

1. Introduction

An online exploratory workshop was held with Hub global partners (27 participants). These represented: forestry, environment, livestock, arable, financial economics, climate science, farmland nature, farm advice, rural business consultant, farmers/owner, paludiculture management, economics, behavioural science, knowledge exchange.

Workshop aims and objectives

Overall aim: to establish how the research community can support transitions to net zero in land use.

The objectives:

- To agree a framework of key enabling conditions
- To harvest success stories and identify common factors/levers/principles
- To identify gaps in the evidence and priorities for research

After a presentation of the current understanding of enabling transitions, responses to the two online questions participants were asked when they registered were presented. Following this, four break-out groups shared and discussed successful and non-successful on the ground interventions.

2. Feedback from participant pre-workshop responses

Participants responded to these two questions:

1. What are most important factors/mechanisms enabling or constraining land use net zero transition on the ground in your sector?
2. What are the gaps in research with respect to enabling conditions in your sector?

The responses demonstrate the need for a systemic approach to understanding enabling. They support the views expressed in the Hub Kick Off meeting TAG session and the underpinning literature. The responses are summarised below.

Q1 Most important factors/mechanisms constraining land use net zero transition on the ground in your sector

Economic Barriers:

- High initial costs, market volatility, and lack of capital for transition investments.
- Economic constraints from locked-in food systems and land capability issues.

Cultural and Social Barriers:

- Social and cultural factors, equity for marginalized groups, recognise farmer identity.
- Land ownership and long-term management control issues.
- Lock- in (economic, cultural, knowledge)

Policy and Regulatory Issues:

- Inconsistent and incoherent policies across regions.
- Timidity about regulation and the influence of corporate vested interests

Lack of Knowledge and Skills:

- Insufficient knowledge, skills, and advice on low GHG systems. alternative land uses.

Environmental and Practical Challenges:

- Wet, temperate climate and soil conditions favouring traditional livestock production.
- Planting trees for net-zero limited due to long time scales and land suitability issues.

Market Uncertainty and Short-termism:

- Uncertainty in carbon markets and short-term financial pressures.
- Volatile climate and market conditions making forward-planning challenging.

Technical and Measurement Issues:

- Lack of options for specific mitigations, such as enteric methane.
- Limited acceptance of new metrics for short-lived gases.

Q1 Most important factors/mechanisms enabling land use net zero transition on the ground in your sector

Collaboration:

- Working with a wide range of stakeholders to find resilient, effective solutions.

Effective Incentives:

- Designing sustainable incentives and cultivating cultural change.
- Providing effective grants for novel forestry and agroforestry approaches

Access to Knowledge and Expertise:

- Upskilling advisors and facilitating peer-to-peer learning.
- Providing technical expertise, open science, and clear policy guidance.
- Build capacity
- Provide credible evidence.

Economic Support:

- Ensuring financial mechanisms such as carbon pricing and credits to incentivize
- Capital grants for low emissions technology & other support mechanisms.

Political Will and Policy Clarity:

- Strong political will, reducing bureaucratic complexity in policy
- Ensuring policy stability, transparency, and clarity.
- Build confidence & trust

Market Mechanisms:

- Correcting distorted market incentives to better support sustainable practices.
- Offer strong value propositions and business models

Q2 Research Gaps in enabling conditions for land use net zero transition on the ground in your sector

Understanding Barriers

- **Cultural and Economic Barriers:** More research is needed to understand the cultural and economic factors that prevent changes in land use.
- **Social Landscape:** Understanding how social factors affect transitions in different landscapes.

Agricultural and Forestry Practices

- **New Crops:** Research into crops that can thrive in specific conditions, such as wetlands.
- **GHG Balance:** Understanding GHG balance of current and future crops, especially on peat soils.
- **Food Security Impact:** Assessing how changes in land use will affect food security.

Baseline Data and Metrics

- **Baseline Comparisons:** Establishing a sufficiently good baseline to understand relationships between climate impacts and emissions.
- **Biophysical vs Socioeconomic Feasibility:** Ensuring that biophysically feasible solutions are also socioeconomically viable.

Long-term and Regional Specificity

- **Long-term Maintenance:** Studying how to maintain initiatives over the long term.
- **Regional Specificity:** Understanding regional differences and needs for tailored solutions.

