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Policy Brief

Regenerative Agriculture in Practice:
Early Evidence and Policy Implications from the University of Leeds Long-Term Regenerative Agriculture Trial

Authors: Ruth N Wade and Pippa J Chapman, University of Leeds
RegenAg Science Team: H. Armitage, L. Collins, L. Doehl, M. Gilpin, R. Grayson, Z. Kitching, K. Smith

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Purpose

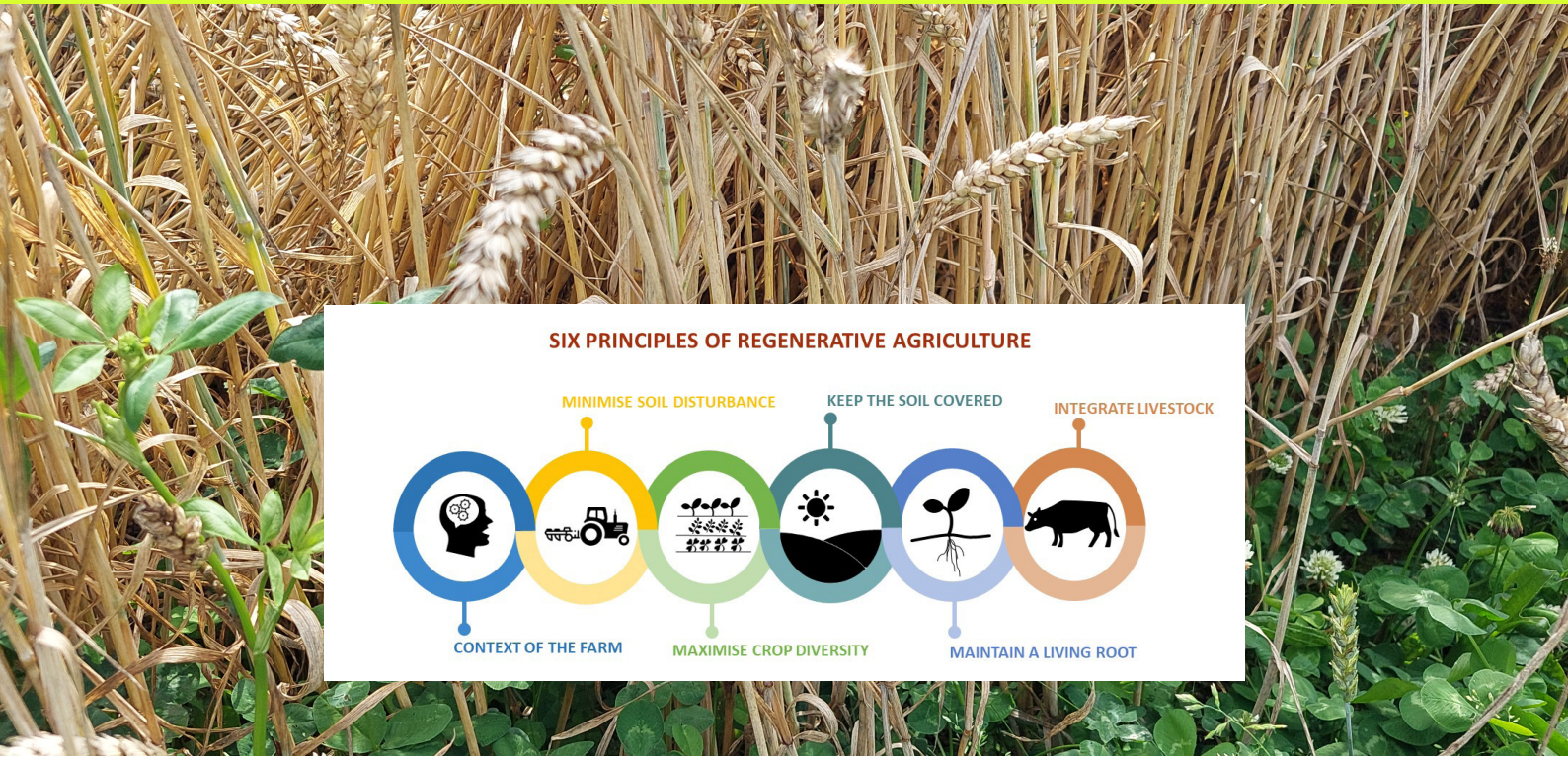
This briefing summarises findings from the first three years of the University of Leeds Regenerative Agriculture Trial, a replicated field experiment comparing conventional and regenerative farming systems under the same soil and weather conditions.

The trial provides independent evidence to inform agricultural policy and support evidence-based transition pathways.

Why This Matters

Regenerative agriculture is increasingly promoted as a way to improve soil health, enhance biodiversity, reduce reliance on external inputs and support climate resilience.

However, uncertainties remain around its environmental, economic and practical impacts, particularly during transition, and the potential for trade-offs. Robust long-term evidence is needed to support effective policy design and farmer decision-making.



