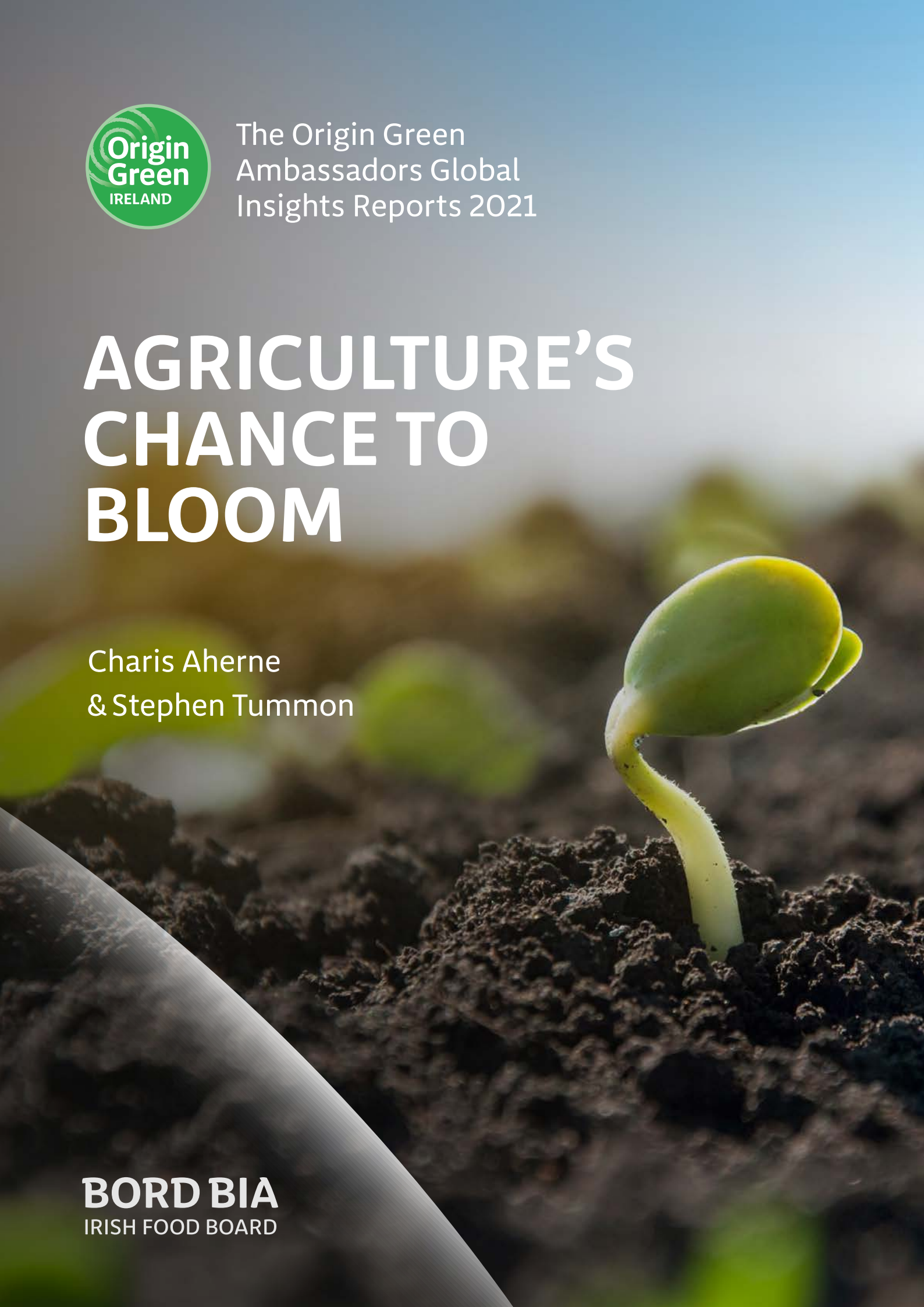
The Origin Green Ambassadors Global Insights Reports 2021

AGRICULTURE'S CHANCE TO BLOOM

Charis Aherne
& Stephen Tummon



BORD BIA
IRISH FOOD BOARD

Origin Green Ambassador Programme

Never has sustainability been so top of mind and globally important, and it is this convergence that has opened some important discussions among the global food industry. Bord Bia's Origin Green Ambassador programme is designed to open and facilitate these conversations and the role of Irish sustainability initiatives in export markets.