Economic Viability and Incentives

- **Economically Viable Systems:** Developing low GHG agricultural production systems that are economically attractive to farmers.
- **Alternative Land Use:** Identifying economically attractive alternatives to traditional farming.

Direct Interventions and Policy

- **Overcoming Barriers:** Direct interventions to overcome barriers to forestry establishment on better-quality land.

3. Summary of break-out group discussions

Four break groups discussed examples of interventions/initiatives that had been successful or unsuccessful. They annotated a miro board, indicating whether the intervention led to a quick win or a transformative shift and responded to a series of questions:

- What are the interventions and their characteristics?
- Why and how did they (not) work?
- At what scale do they operate?
- Do these aim to bring about quick wins or more transformative changes?
- How are they transferable to other contexts?

The term intervention is understood here to include all social, technical, economic and polity-based initiatives and mechanisms (formal and informal).

The outputs are summarised below. The characteristics that lead to effective outcomes align with the literature and other Hub discussions. These show that there are a range of enabling interventions already operating across the system in a portfolio approach. These differ in nature, scale and impact but collectively can inform net zero transition. Historic examples can also provide useful insights and learning for net zero transition

Interventions/initiatives that had been successful or unsuccessful**a) Regulatory Successes: but needs to go further**

- **Peat Burning Regulation:** While regulations on peat burning have reduced burning in some areas, they need to extend this to undesignated upland areas to prevent significant carbon loss.

b) Public-private sector working

- **Public-Private Investments:** Successful initiatives leveraged impact from public funds to attract private investment, promoting large-scale landscape projects. The aim is to get stakeholders in the right place to be able to engage with private markets without necessarily competing with those private markets, and finding the right balance. The Natural Environment Investment Readiness Fund was highlighted as a promising example.

c) Business Models

- **Yeo Valley:** implement innovative initiatives independently and they have the scale to be impactful. This initiative, with a big group of dairy farms focusing on soil health and carbon management, demonstrates the potential of supply chain businesses in driving environmental change without relying on government support.

d) Slurry store and precision application grant: good uptake but implications for system and baseline measures

- **Slurry Store Grant:** Grants for slurry storage and precision application have had high uptake, but lack of baseline data and supply chain readiness has hindered full impact assessment and implementation.

e) Soil mapping- carrot and stick

- **Soil Mapping in Northern Ireland:** Comprehensive soil mapping scheme provide valuable baseline data (soil nutrients and carbon), encouraging widespread farmer participation (99%) through a mix of incentives (high quality service and data) and potential future eligibility conditions for government support.

f) Awareness raising

- **Climate Projections and Risk Awareness (Scottish Government):** Climate projections and interpretations at high spatial resolution have successfully raised awareness of climate change impacts, sparking conversations and additional initiatives among farmers and policymakers. Online access using visualisation raises awareness risk and opportunities.

g) Collaborative Research and Knowledge Exchange

- **Peat Research Projects:** Collaborative research and knowledge exchange across multiple projects (12) across the supply chain. Stakeholder engagement, particularly focusing on practical applications and economic viability has been effective in advancing knowledge and practices. One example, the Fenland soils group, is a farmers group- using opportunity maps around soil changes under rewetting opportunities. Important factors are using the language that they understand and presenting a plausible business model.

h) Behavioural and social norms

- **Moral and Regulatory Changes:** Historical changes in regulations, such as those for river pollution and straw burning, illustrate how combining regulatory enforcement with free advice, not only enables farming practices to change, but also leads to a change in social norms about what is acceptable.

i). Supply Chain Intermediaries

- **Supply Chain Intermediaries:** Dairy farmer engagement with supply chain intermediaries (for example from retailers) has facilitated farmers in monitoring and understanding the carbon on their farm and then helps them through the journey to net zero. This potentially offer a quick win at scale as well as a longer term transformative change

j) Social Movement Building:

- **Movements** around regenerative agriculture show how shared values and community-driven initiatives can create momentum and drive change, contrasting with the often detached perceptions of net zero targets (unattainable). Capitalising on movements and giving them more voice is an empowering narrative
- **Catchment approach.** This regional scale approach which creates a sense of a shared goal, responsibility and ownership in the community, has been successful as it gains its own momentum, tells its own stories.

