

Deep Demonstration

Sustainable food systems in Ireland



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

Cross-sensemaking insight report for the Ireland land agri- food Deep Demonstration

Sensemaking and actionable intelligence

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1. Introduction

This report provides an overview of the learnings extracted from other projects that EIT Climate-KIC is involved in that are related to the transition of land agri-food sectors and relevant to the Irish Deep Demonstration. It is important to note that two other governments have similar Deep Demonstration projects with EIT Climate-KIC: Slovenia and the province of Gipuzkoa in Spain. Even though Slovenia focuses on the entire circular transition of its economy and Gipuzkoa also focuses on the mobility transition, the food value chain remains a key portfolio of interventions for both. The three delegations met at multiple times around the conference 'From Farm to Fork: Shaping Sustainable Food systems' that took place on the 28th of September 2023 at the University College of Dublin and had the opportunity to have deep and rich debates around common challenges.

Additionally to the deep demonstrations, EIT Climate-KIC is also taking part in many projects related to the land agri-food sector decarbonisation such as [ClieNFarms](#), [Climate Farm Demo](#), [SCARE](#), [EJP Soil](#), and [Credible](#).

This report is an attempt to collect interesting facts, observations, and learnings from these projects that can provide inspiration and reflection to further implement the Deep Demonstration in Ireland. The content is consequently organised by key theme and then each theme is described using the sensemaking methodology, ie.

- What was observed?
- So What are the learnings and how are they relevant to Ireland?
- Now What can we potentially do to leverage and act on these learnings?

2. Carbon Farming

EIT Climate-KIC is working across a few projects dealing with carbon farming, the two main ones being [Credible](#) and [SCARE](#) as well as [EJPSoil](#), [ClieNFarms](#) and [Climate Farm Demo](#), which are broader but still addressing carbon farming. This section relates some of their learnings that can be useful for Ireland.

What did we observe?

From the [SCARE](#) project, which is very much focused on bottom-up change and building a network of small groups of producers (groups of about 20 farmers) who are leaders in

driving transformation, we can draw inspiration from a few initiatives. Here are some examples below:

- The group [AgriCO2](#) in Switzerland developed a very efficient systemic model to transform their own system in order to be carbon neutral. You can see an illustration of their system in Appendix 1. At the core of their initiatives were known measures such as cover crops, organic fertilisers, and shallow tillage but they also chose to do more by producing both biochar and compost for organic fertilisation, leading them to create new economic opportunities for their plot. They indeed invested in pyrolysis technology to produce biochar that they then sell to nearby cities applying them on their soils to reduce their irrigation costs (ie. biochar has capacity to hold water); while at the same time, they recuperate green waste from these cities, being paid for it and feeding their compost production. These new processes also enable them to produce heat that they can then valorise. This group of farmers became very quickly carbon neutral creating value for their soil, reducing irrigation costs as adherence to soil is better (adherence is the capacity for water to stick to soil) and creating economic value. They also developed a technology to define the ways to destroy cover crops as well as the optimal time to do it to maximise the carbon sequestered; they developed the machinery themselves, creating opportunities to partner with machinery companies willing to reduce emissions too.
- Sweden is another example from the SCARF project where the basis to become carbon neutral is the same (ie. using cover crops, organic fertilisers, and shallow tillage) but the way of valorising these practices is very different. The valorisation happens by creating a network of companies willing to pay for specific crops – so truly demand-based – and then farmers get subsidies of EUR100 per hectare – whatever they do – to enter the system to supply these companies. They also have a similar system in Finland but more based on a voluntary basis with fewer subsidies and companies also giving a bit more money to support implementation through training etc.
- Another learning from that project is that regenerative approaches come from a different place than organic, it is more holistic rather than choosing what not to include. For example, some groups changed fertilisers to regenerate different soils leading to resilience mechanisms so that there is no need to use pesticides whereas a production can be organic without a holistic reflection including soil, water etc. Regenerative is about reconstituting an ecosystem with symbiotic approaches.

The EU-funded project [Credible](#) – whose goal is to build consensus on the methodologies that could maximise the capacity of soils to act as carbon sinks – sees

carbon farming as a transformation tool to enable the transition toward regenerative food systems and restored landscapes.

- The view is that it will be most impactful when based on methodologies and schemes that are meaningful at the regional level, and capable of inspiring rural communities to bring life back to the soil. The term 'fit for region carbon' is used to express this concept.
- Credible mainly focuses on carbon removals, not avoidance. Removals are essential because they are long-term but avoidance is also important in the sense that it is instantaneous, removals need time to be verified and it can take 20-30 years to materialise, which presents a challenge for compensation and verification.
- Carbon credit removals can also be controversial for offsetting as producers who are already doing well cannot have carbon credit. This is why Credible envisions defining a regional baseline instead of a real baseline which is an average of regional practices so farmers already doing better than average could benefit already. It would help to maintain good practices but cannot be used for offsetting as we are not 100% sure that it will reduce emissions; however, it can be used for insetting. Insetting practices are increasing and it is also a way to have companies contributing to the production system differently. Offsetting also needs precise monitoring while insetting could represent an easier logic of payments to support good practices without necessarily complicated monitoring, it is about monitoring the practices rather than the results.
- The points above also link back to action-based vs. results-based funding mechanisms. Given that result-based funding is tied to a verified outcome, this method is naturally a better fit for carbon farming schemes and this is what Ireland would like to implement too. However, it also needs sophisticated financial mechanisms and comes with the following challenges:
 - There are higher risks and uncertainty for farmers because climate action does not necessarily lead to the desired outcome.
 - There are potential higher transaction costs for farmers and project developers.
 - Monitoring, reporting and verification (MRV) of climate action results needs to be robust.
 - There is a need to ensure additionality and to secure long-term climate impacts.
 - Strong advisory support is needed to be built into reward design and the capacities or resources for this may currently be lacking.