Created in 2013 with the Michael Smurfit Graduate Business School, this programme has at its heart two interlinked pillars: one focused on education in the sphere of Business Sustainability, and the other on partnership with major international food companies. The format of this 23 month programme towards an MSc in Business Sustainability ensures that high quality executives are placed in many of the leading Global Food & Drink companies, hot housing their skills while engaging on live sustainability projects. Working to embed sustainability best practices, strategic planning, refine policies and bring new thinking to their placements.

The Ambassadors are the connection between Ireland's Origin Green programme and its associated partner organisations who are world leaders in the global food industry. Over two years, modules focus on accelerating growth, sharpening business strategies, and anticipating change in an ever transient global economy. In partnering with major international food firms, these ambassadors can then build on an awareness of established Irish initiatives across key target markets.

In this series of global insights reports, the Ambassadors bring you their insights on some of the most pressing sustainability issues and opportunities facing our industry.

Charis Aherne

Charis spent her first placement working with McDonald's Global team in the UK as Sustainable Sourcing Lead developing a climate action toolkit for their suppliers, leading their communications committee for The European Roundtable for Sustainable Beef and managing their Carbon Disclosure Project account. Her second placement was with Starbucks in the UK as Sustainability Specialist where she led the UK supply chain team to implement a full strategic roadmap. Charis joined the SAI Platform for her final placement as Dairy Working Group Officer, benchmarking national dairy programmes to global standards.

https://www.bordbia.info/ucd-2021/

Stephen Tummon

Stephen spent two placements with Unilever's Sustainable Sourcing team based in the UK. He worked with internal stakeholders from the LCA and procurement teams to identify carbon reduction measures and engaged priority suppliers on critical raw materials to begin carbon reduction measures for Unilever's path to Net Zero by 2039. He led the trialing of a tool for the monitoring, reporting, and measuring of Scope 1 and 2 emissions for SME suppliers preparing a summary for various internal stakeholders. He was part of the team that wrote Unilever's Regenerative Agriculture Code for agricultural suppliers. Stephen's last placement was in Spinney's in Dubai leading sustainability projects for this high-end retailer across their 85 stores in UAE.

https://www.bordbia.info/ucd-2021/

Global Challenge

Global Agriculture is in crisis. Soil health is collapsing, biodiversity faces the sixth mass extinction and crop yields are plateauing. Against this crisis there is a rising clarion call for Regenerative Agriculture. But what is Regenerative Agriculture, and why is it gaining such prominence?[1]

Humanity has prospered immensely in recent decades, but the means by which we have achieved such prosperity has come at a devastating cost to soil health and biodiversity[2]. Healthy soil is essential for food security and is the basis of healthy food production systems.[3] Rapid human population growth coupled with increasing consumption has given rise to unprecedented pressure to intensify agricultural production. The current intensification of farming practices and subsequent overreliance on chemical fertilisers is already resulting in unsustainable soil degradation.[4] Fertiliser has significant associated greenhouse gas (GHG) emissions, while simultaneously depleting the natural capacity of soil and its essential nutrients and minerals. Collectively, we have failed to sustainably manage the planet's agricultural resources.

