



## Our aim

The Resilient Dairy Landscapes project is exploring the trade-offs between farmers' livelihoods, the natural environment and the stable supply of reasonably priced dairy products, to find better ways of working in the face of unpredictable future societal, environmental and climate change.

## Our approach

We integrate the latest social, economic, natural, and veterinary science with the expertise of farmers and the dairy industry, to devise and test innovations that will increase the resilience and sustainability of dairy farming in our rapidly changing world.

## Evidence synthesis identifies key interventions for dairy farms to fight climate change

There is strong evidence that public goods including climate change mitigation, improved water quality and soil health can be provided by several on-farm interventions. There are policy options that could prioritise public money for public goods that can most reliably be delivered, while developing the evidence-base for interventions that are feasible on-farm via Environmental Land Management Scheme (ELMS) pilot trials.

Key findings from the reviews:

- Strong evidence was found for the effect of watercourse fencing on water quality (specifically reductions in P and E. Coli).
- The soil loosening review focused on yield effects, based on available published evidence, and found no statistically significant effect of soil loosening on yield across the studies that met the inclusion criteria for the analysis
- In collaboration with the NERC funded iCASP project, the team engaged in a further 11 rapid evidence syntheses based on evidence from 250 papers. This expanded the analysis to a wider range of agri-environment scheme options to enhance the policy relevance of the work. Of these further 11 scheme options, only 5 were found to have a strong evidence base (the remaining options either had limited or contradictory evidence).

The findings were integrated into a joint policy brief between the two projects and presented at the project's first social innovation lab. Feedback from stakeholders was integrated into the final version, which was presented at Global Food Security programme seminars in Westminster and Scottish Government. It was subsequently used in meetings with evidence analysts in Defra and the Committee on Climate Change (CCC), and will feed into the CCC's forthcoming Net Zero Land Use report.

Download the policy brief: [https://docs.wixstatic.com/ugd/6e5046\\_ad7b1d3afabc4edda3d488a4050f874e.pdf](https://docs.wixstatic.com/ugd/6e5046_ad7b1d3afabc4edda3d488a4050f874e.pdf)





## Testing the Landscape Enterprise Network approach

Led by team members from 3Keel, project staff have continued to develop a LENS pilot in the Eden Catchment, drawing together a consortium of industry, NGO and government actors to organize collaborative procurement of ecosystem functions. This includes: Nestle, United Utilities, The National Trust, Green Alliance, Catchment Pioneer (Environment Agency), EnTrade, First Milk, Eden Rivers Trust, and CSF.

The rationale for this from a resilient dairy perspective is that by securing multiple customers for sustainable land management outcomes, which protect soil, water and nutrient systems, we better shore up the general carrying capacity – and long-term productive potential - of the landscape.

The pilot works on two levels: (1) constructing a first co-trade between Nestle and United Utilities, to procure soil health outcomes – respectively for resilient milk supply and water quality, relating primarily to Phosphorus (this co-trade has been agreed and is out to tender to ERT and First Milk), and (2) building a network of interested parties, who will be part of developing a wider LENS trade network for the region (the consortium is live, and is scheduled to be formalized through incorporation of a regional LENS entity in spring 2020).

These developments are creating multiple opportunities for impact and interaction between researchers and action on the ground:

- Existing and new landscape interventions can be investigated and verified via natural science (WP2) and veterinary science (WP3) in the project (see the next two articles)
- The development of new landscape interventions for investigation through the UU/Nestlé co-trade. These will come on-stream in 2020.
- The development of an actively engaged network of landscape stakeholders, the interactions of which can be investigated and fed back through WP4
- The creation of opportunities to engage and ‘show and tell’ policy makers, for instance through the ‘Seeing is Believing’ event in October 2018, and a high-level site visit with Dieter Helm and Emma Howard Boyd in August 2019.

Workpackage 3 is investigating if changes to the local environment as a result of measures such as planting hedgerows, fencing off watercourses and planting trees, has an impact on transmission of cattle diseases that are spread by insect or invertebrate species.

Through mining the literature and databases seven diseases were identified that are endemic or that have had recorded incursions into the UK and that have an environmental component affecting their spread. Nestle dairy farmers were asked if any of these diseases had occurred on their farms. Three common diseases were identified:

- Liver fluke infection, which is transmitted through a common mud snail;
- Summer mastitis, which is transmitted through flies; and
- Lungworm (*Dictyocaulus viviparus*), which has free living stages on pasture.

In addition, we are interested in exploring whether the spread of viruses such as Bluetongue and Schmallengerg may change as a result of habitat alterations. These viruses are spread by Culicoides, or biting midges. The numbers of flies, midges, snails and other invertebrates may increase as a result of hedges and trees being planted, or diminish because more wildlife such as birds, hedgehogs and bats are attracted into these areas, which feed on the vectors.

This year we have focused on liver fluke. We have mapped a snail habitat and enumerated snails in those habitats around watercourses with and without fencing. The snails will be tested for the presence of liver fluke. In addition, bulk tank milk samples will be tested monthly to assess the levels of liver fluke on each of the collaborating farms.

Each farmer has completed two interview/questionnaires and provided information about their farms, the motivations behind adopting each measure and their thoughts about agri-environmental schemes in general. This is providing valuable information that is being analysed and will feed into the Delphi study (in WP1) and the economic analyses (in WP4).



## New project film launched

We made a short film about the project featuring team members and participants at our first Social Innovation Lab in Cumbria.

