest) effectively	A/KE	HN
7	How to implement living mulch systems (permanent clover understorey in a cash crop) successfully	A	HN
8	How to effectively terminate cover crops without impacts on the following crop	A	HN
9	The best cover crops for colder (e.g. northern) conditions	A	HN
10	Impact of changes in soil biology on weeds, particularly blackgrass	A	HN
11	Effects of cover crops on disease & insect pressure in subsequent /neighbouring crops	A	HN
12	Breeding of crop varieties with enhanced disease & insect tolerance	F/B	HN
13	Variety evaluation with low/no plant protection products and/or reduced N application	A	HN
14	The impact of variety blends on product quality and end-market use	A	HN
15	Variety evaluation that includes a description of rooting traits	A	HN
16	How to enable use of landraces and other heterogenous material (e.g. plant populations).	all	NL
17	Evidence of the wider and indirect benefits of working with plant populations rather than single crop varieties or varietal blends.	B/A	HN/NL
18	Evidence of the impacts of mob grazing on soil and livestock health	A	HN
19	Development of cost-effective soil health indicators addressing soil biological function	all	HN
20	Evidence of the impacts of biostimulants on plant and soil health	A	HN
21	Evidence of the impacts of regenerative agriculture systems on the water cycle (flood risk, drought resilience)	A	HN
22	Evidence to allow options for regenerative agriculture to be assessed in terms of wider impacts (e.g. whole life cycle analysis for input options)	A	HN
23	Evidence of the impacts of integration of legumes throughout the cropping system on N cycling including GHG emissions	A	HN
24	How to design crop rotations to optimise economic and environmental benefits	A/KE	HN
25	The impact of lower input use (N fertiliser and plant protection products) within regenerative agriculture on product quality and end-market use	A	HN
26	Understanding of the impact (and the factors affecting it) of regenerative agriculture systems on farm livelihoods	all	CH
27	The impact of regenerative agriculture systems on food quality, particularly nutrient density	F/B	HN
28	Evidence of the potential benefits and disbenefits of developing a certification scheme for regenerative agriculture	P	HN
29	Development of a clear farmland soil carbon code in the UK	P	CH/HN
30	Better understanding of the main socio-economic factors constraining uptake of regenerative agriculture	all	CH
31	The potential benefits and disbenefits of food manufacturers and retailers championing regenerative agriculture.	all	HN