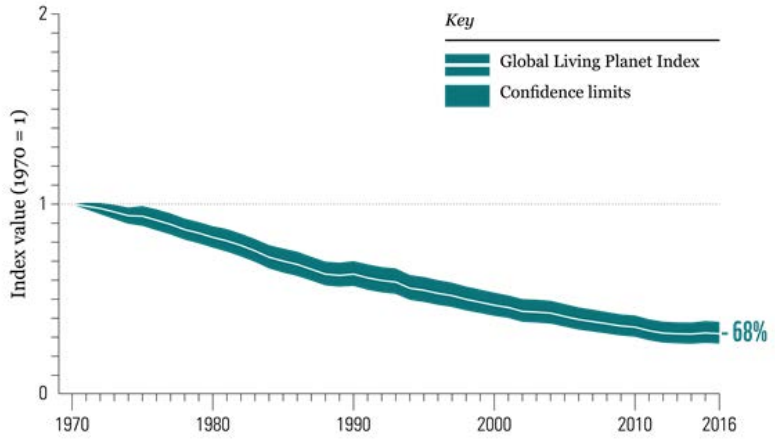


Figure 1: https://livingplanetindex.org/projects?main_page_project=AboutTheIndex&home_flag=1

1 "(PDF) Regenerative agriculture – the soil is the base - ResearchGate." 21 Mar. 2021, https://www.researchgate.net publication/343488958_Regenerative_agriculture_-_the_soil_is_the_base. Accessed 30 Mar. 2021.

2 "Final Report - The Economics of Biodiversity: The Dasgupta Review ...." Accessed February 25, 2021. https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review.

3 "FAO on Twitter: "Did you know soil is a living resource, home to ...." 5 Dec. 2020, https://twitter.com/fao/status/1335178363242164224. Accessed 1 Mar. 2021.

4 "Soil and the intensification of agriculture for global food security ...." https://www.sciencedirect.com/science/article/pii/S0160412019315855. Accessed 25 Feb. 2021.

In the past 150 years half of the globe's topsoil has been lost[5] and furthermore the remaining half has reduced organic matter, diminishing soil quality and its productive capacity. In 2014 the UN Food & Agriculture Organization (FAO) reported that the world only had 60 harvests left if current practices are not changed.[6] In addition to this, biodiversity is being lost at an alarming rate. The World Wildlife Fund (WWF) released a study in 2020 highlighting that population sizes of many animal species have dropped on average by 68% in the past 50 years[7]. With agriculture using over one-third of the global land surface[8], and more acutely 67% in Ireland[9], there is rising pressure on the agriculture sector to address this situation and prevent further loss.

Regenerative agriculture has an opportunity to remedy this by concentrating on soil health and organic matter in a productive agricultural system that prioritises a thriving ecosystem which can reduce fertiliser inputs. Biodiversity provides functioning ecosystems that supply oxygen, clean air and water, pollination of plants, pest control, wastewater treatment and many ecosystem services.

Source: (NRCS Oregon, Flickr/Creative Commons)

5 "What is Erosion? Effects of Soil Erosion and Land Degradation." https://www.worldwildlife.org/threats/soil-erosion-and-degradation. Accessed 26 Mar. 2021.

6 "Detail | 2015 International Year of Soils." 6 Jul. 2015, http://www.fao.org/soils-2015/events/detail/en/c/338738/. Accessed 26 Mar. 2021.

7 "LIVING PLANET REPORT 2020 - ZSL." https://f.hubspotusercontent20.net/hubfs/4783129/LPR/PDFs/ENGLISH-FULL.pdf. Accessed 26 Mar. 2021.

8 "Land use in agriculture by the numbers | Sustainable Food and ...." 7 May. 2020, http://www.fao.org/sustainability/news/detail/en/c/1274219/. Accessed 26 Mar. 2021.

9 "Land and Soil :: Environmental Protection Agency, Ireland." https://www.epa.ie/irelandsenvironment/landandsoil/. Accessed 22 Mar. 2021.

10 "Importance of biodiversity | Australia State of the Environment Report." https://soe.environment.gov.au/theme/biodiversity/topic/2016/importance-biodiversity. Accessed 26 Mar. 2021.

Relevance to Irish Industry

Agriculture uses over two-thirds of the national land cover in Ireland[11] and, in 2019, was responsible for 35.3% of Ireland's GHG emissions[12].