- To work well, action-based funding mechanisms need strong contracts in place to make sure that producers will continue to implement measures to ultimately reduce their emissions in the long term.

Based on [EJPSoil platform](#) which is part of the [Climate Farm Demo](#) project, we can also see that action-based funding mechanisms actually represent the majority of current carbon schemes implemented:

- Overall (as of 1 December 2023), 93 schemes have been implemented around the world, the majority of them (57) are action-based, 23 are result-based and only 10 are hybrid.
- It is also interesting to note that 51 of the schemes are private, 33 are public and only 5 are public/private schemes.
- Public/Private funded schemes are mainly in Germany where they have three regional schemes focused on peatland rewetting [Klimamoor – The KlimaMoor "Am Löh", Ahlenmoor](#).
- Private schemes are mainly in Europe with one scheme in the United States. Organisations involved are a mix of non-for-profit and non-governmental organisations (like [Finnwatch](#) in Finland, [CoolCrowd](#) in Norway focusing on crowdfunding, [BCarbon](#) in the US) and private companies, small and big like [Soil Capital](#) heavily present in France and Belgium or Danone for example.
- The majority of the private carbon farming schemes are for arable farming (41%), followed by Peatland (18%) and Mineral Grassland (15%), the rest being divided between agroforestry, forestry and biochar.
- Public schemes are all around Europe as well as in Turkey and Australia with the scope of actions being very similar to private schemes (ie. arable farming, peatland and mineral grassland being the top three).

Finally, during the annual summit between ClieNFarms and Climate Farm Demo that took place in October 2023, there were some discussions on emissions reporting that may be interesting to consider for rewarding mechanisms:

- LULUCF reporting makes sense by hectare whereas other emissions are usually more by unit of product. This may introduce difficulties, particularly in proposing pathways to net-zero as a number of actors tend to use carbon footprints by unit of product; it would be interesting to assess the implications of this as emissions per unit of product and per hectare are critical for the transition pathway but total emissions are the most important at the end so focusing on the first two will not be enough.
- At the national level, what is important is not so much to define what Carbon Neutral or Net-Zero means at the farm level but how farms (at their level) can contribute to the carbon neutrality (or net-zero) of their own countries.

To realise this at a national level, it is becoming clear though that due to the wide variation in soil types and farm systems, it is important to know what is happening in individual farms and to attribute concrete value to ecosystem services so that land managers know what to do to contribute to total emissions reduction.

- Most company approaches to carbon reduction focus on efficiency and their rewarding approaches are based on carbon footprint (reduction) by unit of product. As long as the increased efficiency per unit of product is a 'license' to produce more products, this will not help reduce emissions.

So what are the learnings?

- Carbon farming measures need to be envisaged based on their particular geographical and economic context so a regional approach rather than national is recommended.
- Given removals are very long-term, it would be better for farmers to have a mix of avoidance and removals so that there is a guarantee and an immediate value created. It could be a way to implement a framework at a more rapid pace creating immediate value and helping to build trust. Linked to this, a hybrid mechanism combining both action and result-based funding is interesting to explore further to make sure we create short-term value for farmers while ensuring long-term value and results.
- Additionality is key as a basis for reward mechanisms. It is unlikely that measures already in place will be rewarded compared to additional carbon removals or additional emissions reductions. This could become an issue in the long term when there is no scope to further reduce emissions or increase removals, raising the question whether farmers will continue to get paid for ecosystem services.
- Additionality may be controversial with carbon offsetting as companies can make no efforts to reduce their emissions (or even increase them) and just buy credits to offset this. However, as there will always be companies that cannot become carbon neutral despite investments, there is still space for offsetting so that these companies can offset at a certain threshold of their own reductions.
- Carbon farming is not only about farming but also about agroforestry to increase biodiversity, and water as more carbon means more water retention which creates fertility. Having that ecosystem view leads to a range of opportunities and shifting the value proposition in primary production may have a significant positive impact on the development of more sustainable business models. We can see this in the Swiss example AgriCO₂ when producing compost and biochar enables them to create heat, manage waste, and reduce irrigation costs.
- It is interesting to look at all types of reward mechanisms, but we also need to think about who pays, how, and why.

- Carbon efficiency mechanisms may be useful as a comparator on global commodity markets but mean nothing in terms of additionality. Rewarding mechanisms for carbon emission reduction and carbon removals need to make sure there is guarantee of additionality.

Now what can we do?