k) Standards and Certification:

- **UK forestry standard** was science and best practice informed and co designed. It facilitated land managers' access to grants, providing guidelines and training and motivated sustainable practices, although widespread adoption takes time.
- **Organic standards** provide an agreed set of standards which has enabled transition because it gives farmers a target to aim for and a process to do. Conversely the regenerative agriculture movement is struggling because anyone can claim they are doing RA (e.g. McCain's claim all their potatoes are

regenerative). Yet there are also arguments that this 'constructive ambiguity' is enabling the movement to thrive and grow.

l) Integrating net zero goals

- **Integrating net zero goals** with other objectives like biodiversity, water security, and resilience can make interventions more achievable. Farmers, retailers and policymakers have multiple different objectives, they are not starting with net zero, a lot of these things can work if folded in with others.
- **Food security** is an opportunity to say that we need to reduce our emissions, farmers would respond to calls for more efficiency and reduction in 'high carbon food'.
- **Resilience** is another opportunity to link with better planning of what, where and why on the farm.
- **Economic drivers:** Economic factors, like rising nitrogen prices, can incentivise sustainable practices, highlighting the role of input costs and market forces in driving environmental change.

m) Soil Health and Regulation: protection needs to be part of the story of enabling positive change

- **Need for Clear Regulations:** Current soil health management lacks clear direction from policymakers. Non-compliance and limited inspections are prevalent.
- **Communication and Education:** There is a need for better communication regarding existing regulations and support for compliance, ensuring farmers are informed and motivated to follow soil health guidelines.

n) Scaling Small Successes: making success stories appealing

- **Barriers to Change:** Small-scale success stories often remain limited to engaged and resourceful farmers. Scaling these successes to larger, more commercial farms or less resourceful farmers is challenging.
- **Appealing Success Stories:** Success stories need to be made appealing to encourage broader adoption among farmers who may be risk-averse or resource-constrained.

4. Conclusions

The enabling environment is the context in which individual land managers and organisations function. We know from the literature that enabling factors need to address the systemic impediments regarding political commitment and vision, and policy, legal and economic frameworks; public and private sector funding and processes; governance, power structures, incentive-systems and institutional linkages and social norms. These determine capacity and individual values and motivations of land managers and their organisations. As such a systems approach is needed for enabling transition in this complex environment.

At the macro scale: governance, institutions, (dis)incentives, economic and market opportunities and knowledge and innovation support systems. At the micro scale: individual capacities (extent of lock in knowledge, culture, economic), opportunities (access to resources) and motivations (attitudes, values, habits) determine agency and behaviours.

Enabling factors and processes can operate at multiple scales and intensity, with deep and shallow interventions or leverage points, bringing about quick wins through to long term transformative change. There is consensus that a portfolio approach works best. A combination of enabling factors is needed including effective incentives, economic support, market mechanisms, political will and clarity, harmonisation of tools, providing credible knowledge, access to knowledge and expertise, building capacity across the knowledge system, fostering collaboration and social movements.

Successful on the ground interventions demonstrate a range of characteristics:

- Combining regulation with free advice has been historically successful bringing about significant shifts in farming practices and a change in social norms. High uptake of soil mapping in Northern Ireland has resulted through a mix of incentives (high quality service and data) and potential future eligibility conditions for government support.
- Supply chain intermediaries (retailers, processors) can be impactful where they engage a number of farmer suppliers and help them through the net zero journey, operating at scale this can have quick wins as well as a transformative change.
- Small-scale success stories often remain limited to engaged and resourceful farmers, scaling these successes to larger, more commercial farms or less resource-rich farmers is challenging. Involving farmers using the language that they understand and grounding interventions in sound business models can help make interventions more appealing.
- Social movements around regenerative agriculture show how shared values and community-driven initiatives can create momentum and drive change, contrasting with often detached net zero targets which are perceived as unattainable. Capitalising on these movements (as well as regional and catchment approaches) is another route to enabling transition.
- Integrating net zero goals with other objectives like biodiversity, water security, and resilience makes interventions more acceptable and achievable at farm level. Farmers, retailers and policymakers have multiple different objectives so folding these in together can be more effective.
- Interventions need to anticipate implications, for example, grants for slurry storage and precision application have had high uptake, but lack of baseline data and supply chain readiness has hindered full impact assessment and implementation.