Ireland as a nation has made a commitment of Net Zero emissions by 2050, with targets of a 7% decrease in emissions annually from 2021 to 2030. The stark reality is that in 2020, agricultural emissions grew by 0.4%, which the EPA has attributed to the increased usage of fuel and nitrogen fertiliser[13]. In the 12 months to October 2020, fertiliser usage in Ireland increased by 3%.[14] [15]
So agriculture is well below the target of a 7% annual decrease set in the Programme for Government. And Ireland has committed to a 51% overall reduction over the next decade.[16]

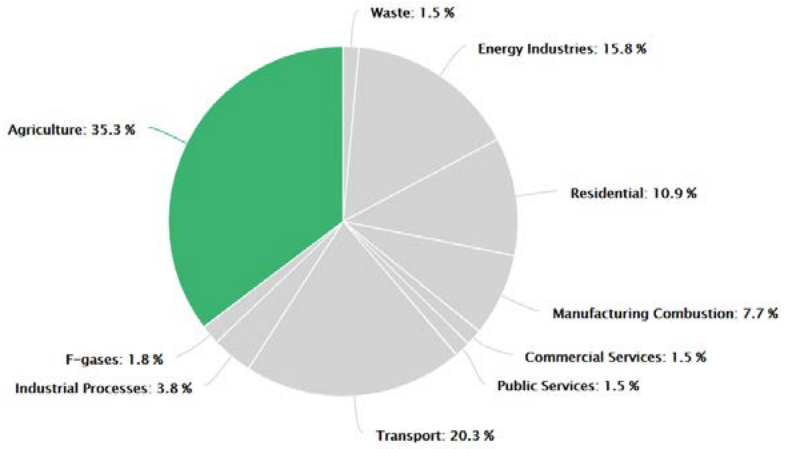


Figure 2: https://www.epa.ie/ghg/agriculture/

11 "Land and Soil :: Environmental Protection Agency, Ireland." https://www.epa.ie/irelandsenvironment/landandsoil/. Accessed 22 Mar. 2021.

12 "Agriculture :: Environmental Protection Agency, Ireland." Accessed February 25, 2021. https://www.epa.ie/ghg/agriculture/.

13 "Carbon emissions from agriculture stable in 2020 – EPA 29 January ...." Accessed February 25, 2021. https://www.farmersjournal.ie/carbon-emissions-from-agriculture-stable-in-2020-epa-599090.

14 "Agriculture :: Environmental Protection Agency, Ireland." https://www.epa.ie/ghg/agriculture/. Accessed 22 Mar. 2021.

15 "Agriculture :: Environmental Protection Agency, Ireland." https://www.epa.ie/ghg/agriculture/. Accessed 22 Mar. 2021.

16 "Carbon emissions from agriculture stable in 2020 – EPA 29 January ...." Accessed February 25, 2021. https://www.farmersjournal.ie/carbon-emissions-from-agriculture-stable-in-2020-epa-599090.

With increasing pressure from the public on agriculture's environmental impact, all steps must be taken to reduce environmental impact. Ireland's agricultural industry is predominantly based on its natural ability to produce grass. However, the industry is currently relying on synthetic fertilisers to reach the increased demand for grass growth required for increased milk and beef production.

Since the milk quota was abolished in 2015, milk production has risen by 50%[17], as has the demand for grass. This is alongside the Foodwise 2025 report, which has set ambitious targets for further growth in primary production and exports. Fertilisers are now a significant contributor to Ireland's agricultural emissions. A Bord Bia report found 17% of the dairy sector's emissions come from fertiliser application, with the consequential ammonia loss contributing directly to the decreased quality of Ireland's water[18].

The nutrient runoff from these fertilisers into rivers has decreased water quality, with severe consequences on local biodiversity. Such effects have led to the EU Farm to Fork Strategy calling on countries to reduce fertiliser input by 20% by 2030[19]. Soil health, water quality and biodiversity are intrinsically linked, and regenerative agricultural practices provide solutions to improve and address all of these with a holistic approach.