- Ireland is already considering to reward immediate carbon reductions (ie. what we called carbon avoidance further up) in its ecosystem services framework including biodiversity actions so this is in line with these learnings. We now need to establish a demonstration at scale to prove that with robust MRV, results can be achieved so that investment from non traditional sources can be funneled to farmers for the ecosystem services they provide.
- The national framework in Ireland will need to include details on what types of measures can be paid for up front and which ones can only be paid for after additionality is proven (results based). This will likely need to include premiums in relation to risks to permanence of measures being factored into the carbon price.
- In line with the learnings above, Ireland is developing a national carbon farming framework (payments for ecosystem services) that will set the standards for baselining emissions reductions, carbon removals and biodiversity and water quality improvements. The framework will also set out the governance structures for the national framework and detail the process for retiring credits as well as the key principles for a robust system.
- As always, who will pay for the framework and how is a key question, reinforcing the need for the funding to be explored and secured. Private funded schemes seem to be numerous all around the world and represent a huge opportunity for Ireland as well as exploring public/private funding mechanisms. A Funding and Financing working group is being established in Ireland to answer the many questions around who will pay, how much, ownership, who credits can and cannot be sold to etc.

A significant challenge for Ireland centres around the perception that Ireland is one of the most sustainable producers of meat and dairy in the world. This perception is based on carbon efficiency figures that are compared across different countries. However, though these figures look good for Ireland, total emissions have been increasing (to 2022). Significant effort will be required at an international level to shift away from carbon efficiency as a measure of sustainability to use total carbon reduction figures in their place.

3. Dairy

What did we observe?

The ClenFarms project has two demonstration projects in Ireland (both led by Teagasc), [one focused on beef](#) and [one on dairy](#).

The dairy project specifically focuses on transitioning grazing systems to grass-white clover systems with reduced N fertiliser input. The research programme examines three pasture-based systems – grass-only, grass-white clover, and Multispecies Swards and the research farm is also implementing a range of measures to transition towards climate neutrality, e.g. low emissions slurry spreading, using protected urea, planting trees and hedgerows, improving/maintaining high soil fertility, covering slurry storage, etc.

Some solutions that came up at one of the dairy workshops reinforcing some of the thinking of the dairy flagship already are the following:

- The need to move from emission efficiency & intensity to total emissions
- Think about the actual consequences of breaking the rules
- Support farmers to get access to vets for consultations on herd health (subsidies)
- Establish a baseline with a personalised 'Know your farm emissions' program to support farmers
- Intensify knowledge transfer between research, commercial farms and extension services
- Consider shared equipment for sharing emissions but also for circularity opportunities
- Communicate and involve the wider community

This workshop also considered what known solutions could have the most significant impact on the dairy sector. Overall, the following measures were perceived as the most impactful by experts: reduction of herd size, grass-legume mixtures, (re)wetting of organic soils, conversion to forest/nature, followed by methane-inhibiting feed additives, agroforestry, and low-emission synthetic fertilisers.

It was also identified that the high-impact solutions that are **less likely** to be implemented are mainly agroforestry and rewetting measures, followed by anaerobic digestion, conversion to forestry, slurry acidification, and reduced herd size.

Some ClieNFarms demonstration projects in other countries also use interesting solutions in the dairy sector that are related below (more examples – not only related to dairy – can also be found [here](#)).

- Switzerland is implementing measures to [optimise grassland management](#) as grassland-based dairy production is a mainstay of Swiss agriculture and grassland stores much more carbon than if they were converted to arable land. Some of these measures are (i) choosing site adapted grass-legume mixtures, (ii) synchronising grazing with vegetation stages, (iii) judicious use of compensatory feed and (iv) keeping dual-purpose cows with high pasture suitability. Under suitable conditions (e. g. pasture areas close to the stable) and with appropriate processing and marketing, the workload for the Swiss demo farms was reduced while economic revenue increased.
- A [demonstration farm in France](#) reduced the age at first calving by 2 months thanks to better growth of the heifers (ration consisting of unlimited hay, water, and a concentrate based on faba bean and a barley pellet). The consumption of concentrates was increased but it was compensated by a decrease of dry matter of fodder that would have been needed for the 2 additional months. This helped reduce the number of unproductive animals and thus reduce enteric methane emissions. Reducing the age at first calving is also beneficial for animal health and welfare, having a positive impact on a cow's lifespan, alongside improving milk production.
- [11 demonstration farms in Spain](#) are doing milk pregnancy tests every four months to check if cows that are supposed to be in calf still are or not. Indeed, between 10 and 15% of dairy cows positive to pregnancy lose their calf between diagnosis and day 100 after positive fecundation day. With this information, farmers can avoid not intentionally open days for cows, shortening the days in milk and improving feeding efficiency. Efficiency is key regarding carbon emissions; when cows are beyond 300 days in milk, their efficiency in terms of transforming dry matter into milk drops dramatically. A supposed pregnant cow that lost his calf means -in economic terms- over EUR 4.5 per cow and per day lost.

So what are the learnings?

- The challenges and enablers to drive transformation in the dairy sector are similar across countries and the differences come mainly from the type of land and soil we are dealing with (regional focus) as well as regulations and incentives in place (national focus).

- Herd size seems to be a taboo in many countries and agroforestry as well as water table management for peatlands also seem to present implementation challenges. This type of project gathering demonstration farms across Europe is critical to share learnings and support one another.
- Ireland is already experimenting with a lot of measures in the dairy (and beef) sector that we can leverage for the DD flagship.