About the Trial

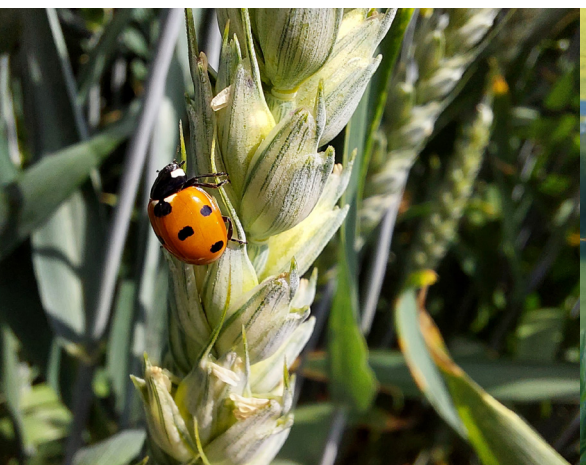
Established in 2022 through the FixOurFood programme, the trial is located on the University of Leeds' commercial farm near Tadcaster, on the boundary between North and West Yorkshire.

Funding is secured until 2030 through support from Defra (2024-2025) and charitable foundations (2025-2030, Rothschild Foundation, Aurora Trust, Gatsby Charitable Foundation and The Mark Leonard Trust).

The trial compares conventional farming with increasingly regenerative systems using an additive design, allowing individual and combined regenerative agriculture principles to be assessed under the same conditions.

The trial incorporates a range of practices aligned with regenerative agriculture principles including reduced cultivation, cover crops, living mulches, companion cropping, farmyard manure, and the integration of herbal leys and grazing into the arable rotation. Measurements include soil health, biodiversity, water quality, greenhouse gas emissions, crop performance and profitability.

The site is a magnesium-rich calcareous clay loam, providing a valuable test of regenerative agriculture under challenging UK soil conditions where reduced cultivation and crop establishment can be difficult.



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Key Findings and Policy Implications

1. Soil Structural Benefits Are Emerging Within Three Years

Maintaining living roots through practices such as herbal leys and living mulches appears to be a key driver of soil structure improvement. Early evidence shows increases in earthworm populations, changes in soil aggregation and shifts in soil microbial communities. Systems adopting more regenerative principles generally showed greater improvements.

However, living mulches may make cash crop establishment more difficult and may compete for water and nutrients, potentially reducing yields and profitability.

Policy implication: Agri-environment schemes should recognise year-round living roots as a key approach to enhancing soil health, while acknowledging the management challenges associated with these practices.

2. Better Soil Monitoring Is Needed

The trial highlights limitations of common soil health metrics. Some soil health indicators show little short-term change (e.g. bulk density), while others are strongly influenced by sampling conditions (e.g. earthworm counts) or require sampling at multiple soil depths to provide meaningful results (e.g. soil carbon).

Policy implication: National soil monitoring frameworks should use multiple standardised indicators and assess changes in carbon throughout the soil profile.

3. Production Risks Vary Across Cropping Systems

Winter wheat yields were broadly maintained across conventional and regenerative systems early in the transition. However, reduced-cultivation spring crops were more vulnerable to establishment failure on soils prone to surface capping, particularly under difficult weather conditions.

Extreme wet and dry conditions were among the most significant barriers to successful crop establishment in reduced cultivation systems and increased management complexity.

Policy implication: Transition policies should distinguish between evidenced and perceived production risks while embedding climate resilience and flexibility into agri-environment schemes.

4. Cover Crops and Living Mulches Provide Environmental Benefits

Maintaining cover crops and living mulches over winter significantly reduced the potential for nitrate leaching compared with leaving the soil bare.

Practical challenges remain, including herbicide requirements for termination, increased management complexity and variable plant growth and ground cover under growing conditions in northern England. No clear advantages were observed from using five versus 10 species cover crops.

Policy implication: Incentives should focus on environmental outcomes rather than prescribing increasingly complex species mixtures and should reflect regional differences in the feasibility of establishment and growth in short sowing windows.

5. Climate and Greenhouse Gas Outcomes Remain Uncertain

Although crop yields were similar across systems in year 1, greenhouse gas emissions (GHG) differed between treatments. Nitrous oxide emissions remain a key uncertainty, and regenerative practices did not consistently deliver climate benefits at the field scale.

Policy implication: Policymakers should avoid assuming that regenerative agriculture automatically reduces GHG emissions and invest in greenhouse gas research and monitoring network for agricultural landscapes to improve understanding of emissions dynamics, identify effective mitigation measures, and support evidence-based climate policy for farming systems.

6. Financial Support Is Critical During Transition

The trial found that Sustainable Farming Incentives helped towards de-risking the transition to regenerative agriculture. Companion cropping improved financial resilience in some years and systems.

Policy implication: Financial support is essential to help farmers manage the risks of transitioning to regenerative agriculture, environmental improvements should be rewarded, and investment in knowledge exchange, farmer-to-farmer learning, and technical advice is vital to support the successful adoption of new practices and improve long-term outcomes.

Recommendations for Policymakers

1. **Provide stable, long-term support** for regenerative transitions, recognising that some environmental benefits take longer than others to be realised.
2. **Improve national soil monitoring frameworks** through standardised physical, chemical and biological indicators.
3. **Design flexible agri-environment schemes that support climate resilience**, accounting for regional variability and weather-related risks.
4. **Invest in further research and knowledge exchange**, particularly around quantifying greenhouse gas emissions, soil carbon and practical implementation.

Key Message

Early evidence from the University of Leeds Regenerative Agriculture Trial shows that regenerative practices can begin improving soil structure within three years.

However, benefits and trade-offs vary between the practices adopted, climate-related challenges remain significant, and greenhouse gas outcomes are not yet clear.

Long-term research, flexible policy frameworks and targeted transition support will be essential for successful adoption at scale.

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Funders:

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