Regenerative agriculture is a method of farming that leads to decreased emissions, less nitrogen fertiliser use and an increase in biodiversity on farms. By implementing agricultural regenerative practices, Ireland can protect itself from biodiversity collapse, protect itself from public (or B2B customer) scrutiny on climate change, and protect the long-term food supply.

17 "See how dairy cow numbers have changed since quotas were ...." 9 Nov. 2019, https://www.agriland.ie/farming-news/see-how-dairy-cow-numbers-have-changed-since-quotas-were-abolished/. Accessed 18 Mar. 2021.

18 "pubs/reports/water/waterqua/Water Quality in 2019 ... - EPA.ie." https://www.epa.ie/pubs/reports/water/waterqua/Water%20Quality%20in%202019%20-%20infographic.pdf. Accessed 1 Mar. 2021.

19 "From Farm to Fork - European Commission - europa.eu." https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/farm-fork_en. Accessed 22 Mar. 2021.

What is Regenerative Agriculture?

Regenerative agriculture is an approach to farming that looks to answer these challenges. For this paper, we will use a definition of regenerative agriculture from Wageningen University, which defines it as:

> *"an approach to farming that uses soil conservation as the entry point to regenerate and contribute to multiple provisioning, regulating and supporting services, with the objective that this will enhance not only the environment but also the social and economic dimensions of sustainable food production"*[20]

The five core principles of regenerative agriculture that define this practice are:

1. Minimise soil disturbance
2. Maximise crop diversity
3. Keep the soil covered
4. Maintain living root year-round
5. Integrate livestock

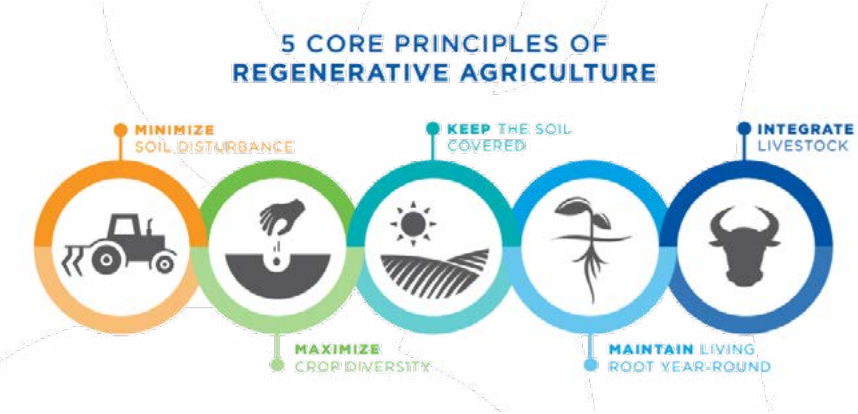


Figure 3: https://onpasture.com/2020/11/02/what-are-the-principles-of-regenerative-ag/[21]

20 "(PDF) Regenerative agriculture – the soil is the base - ResearchGate." Accessed February 25, 2021. https://www.researchgate.net/publication/343488958_Regenerative_agriculture_-_the_soil_is_the_base.

21 Figure 3: https://onpasture.com/2020/11/02/what-are-the-principles-of-regenerative-ag/

All of these focus on the rhizosphere, which is the region of soil directly influenced by root secretions and associated soil microorganisms.[22] Ensuring a healthy rhizosphere promotes plant growth whilst improving resilience against flood and drought. In Ireland, grass is the critical source of animal feed. Practices such as minimum tillage or direct drilling prevent soil inversion and promote these crucial root systems whilst keeping the soil covered. This type of soil cultivation reduces soil disturbance and soil erosion, aligning with three of the five principles. Establishing a complex root system brings resilience to the grass and can increase biological activity, including earthworms. It also improves nutrient capture, reducing runoff into the local waterways – all these work towards an improved rhizosphere and, therefore, soil quality.