Appendix 1 Break out group miro boards

GROUP 1

Share success stories & unsuccessful cases that are transferable to other contexts

What are the interventions and their characteristics?

Why and how did they (not) work?

At what scale did they operate?

Do these aim to bring about quick wins or transformative changes?

How are they transferable to other contexts?

type of intervention

Success story/case study name	food assurance scheme for NZ	government grant	training, reskilling capacity building	lobby or feed into policy	collaboration, farmer-led initiatives	co-design to change institutions (rules of the game), co-operations working at scale
Success story/case study name	increasing uptake starting of the practice change to soil water monitoring and nitrogen management	Government & farmer co-design of a practice change program	farmer-led "practice change" program	farmer-led "practice change" program	farmer-led "practice change" program	farmer-led "practice change" program
Soil Nutrient Health Scheme	Soil Flow NZ (part of Ecosystems) encourages management of healthy local production food	Farmer's couldn't see the impact/benefits	Quick wins	National Inventory single trusted source	farmer-led "practice change" program	farmer-led "practice change" program
Legislation change (water & soils) - focusing on water on that side (soil) or water (soil) on longer term	Changes to burning laws to increase of location of crop areas for water management and water regulation burned	Quick wins	regional initiatives in local knowledge exchange leading to government grants	The limitations of the Minister & Green burning policy due to application at Govt level		

quick wins → more transformative changes

GROUP 2

Share success stories & unsuccessful cases that are transferable to other contexts

What are the interventions and their characteristics?

Why and how did they (not) work?

At what scale did they operate?

Do these aim to bring about quick wins or transformative changes?

How are they transferable to other contexts?

type of intervention

Success story/case study name	Carbon pricing - UK	Woodland Carbon Code - voluntary market funded for investment in new woodland in rural production on carbon land	Presumption against woodland removal policy	Yes ability supporting farmers to deliver soil health action 10 year plan	Failure for coherence and reg for soil health/function
Success story/case study name	Carbon pricing - UK	Woodland Carbon Code - voluntary market funded for investment in new woodland in rural production on carbon land	Presumption against woodland removal policy	Yes ability supporting farmers to deliver soil health action 10 year plan	Failure for coherence and reg for soil health/function
Success story/case study name	Carbon pricing - UK	Woodland Carbon Code - voluntary market funded for investment in new woodland in rural production on carbon land	Presumption against woodland removal policy	Yes ability supporting farmers to deliver soil health action 10 year plan	Failure for coherence and reg for soil health/function
Success story/case study name	Carbon pricing - UK	Woodland Carbon Code - voluntary market funded for investment in new woodland in rural production on carbon land	Presumption against woodland removal policy	Yes ability supporting farmers to deliver soil health action 10 year plan	Failure for coherence and reg for soil health/function

quick wins → more transformative changes

GROUP 3

Share success stories & unsuccessful cases that are transferable to other contexts

What are the interventions and their characteristics?

Why and how did they (not) work?

At what scale did they operate?

Do these aim to bring about quick wins or transformative changes?

How are they transferable to other contexts?

quick wins → more transformative changes

factors & common principles

GROUP 4

Share success stories & unsuccessful cases that are transferable to other contexts

What are the interventions and their characteristics?

Why and how did they (not) work?

At what scale did they operate?

Do these aim to bring about quick wins or transformative changes?

How are they transferable to other contexts?

quick wins → more transformative changes

type of intervention

Appendix 2 Programme

LUNZ HUB Exploratory workshop: Enabling transitions to net zero in land use – what works?

Online: 24 June, 14.00 – 15.30

Programme

14.00	Plenary Introduction to the Topic Expert Group and workshop aims Participants introduce themselves in the chat
14.10	Plenary – what do we mean by enabling conditions and how do we know when they have worked? <ul style="list-style-type: none"> • present overarching framework (what we know already) • present analysis of pre workshop questions
14.30	Break out session in small groups Share success stories and identify common factors/principles that are transferable to other contexts https://miro.com/app/board/uXjVK9mdipA=/
14.50	Plenary feedback from each group
15.10	Plenary discussion- How can we best capture on the ground experiences? What sort of research is needed?
15.30	Final summary, next steps, and farewell



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