Now what can we do?

- It would be interesting to explore why agroforestry, peatland rewetting measures and anaerobic digestion are less likely to be implemented and how this is relevant to the Irish context and some measures that are already implemented (ie. AD on dairy farms seem to be working quite well so far vs. agroforestry that may be more challenging).
- Grassland's potential to sequester carbon compared to arable land need to be considered in the scenarios and trade-offs of the new 2050 Vision and in activities of Flagships 4,5,6,7.
- The Dairy Flagship can assess the relevance of specific measures from other demonstration farms - alongside their potential impact – to see if some of them could work in an Irish context.
- The DD in Ireland is very much building on the work of the Signpost Farm network (ClieNFarms demo farms) in Ireland led by Teagasc. This is just one example of how CKIC is building on and connecting the dots between existing initiatives to amplify impact.
- The Irish DD currently focuses on reducing emissions in livestock production, it does not consider the role of the livestock sector in the entire food system yet, representing an opportunity for further exploration.

4. Tillage

What did we observe?

The ClieNFarms project is again relevant here as numerous demonstration farms in other countries are using solutions that could be interesting to consider for the Tillage flagship:

- [A demo farm in South West of France](#) is experimenting with nearly permanent soil cover to reduce erosion and improve soil fertility, using two types of crops

for summer and winter, the achievement of that succession is that the cover crop is destroyed mechanically without glyphosate.

- [Localised nitrogen fertiliser injections](#) under the soil surface with or near the seed at sowing is a promising alternative to reduce fertiliser application in no-till or reduced-tillage systems.
- [Growing more annual harvested grain legumes](#), such as pea crops, is one of the promising solutions for the arable sector for targeting both climate mitigation and local protein production. French studies have shown that this solution is a guaranteed improvement of farm carbon balance with an increase of 15 to 20% of areas in pea, faba bean or soya. This effect is also higher if combined with an increase in cover crop proportion.
- To get the best results with strip tillage, it is necessary to [combine fertilisation with tillage](#), it can be combined with slurry/digestate or a mineral fertilizer injection before crop sowing. There are many economic and climate advantages of strip tillage such as less working time and faster execution, a 60/70% reduction in fuel consumptions, reduced carbon footprint (GHG emissions relative to field operation), less machinery needed, and a reduction of maintenance operations which in turn means a lower investment.
- [The application of Biochar](#) to store carbon dioxide taken up from the air by plants. We mentioned Biochar in the carbon farming section, it is a carbon-rich substance produced from biomass (plant matter) and through a process called pyrolysis, where the biomass is heated to very high temperatures under low oxygen conditions. It can be produced from a wide range of feedstock materials, including some waste materials that have no other use, and can be applied to soils to sequester carbon for centuries. Yet there are also limitations to the use of Biochar, much related to the origin of the biomass used and the potential related pollution, for example the use of biomass originating from cuts of road sideways.
- [A farmer in north-East of Spain](#) (Catalonia) has been experimenting with crop rotations and instead of rotating crop and barley, he started to rotate crops with a mix of legumes and cereals (adding annual clovers, vetches and ray-grass to hybrid barley to one area and have another larger area with oat instead of barley). This approach had multiple benefits: reduced need for inorganic fertilisers, more digestible forage obtained, and later corn planting done in better soil conditions due to the presence of additional nitrogen fixed by the previous crop.
- Beyond this concrete example coming from the ClieNFarms projects, there are also lots of research related to other crop rotations, [strip cropping*](#) (introducing diversity in the form of time, space and genes in current cultivation systems) and [pixel farming**](#) (cropping system organised by pixel plots designed so that

the right plant community is allocated to the right location, at the right time and right resolution) that can be interesting to explore for Ireland.

*Wageningen University Publication: *Redefining the field to mobilise three-dimensional diversity and ecosystem services on the arable farm*, Ditzler, Van Apeldoorn, Schulte, Tiftonell, Rossing, January 2021

** Wageningen university publication: *Automating Agroecology: How to design a framing robot without a monocultural mindset*, Ditzler, Lenora, Driessen, Clemens, 2022

So what are the learnings?

- Many farms in Europe are already experimenting with new crops and technologies that could be replicable in Ireland.
- Technology is still a big enabler to some of these solutions – like pyrolysis for biochar production – but these solutions seem otherwise feasible within the current production context (like fertilisation injection, crop rotation, grain legumes, etc).
- The type of soil is still key to choose the right demonstrations but given that most Irish soils are loams, nearly permanent cover crops for example could be explored further, also aligned with carbon farming practices. The same applies with crop rotation with oats for example as oats can easily be grown in Ireland.
- A key challenge to expanding the tillage sector in Ireland is the availability of land. Tillage is profitable, but not as profitable as dairy. The pressure on dairy farmers in terms of nitrates is forcing them to expand the area of land for the same number of cows. This is something that will need to be monitored closely if and when the national carbon farming framework is being rolled out to ensure there are no further negative consequences on availability of land for tillage.
- The value chains for some of the 'new crops' are not yet developed and will need to be explored further.

Now what can we do?