Crop diversity promotes nutrient capture within the soil, and the introduction of multi-species grass cover is working towards this. This is an example of how regenerative agriculture and biodiversity can work together. Increasing crop diversity brings benefits to the soil nutrients while also providing a more varied environment to boost local biodiversity.

Studies on UCD Lyons farms have shown that increasing the number of swards enhances biomass production even when fertiliser input is decreased by 60%.[23] Animals raised on multispecies swards with fertiliser input reduction of 45% were found to grow and reach slaughter weight quicker than animals raised on perennial grass. They also required fewer anthelmintic treatments.[24] The labour and inputs cost savings implications of this are obvious and very significant.

22 "Rhizosphere - an overview | ScienceDirect Topics." https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/rhizosphere. Accessed 18 Mar. 2021.

23 "The effect of grazing versus cutting on dry matter production of ...." 31 Jul. 2019, https://onlinelibrary.wiley.com/doi/abs/10.1111/gfs.12440. Accessed 25 Feb. 2021.

24 "(PDF) Grazing multispecies swards improves ewe and lamb ...." 20 Dec. 2018,

Teagasc research has shown that a 6-species sward with 150kg of nitrogen (N)/ha applied has yielded more per year than both ryegrass swards with 300kg of N/ha applied per year.[25] It produced more than both ryegrass crops when the drought hit and the multi-species sward, once it received water, had a much quicker and stronger recovery.

Livestock is the fifth principle in the regenerative agriculture system. The benefits of keeping livestock come as part of mob grazing. This method refers to keeping large numbers of cattle on a small land area and moving them frequently, allowing a rest period for the pasture to become fully mature and restore itself between each grazing. This system has similarities to rotational grazing and strip grazing. However, it differs by having increased stocking density whilst providing longer rest breaks on the pasture in between. Emulating the vast herds of bison, mob grazing encourages the grass plants to complete their entire lifecycle, increases root system development, improves overall sunlight capture, and increases the land's productivity. Mob-grazed cattle trample significant quantities of forage into the soil surface, feeding the microorganisms and other soil life, growing soil organic matter.[26]

Adaptive multi-paddock grazing is a regenerative farming technique currently being trialled by McDonald's and FAI Farms to research the benefits of mob grazing and other regenerative agriculture principles and how to adapt it into the UK and Ireland beef farming systems. This is done as a nature-based, holistic approach by having a more adaptive system that responds to challenges as they arrive with soil health as a primary focus. This also highlights how the principle of this is that regenerative agriculture is not prescriptive, and therefore it is a practice of determining the best approach for each farmer and their land.[27]

https://www.faifarms.com/mcdonalds-fai-demonstrating-commercial-regenerative-beef-farming/

25 "Multi-species swards outperform ryegrass monocultures - Agriland.ie." Accessed February 25, 2021. https://www.agriland.ie/farming-news/multi-specie-swards-outperform-ryegrass-monocultures/.

26 "Mob Grazing - The Campaign for Real Farming." Accessed February 25, 2021. http://www.campaignforrealfarming.org/wp-content/uploads/2012/11/Mob-Grazing.pdf.

27 "McDonald's UK and Ireland & FAI: Demonstrating ... - FAI Farms." https://www.faifarms.com/mcdonalds-fai-demonstrating-commercial-regenerative-beef-farming/. Accessed 25 Feb. 2021.

Biodiversity:

Biodiversity, defined as the variety of plant and animal life in a particular habitat, enables nature to be productive, resilient and adaptable. Diversity in the natural world increases nature's resilience to shocks.