Watch the film now:  
<https://www.resilientdairylandscapes.com/the-project>

A screenshot of the Resilient Dairy Landscapes website. The header features the project logo (a cow in a circle) and the text 'RESILIENT DAIRY LANDSCAPES'. Navigation links include 'HOME', 'PROJECT INFORMATION', 'NEWS', and 'CONTACT US'. A search bar is present below the navigation. The main content area shows a video player with the title 'The Challenge' and the video title 'Resilient Dairy Landscapes'. A 'Play Video' button is visible at the bottom of the video player.



## New research to explore effects of hedgerows on soil and biodiversity

In February 2019 we planted a new experimental hedge in a pasture field at the University of Leeds Farm to examine the impacts of planting new hedges through time. This experiment includes eight treatments involving different species and management types.

As hedgerows often vary in terms of species composition our experimental hedge includes four hedge types: a) mix of Blackthorn, Hawthorn and Hazel, b) Blackthorn, c) Hawthorn and d) Hazel. For each hedge type we have also included two management techniques to control weeds and grasses while the hedge establishes, one involves spraying and the other involves applying mulch. Prior to hedge planting we collected soils cores to get a baseline understanding of the soil hydrological and physical properties, we will collect further samples through time to examine how hedge development affects these.

We have installed soil moisture sensors at three depth under each treatment and within the field. This soil moisture data, which is being collected every 15 minutes, will help us understand how hedges impact the water content of the soil as they develop through time as a result of changes to evapotranspiration, interception and infiltration. Additionally, we will explore how these different treatments affect the biodiversity both within and below the hedges.





## Who has a stake in what happens to dairy production systems after Brexit?

A stakeholder analysis workshop was held at University of Leeds with representatives from 3Keel and BITC, facilitated by Prof Reed in May 2018. Selected members of the project's stakeholder advisory panel fed into the analysis remotely, leading to the identification of >100 stakeholder organisations and groups, from local to national and international scales. Stakeholders were categorised as:

- Publics;
- Local, national government departments, agencies and initiatives;
- National and international businesses;
- Local businesses;
- Networks and partnerships;
- Third sector;
- Land managers; and
- Academic and consultancy stakeholders.

Information was collected for each stakeholder on their relative interest in different aspects of the research, their ability to influence (whether facilitating or blocking) research and impact outcomes; and the likely benefits for each group of engaging with the research. Results were used to identify influential and hard-to-reach groups to prioritise for engagement, and for invitation for the project's first Social Innovation Lab in October 2018.

## Perspectives from farmers and other dairy stakeholders

The project held its first Social Innovation Lab in Cumbria in October 2018, and this was followed up with a two-part Delphi survey, the second of which will conclude by end of October 2019. The aim of this workshop and interviews was to inform future iterations of Nestle's Farmed Environment Plan in Cumbria and contribute ideas towards post-Brexit agricultural policy.

A Social Innovation Lab is a workshop with a focus on generating and discussing new ideas (innovations), drawing ideas from participants (the social part) as well as the latest research, that are designed to benefit local people and other stakeholders (the social part again). In an evidence-based policy world, researchers often get privileged access to policy-makers, but the Social Innovation Lab is designed to enable groups of stakeholders and researchers to integrate the most innovative, robust and relevant ideas, wherever and whoever they come from, to present to policy-makers. The Social

Innovation Lab was a success and the feedback received has been invaluable. Read the full report of the event on our publications page.

The Round 1 Delphi survey was completed with 20 Cumbrian dairy farmers and a further 7 stakeholders from the region, selected on the basis of the project's stakeholder analysis (above). Results show a high degree of convergence around the most popular scheme options from Nestle and First Milk's dairy premium scheme. However, interviews suggested that some of these options were already being enacted by farmers prior to the introduction of the scheme. There was more divergence in views around some of the capital works options. These areas of convergence and divergence, and other questions relating to the motivations and barriers to the adoption of these options, are being explored in a Round 2 survey to be completed before the October Brexit deadline, and findings will be presented to stakeholders in the second Social Innovation Lab in 2020.



## What role for public-private partnerships to deliver public goods?

Interviews for the project's initial Bayesian model enabled the team to produce a further policy brief on the role of public-private partnerships for the delivery of public goods from dairy production and other agricultural sectors. A draft of this was discussed at the first Social Innovation Lab, and the final version was presented at seminars in Westminster and Edinburgh. A workshop is planned for October 2019 with key players in the UK's two regional carbon markets to scope the potential to integrate the Landscape Enterprise Network approach with these market-based schemes. High-level policy engagement is ongoing via evidence analysts to integrate this work with the forthcoming ELMS scheme in England

Download the policy brief:

[https://docs.wixstatic.com/ugd/6e5046\\_9b35255a779846b68488898050ba6365.pdf](https://docs.wixstatic.com/ugd/6e5046_9b35255a779846b68488898050ba6365.pdf)



## Policy events

The initial findings from the Social Innovation Lab and two policy briefs above were presented to Scottish Government in Edinburgh last October. You can watch the video overview of our project with the policy messages we presented to Scottish Government: <https://vimeo.com/302439654/2487a35f75>.

In December the project also presented these findings to Defra. You can view the slides: <https://www.slideshare.net/MarkReed11/can-the-private-sector-work-with-government-to-cofund-public-goods-from-agriculture-125595508>. As part of this event, the team also joined up with researchers from N8 AgriFood to produce a policy brief on Key challenges for AgriFood Supply Chains Post-Brexit: <https://www.n8agrifood.ac.uk/media/dx-tile/N8-Brexit-Policy-Insight-Final.pdf>