- The Carbon Farming flagship could include some of these practices in their assessment of possible measures to support tillage and horticulture growth while reducing emissions and supporting carbon farming. There is significant potential for credits for avoided emissions from converting land from livestock production to tillage to make tillage more competitive with dairy in terms of accessing land.
- These measures should be assessed against their carbon reduction potential and also in conjunction with other solutions and scenarios where trade-offs might need to be agreed on (ie. also related to Flagship 1).

- The Tillage flagship could look at broader successful tillage practices in the same pedo climatic zones in the EU for further inspiration. New value chains for tillage need to be set up and explored as part of the DD (ie. Flagships 7 and 2). A long term end to end value chain approach will need to be taken in establishing demand for new crops and this process will likely need to be derisked through state/external support.
- There is an opportunity to connect Tillage with Dairy and Meat to explore joint opportunities and jointly address the challenge of land use and nutrient cycling.

5. Local and short food chains

What did we observe?

From the exchanges between Slovenia and Gipuzkoa that took place during the community day in Dublin, we could see that the topic was very important for the delegations in their overall aspiration to achieve a truly sustainable food chain in their territories and this proves to be particularly challenging as it involves not only institutions but lots of stakeholders along the food chain (farmers, food manufacturers, industry, retailers, public organizations, individual consumers).

Both Gipuzkoan and Slovenian governments aim to promote the consumption of local products to promote sustainable diets, boost the local economy but also to reduce the food footprint overall:

- It is a priority for them since they hope it can make the primary sector more attractive for new generations, generate new business models in primary production, promote short chains and increase transparency in the traceability of local products.
- In this context, it is considered that institutions should lead by example, implementing schemes that encourage the consumption of local foods in public services (managed by institutions). This idea has been on the table for some time, but the complexity of its execution, for example, the need to ensure the availability of varied local products to comply with the volume of requests from the above-mentioned public services alongside the need to comply with strict sanitary legislation which in many cases originates in different levels of administrations, have made it difficult to transform it into operational projects.

- In Gipuzkoa, within the deployment of the Deep Demonstration, the Province is supporting the launch of specific prototype actions, one of which is precisely devoted to promoting the consumption of local food in public services (schools, residences, hospitals, events, etc.)
- In Slovenia, improvement of the catalogue of foodstuff for public procurers as well as capacity building and promotion of best city-level practices (e.g. the city of Kranj which has an app for dynamic purchasing system) are some of the considered actions within the Food portfolio.

So what are the learnings?

- In Ireland, given that 90% of beef and dairy products are currently exported, there has been less focus on local consumption. However, local production and consumption hubs to create more value for dairy farmers and their communities are currently being explored through the dairy flagship, also focusing on how coops can reinforce local value creation. Bioeconomy and circular opportunities (like setting Anaerobic Digestion plants on dairy farms for example) are already happening in a localised way so there are opportunities to consider shorter value chains in areas making sense for Ireland.
- Even though the local market is small and there will still be exports, there might be an opportunity to explore how an increased local consumption of productions could reduce emissions (even though it might be a small %) alongside boosting the local economy.
- In horticulture, there is a need to expand production of the crops that can grow well in Ireland, especially since traditional areas in the mediterranean are now struggling to grow predictably due to change in climate as well as water scarcity.
- There is also a big opportunity to expand the tillage sector in Ireland and reduce livestock by incentivising the use of Irish grown animal feed that has a much lower footprint than internationally procured.
- There is a niche market for small local food producers but these tend to be expensive with a limited customer base so they would need to be supported to expand.
- There is also an opportunity to take into consideration the role of Irish public institutions in sourcing sustainable and local food to create a greater demand for these products. This could be a key enabler to changing public institution behaviour and therefore requires some capacity building on criteria to use to source local/sustainable food as well as some investment to make it easier to implement, this can also mean funding food warehouses in public institutions or school kitchens.

- Different types of public institutions (ie. schools, hospitals, residences, offices, etc.) all have different setups and needs and might need to be dealt with differently. Procurement rules can be similar but the setup of warehouses and other enablers will need to be bespoke.

Now what can we do?

- The Irish DD can think about the relevance of short value chains to reduce food and feed footprint and enhance circular bioeconomy opportunities where that makes sense. Even though exports are still prevalent, there is a willingness to increase self sufficiency in some crops and production systems (ie. feed, etc.) so there is still a huge potential for localised processes to be explored to create value, reduce emissions and improve the sustainability of the sector overall.

6. Strategic development of Forestry

What did we observe?

Both Slovenia and Gipuzkoa are struggling with similar challenges of abandonment and fragmentation of forests; they have been discussing unique approaches to tackle them and foster the role forests can play in fighting climate change.

- In Gipuzkoa, the recently created Forestry Foundation (Basotik, which means “from the woods” in Basque) is an example of Institutional engagement in forestry management. The Foundation is 100% owned by Gipuzkoa Province Council and intends to replant and manage forests sustainably with three main objectives: to offer professional, homogeneous, and sustainable management to Gipuzkoa's forests, efficiently addressing its fragmentation and abandonment; to improve the CO2 sink capacity of forests and to reinforce a sector that generates 6,000 jobs in Gipuzkoa, favouring its competitiveness and profitability.
- In Slovenia, the great tradition of national forestry policy under the Ministry of Agriculture, Forestry and Food, results from past forestry practices and

implemented policies protecting forests and lessons learned from challenges in providing infrastructure in wood processing.