A crucial part of Europe's Green Deal is the EU's biodiversity strategy for 2030. This aims to increase biodiversity, protect nature, and reverse the degradation of ecosystems to put Europe's biodiversity on the path to ecological recovery by 2030.[28] Our National Policy is set out in Ireland's National Biodiversity Action Plan 2017-21. But an interim review of the implementation of the National Action Plan published in February 2020 states that the challenges involved in protecting Ireland's habitats and species are now more severe than ever and require urgent action.[29]

The All Ireland Pollinator Plan[30], which was updated in Spring 2021, has six new objectives to help make Ireland more pollinator-friendly, to assist in restoring biodiversity. These are focusing on; making farm, public and private land pollinator friendly, the honeybee strategy, conserving rare pollinators and the coordination of the plan. For objective one, making farmland pollinator friendly there are five specific sub-targets to achieve this:

1. Increase the amount of farmland that is managed in a pollinator-friendly way
2. Encourage the sustainable use of agricultural pesticides (insecticides, fungicides, and herbicides)
3. Provide clear information and training on pollinators to the farming community
4. Raise awareness and celebrate pollinator diversity on farmland
5. Track changes in pollinators on farmland

28 "EU Biodiversity strategy for 2030 | European Commission." https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/eu-biodiversity-strategy-2030_en. Accessed 25 Feb. 2021.

29 "Interim Review of the Implementation of the National Biodiversity ...." https://www.npws.ie/interim-review-implementation-national-biodiversity-action-plan-2017-2021. Accessed 25 Feb. 2021.

30 "All-Ireland Pollinator Plan." https://pollinators.ie/. Accessed 25 Feb. 2021.

Industry Response

Globally:

Across the world, both governments and organisations are responding to the dual challenges of soil depletion and biodiversity collapse. While most large organisations are implementing the principles of regenerative agriculture, the expectations among them differ.

Danone has been leading the charge for regenerative agriculture, partnering with the international soil carbon initiative 4p1000 and a founding member of the One Planet Business for Biodiversity coalition (OP2B). Danone has stated that enhancing soil organic matter will help sequester more carbon and mitigate climate change. They use practices such as limiting chemical inputs, rotating crops, reducing tillage and using crop residues as compost.[31] Danone has even started communicating with its consumers; an example of this can be seen below.

Figure 4: https://www.happyfamilyorganics.com/farmed-for-our-future/

31 "Regenerative agriculture - Danone." https://www.danone.com/impact/planet/regenerative-agriculture.html. Accessed 25 Feb. 2021.

Unilever is also implementing regenerative practices with the ambition of increasing local biodiversity, restoring soil health, and preserving water as these benefits are undisputed. However, following research released by The World Resource Institute, which is questioning the carbon sequestering abilities of regenerative agriculture, Unilever does not depend on these practices to sequester carbon. The World Resource Institute has released two articles examining the power of regenerative agriculture to mitigate climate change.[32] [33] While we might not know yet if carbon sequestration will be verifiable and utilised, other the other benefits of regenerative agriculture undisputed.

Danone, in December 2020, announced they were going to expand their regenerative agricultural programme across more dairy farms in the US. Currently, their programme covers 82,000 acres. They have planted cover crops on 64% of acres and practised reduced or no-till on 77%. Results showed that 93% of the fields in the programme had a positive soil conditioning index value. So far, they have claimed to have reduced more than 80,000 tons of carbon and sequestered 20,000 tons through regenerative soil practices.

Farm to Fork Strategy

The EU has launched its Farm to Fork Strategy to improve the environment on which agriculture depends. The strategy aims to make food systems fair, healthy and environmentally friendly. It identified the need for an accelerated transition to more sustainable food systems with positive impacts on biodiversity and the environment. A legislative framework will be proposed to support the implementation of the strategy. The EU will take action on two significant fronts. First, a target to reduce nutrient loss by at least 50% while ensuring no deterioration in soil fertility, aims to reduce fertiliser use by at least 20% by 2030. Secondly, targets will be implemented to reduce the overall use of chemical and hazardous pesticides by 50% by 2030.[34]

32 "Regenerative agriculture - Danone." https://www.danone.com/impact/planet/regenerative-agriculture.html. Accessed 25 Feb. 2021.

33 "Regenerative Agriculture Practices | World Resources Institute." 12 May. 2020, https://www.wri.org/blog/2020/05/regenerative-agriculture-climate-change. Accessed 25 Feb. 2021.