In Ireland, forest ownership is mainly private (51%) and all afforestation is currently on private land. The state implemented a new forestry scheme in 2022 with premiums for planting trees to increase by 46 to 66 % and extended to 20 years for farmers. Integration of forestry expertise in agriculture extension systems is still a challenge. The wood value chain needs more development and LULUCF emissions are separated from agricultural emissions in the national inventory.

So what are the learnings?

- Ownership of forests can pose challenges to drive changes as forest owners are the ultimate decision-makers about what to do with their land, the state can still play a role with schemes and incentives.
- Afforestation processes are not always aligned and clear about what trees to plant given the changing climate etc.
- Natural disasters and diseases can affect forests and afforestation efforts significantly and need to be mitigated.
- Wood and Forestry should be more embedded in agricultural measures, they are still sometimes considered separately even though they are key elements of the national economies to reduce emissions.

Now what can we do?

- There is an opportunity to challenge the meaning of classical ownership of forests to be a collective 'common good' and build a narrative around it.
- A concept of collective governance and coordination between many forest owners should be envisaged to reach goals and build collaboration.
- Support from Research and Science should be sought to make smarter decisions on the best tree species in afforestation processes.
- Lessons from recent floods, fires, and bark beetle plague should be leveraged to consider the best models of agroforestry to make forest land more resilient.
- Consider setting up some kind of association for small forest owners (similar to farmer associations).

7. Re-imagine agriculture and ensure farming succession

What did we observe?

Slovenia and Gipuzkoa shared the following challenges while meeting in Dublin that are very relevant to the Irish situation:

- Perception about agriculture and farming systems overall can be quite negative, seeing farmers as polluters and not understanding the current challenges about the land, the use and price of pesticides, and the impact on animal and human health.
- Farmers can also feel that they are not understood and any changes in regulation – especially the volatility of these changes – can trigger a lack of trust and confidence that the government is here to support them while reaching climate objectives together.
- The relationship to landscape seems to be quite complex and misunderstood sometimes. People in developed countries tend to take land for granted and see it as either a beautiful space or a space to maximise production and revenues, not necessarily thinking about their connection to it. Whereas for some populations depending on it (Africans for example), the land is their main asset so their way of managing it to both produce food while protecting it comes from a different place.
- Young people in both Slovenia and Basque country do not see farming as attractive and meaningful work, posing problems for succession.
- In Gipuzkoa, the over-arching Etorikizuna Eraikiz strategy included an active listening exercise involving a wide array of farmers, who together with other stakeholders imagined the future of the sector in their region. More recently, the Gipuzkoa model has evolved into combining farming with a part-time job in industry – hence the “Mixed Professional Farmers” programme recently launched by the local government (still in the pilot phase) which intends to foster cooperation between industries and the service sector to allow professionals to devote part of their professional time to farming activities.
- In Slovenia, they focus more on subsidies for young farmers and building a better image of farming in general (communication and PR).
- In Ireland, generational renewal is also a challenge, innovative taxing policies for promoting young farmers’ interests as well as inheritance policies are considered.

- To re-imagine agriculture, Wageningen University & Research in the Netherlands is proposing six dilemmas in order to make choices and choose a course. These choices are neither simple nor one-dimensional but they could be relevant for Ireland:
 - First dilemma: What will be Dutch contribution to the world food supply? Do Dutch farmers only produce for the Dutch market, in short chains? In that case, the number of cattle can be reduced considerably. Or is Dutch agriculture part of the European food strategy? In this strategy, the Netherlands mainly produces what it does best (such as dairy, vegetables and potatoes) for consumers in the London-Paris-Berlin triangle. This second role requires a larger agricultural area and high productivity, within environmental limits. As a third role, the Netherlands also contributes to a global level, focusing in particular on the production of starting material (vegetable seeds, seed potatoes), technology and the provision of knowledge. This may also require less land in the Netherlands, but it does place high demands on soil quality, water availability, labour and crop health, among other things.
 - Second dilemma: What is the function of animal husbandry in the Netherlands? Will we continue to meet the European/global demand for high-quality proteins with our animal husbandry? Or will our animals become mere processors of grass and waste streams? In the latter case, we will stop importing animal feed (soya, grain), which will reduce the number of livestock and eliminate the manure surplus. However, this is subject to the condition that consumers eat much less meat, see sixth dilemma.
 - Third dilemma: What is the moral position of animals in our food supply? What rights do we grant animals and to what extent are we allowed to exploit animals for our food supply, and under what conditions? What does a more animal-friendly livestock sector look like?
 - Fourth dilemma: How many of the future climate and nature goals do we want to achieve? The Netherlands has agreed to drastically reduce greenhouse gas emissions by 2050. How will the Netherlands compensate for the remaining emissions in order to become climate neutral? The Netherlands also wants 30% protected nature by 2030. Is the Netherlands going to plant a lot of extra forests and designate nature reserves to achieve these two goals – which is virtually impossible – or is the Netherlands, as a densely populated delta, going to exchange climate and/or nature goals with other countries? For example, an exchange is conceivable between the Netherlands (higher agricultural production) and other European countries (more space for forests) in order to jointly achieve the climate, nature and food goals.

- Fifth dilemma: Are we going to separate or interweave agriculture and nature in the Netherlands? Separating (natural areas in addition to highly productive agriculture) requires different measures and spatial planning than interwoven (nature-inclusive and regenerative agriculture) and has different effects on land use, biodiversity, and productivity, among other things.
- Sixth dilemma: Can and do we want to steer consumer behaviour? Are we still holding on to freedom of choice? Or are we going to restrict the consumer's freedom of choice to achieve the nature and environmental goals and combat social inequality? In the latter case, consumers will pay a higher price from now on, but will lower incomes be able to do so? Should we make agreements about this at the EU level? And will supermarkets be allowed to sell cheaper food from less strict countries?

So what are the learnings?

- There is an opportunity to explore new business models to make farming more profitable, attractive, and safe for the land, by considering extending farming functions and experiences into tourism or other industries leveraging learnings from the Gipuzkoan 'Mixed professional farmers' programme.
- We need a new narrative on agriculture and farming to show the benefits of farming but also of land services or "land guardian" functions. It should start with a deep understanding of the current situation with its complexity, a reconnection of people to their land but also an exciting and attractive story about the future.
- A regional approach seems again to be relevant for establishing that connection to the land.
- Succession in farming is a common challenge also shared with other EU countries that needs to be tackled urgently for change to happen in the long term, it should continue to be explored through different means – policy, finance, communication, and capability building.
- The challenge of defining a long-term vision for the land agri-food sector including its connection with nature and role in the broader economy and society is common to many EU countries (see the Netherlands dilemma).

Now what can we do?

- The Irish DD should consider (and already do) including young farmers and young people overall (ie. those who may be interested in farming in the future) in all co-creation activities of the flagships, including flagship 1 on the 2050 vision. The dairy flagship is already co-creating the vision of a future sustainable dairy sector with farmers themselves so that measures are relevant and a sense of trust and

ownership is created; and the carbon farming flagship is also organising focus groups with farmers to define the new ecosystem services framework. These approaches of inclusion and deep listening need to continue to be included in all flagships and at all stages, through focus groups but also interviews, surveying, regular check-ins/'sensors', etc.

- The communication and public perception will also be key to addressing that succession challenge. We need to communicate small wins as fast as we can to hopefully change the narrative to a positive one in the media.
- The Irish DD could also consider the six dilemmas from the Netherlands to feed in Flagship 1 and the definition of the 2050 vision to re-imagine the land agrifood sector.

8. Scaling approach

The [ClieNFarms](#) project has done lots of work and thinking on scaling demonstrations and what enablers should be in place to do so, developing a specific scaling toolbox. We thought these could be relevant to take into consideration for the Irish Deep Demonstration.

What did we observe?

For a scaling process aiming at transforming a production system to occur, it is imperative to mobilise the stakeholders who interact within the territory and specific value chains of products or services. We believe that three critical factors are needed to mobilise enough stakeholders and get them to work together to reach a sufficient scale. These three factors are:

- **Value:** The transformation needs to generate value perceived as sufficiently rewarding by the different actors. This value can be related to new products or services that are perceived as beneficial, because they can be monetized. It can also be inspirational, benefit the local communities, or improve the local environment and livelihoods. While value is multidimensional, it needs to be perceived as tangible by some of the actors who need to be convinced that taking transformative action is worth the effort required. Understanding the specific value and what motivates individual stakeholders is important; some are more interested in improving margins, others by beautifying the landscape, and others

by what enjoyment can be reaped in conjunction with the new products or services.

- **Risk:** Any transformation is associated with new practices, and new interactions between stakeholders which consequences cannot be fully predicted. A new crop or a new production comes with unprecedented hazards, which, combined with the lack of experience on how to mitigate these, leads to critical risks for the actors. The art of transformation is to ensure that risks are assessed, mitigated, and shared. Training and peer-to-peer learning are essential for this, but specific de-risking tools may also be needed like insurance or guarantee mechanisms. Farmers are accustomed to dealing with risks, and risk and resilience issues can actually be appealing to them in comparison to mitigation aspects that they do not perceive as so important. Some farmers also see the transition as offering new opportunities, there are risks associated with the transition but there are also risks for not taking action. A transition phase of five to ten years is usually observed during which farmers need to be supported to minimize and address the transformation risks.
- **Trust:** There is no transformation if there is no trust across stakeholders. A farmer needs to trust that he or she will get more value from his or her products, consumers will not pay any premium if there is no confidence in the added value of a product. Generating trust requires patient action and is facilitated by transparency, traceability, and contractual mechanisms. Data needs to be made available and the way it is managed needs to be transparent and acceptable to all parties. Information on the products needs to remain available across the supply chain. Contracts must be fair, particularly in sharing equitably the risk and the added value generated.

The role of companies in funding and scaling has also been observed as both an enabler and a tension point:

- An important tension can be perceived between approaches involving companies (and payments from them) and other approaches. This raises an important issue about how farmers can remain in the driving seats of the transformation of their farms and avoid becoming hostages of companies focusing primarily on carbon. The long-term views and the resilience aspects do not depend only on carbon and can even have opposed effects on resilience.
- This was particularly raised by the [Innovative Systemic Solution Space \(ISS\) in Belgium](#) of the ClieNFarms project - on low till and low pesticide cropping systems - where the farmers of the Demonstration farms do not trust the approach of Soil

Capital which focuses on a small number of practices to target their investments, which is perceived as not holistic enough.

- The [Italian i3S](#) is also facing issues related to the coordination between insetting approaches by companies and Eco schemes subsidies. This would be interesting to explore further to feed in the reflections on rewarding mechanisms.
- In general, we can observe that the scaling ambition is quite variable and depends on the approach. When companies are involved, the ambition tends to be sectoral whereas for special crops for example (ie. tomatoes, olives, etc.), the ambition can be national.

So what are the learnings?

- The Value, Risk, and Trust framework is useful to mobilise stakeholders for scaling but also for stakeholder mobilisation in the early stages. Before scaling, there is still a need to make innovation happen through demonstration projects and these require a lot of stakeholder engagement too (the stage we are in for the Irish DD).
- Working with companies is crucial to support scaling and attract funding but these may represent conflicting interests, it would be interesting to explore these scaling archetypes a bit better and analyse the various motivations using the value, risk and trust framework.
- Ambition for sectors vs. special crops don't come from the same place – how can we have national sectoral ambitions to drive transformation and mobilize the right set of stakeholders across the system?

Now what can we do?

- Even though the Irish DD flagships are still in the activation phase and far from the scaling phase, there is still merit in using the Value, Risk, and Trust framework to think about the stakeholders we need to engage and also to scale already known measures being implemented.
- There is also potential to use the framework to think about how to engage the private sector to fund, support and overall take part in our flagship activities and demonstrations.

9. General / Deep Demonstration process

What did we observe?

From the exchanges between the Slovenian, Gipuzkoan and Irish delegations during the Farm to Fork conference in Dublin at the end of September 2023, there were some main observations around the process and the way of working on a Deep Demonstration with EIT Climate-KIC:

- The governments realized that they overall have the same challenges, creating the impression they are not doing it on their own. Challenges are the same but starting points are different.
- There was a sense of positivity and optimism about the Deep Demonstrations, aiming for the same goal in different contexts, building the foundation of a community of purpose that can exchange on the same complex problems and the uncertainty that comes with it, 'a burden shared is a burden halved'!
- Government teams understood better that the type of partnership they have with EIT Climate-KIC is different from a consultancy contract, it is about being supported to innovate in a systemic way, and the aim is to build the capacity and capability themselves so that they can have a greater impact in the long-term.
- The Irish DD inspired a lot the Slovenian government to be able to prioritise where to start (ie. choose 7 flagships to focus on for example) and also triggered some reflections around the role of exports in the economy and how can it fit with the willingness to increase local diets and short value chains.

So what are the learnings?

- Knowledge sharing and collaboration are key elements to drive transformation, anywhere in the world.
- There is so much value in informal exchange between policymakers, policy-to-policy conversations should be facilitated more openly.
- The type of learning partnership in place with EIT Climate-KIC to make systems innovation happen requires dedication of resources, trust in the process, and openness to build capacity even though this might be uncomfortable (ie. when it comes to taking risks and innovate with policies for example).

- Deciding on whether or not to be an exporter is a complex question pondering the impact on the economy but also on emissions, intensity of agriculture, and well-being of the population. The willingness to increase local consumption can sometimes be seen as contradictory to the desire to increase exports to boost the economy.

Now what can we do?

- We need to continue connecting the three governments to support policy-to-policy interaction and exchange of learnings overall.
- Out of all measures and innovations mentioned during these exchanges, there is a need to classify what is feasible in terms of production, diversification, carbon sequestration, etc, linked to the soil, and the land but also what should be for local consumption vs. exported. A regional approach also seemed to be very important to implement change that is relevant and generate trust and value for local stakeholders.
- It is already underway but DAFM needs to continue to embrace a system innovation mindset and support new ways of working and innovation processes including policy innovation processes like the current work being done on the ecosystem services framework.

10. Conclusion

To conclude, in addition to the exchanges between Slovenia, Gipuzkoa, and Ireland on the transition of their respective land agri-food sectors that have been very open and enriching, we can see that so many projects are dealing with the same challenges related to decarbonising the sector and many of them are taking a demonstration approach, reinforcing the validity of our ways of working - and learning by doing - that we are implementing through the DD.

Beyond the impression of sharing the load and finding support in tackling similar challenges, connecting with these governments and projects can also generate lots of tangible ideas to consider in portfolio composition such as implementing specific measures to enhance carbon sinks while at the same creating new economic value and activities (ie. biochar, compost etc.), involving more young farmers in focus groups to tackle succession issues, re-thinking how land and forestry ownership could be considered and governed, and so on.

Above all, the main outcome of cross sensemaking is to continue the dialogue to cross fertilise insights and have a greater impact together. This could be done through informal catch-ups but also sensemaking sessions conducted as part of a new community of purpose, gathering potential other projects and EIT Climate-KIC community members.

11. Appendix

AgriCo2 Carbon farming system in Switzerland.