34 "From Farm to Fork - European Commission - europa.eu." https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/farm-fork_en. Accessed 22 Mar. 2021.

Ireland

A group of European Innovation Partnerships (EIPs) have come together in Ireland to focus on environmentally engaged farming.[35] An example of one of these schemes is the B Project. This promotes Biodiversity within farming and financially rewards farmers for dedicating part of their farm to biodiversity regeneration.[36]

A Bord Bia report looking at Carbon Footprint Leaders (CFL) in the Sustainable Dairy Assurance Scheme (SDAS) showed leaders had reduced their carbon footprint by 18% while also increasing their milk production by 50%. The CFL had also reduced their fertiliser input by 42% on farms since 2014. They have increased their stocking rates by 22%. At the same time, 75% of them complete soil tests on 100% of the farm area.

It is clear that a low Carbon Footprint of below 0.9 links to having the highest number of grazing days and lowest concentrate input per cow. Although the report focuses only on dairy farms in Ireland, the results suggests a link between regenerative farming and a lower carbon footprint.

The Agricultural Sustainability Support and Advisory Programme (ASSAP) is a government/industry collaborative initiative that began in 2018 and will run until the end of 2021. The programme offers free support and advisory services intending to improve water quality through working with farmers. Within Ireland, members of the GLAS scheme can receive subsidies for implementing cover cropping.[37]

ASSAP Farming for Water Quality

35 "Ireland | EIPs make the case for a better CAP ... - ARC2020." 7 Sept. 2020, https://www.arc2020.eu/eip-ireland-cap/. Accessed 19 Mar. 2021.

36 "The Bride Project: Biodiversity Regeneration in a Dairying ...." https://www.thebrideproject.ie/. Accessed 19 Mar. 2021.

37 "GLAS - gov.ie." 7 Feb. 2020, https://www.gov.ie/en/service/9133a5-green-low-carbon-agri-environment-scheme-glas/. Accessed 25 Feb. 2021.

Currently, there is a race on to build the world's first carbon-neutral dairy herd.[38] One company in this race is Carbery. They are seeking to utilise multi-species swards for carbon capture, and biodiversity on farms is being increased to reduce reliance on pesticide and fertiliser inputs.[39]

Due to the dependency on grass in Ireland, grassland management systems are critical to future-proofing the business. Teagasc has made recommendations to address cost-effectively reducing GHG emissions in farming via a Marginal Abatement Cost Curve (MACC).[40] Below are some of these recommended steps and ones that Irish farms have already taken, which have also improved their soil health.

- Low emission slurry spreading technologies
- Correct timing for slurry spreading
- Promote the use of Protected Nitrogen
- Application of lime
- Regular soil testing
- Introducing clover and other multi-species pasture
- Regular measuring of grass cover
- Usage of min-till or direct drilling soil cultivation methods
- Paddock Rotation
- Roadways

38 "The Race is on to Build the World's First Carbon-Neutral Dairy ...." 15 Jan. 2021, https://www.dairyherd.com/news/business/race-build-worlds-first-carbon-neutral-dairy. Accessed 1 Mar. 2021..

39 "Farm Zero C – BiOrbic, Bioeconomy SFI Research Centre.." https://biorbic.com/farm-zero-c/. Accessed 25 Feb. 2021.

40 "Return of the MACC - Teagasc." https://www.teagasc.ie/media/website/publications/2018/11-Return-of-the-MACC.pdf. Accessed 19 Mar. 2021.

Key Takeaways

Regenerative agriculture and biodiversity are essential for the future of the Irish industry. With a role in the EU's Green Deal, Ireland must shift from our reliance on fertiliser and monoculture farming towards more regenerative and biodiversity-friendly methods. In order for Ireland to reach its (non-negotiable) Climate Commitments, the carbon footprint of farms simply must decrease. Regenerative agriculture can help this by reducing fertiliser, and by working towards carbon sequestration, while simultaneously increasing biodiversity.

source: https://euraxess.ec.europa.eu/worldwide/north-america/european-green-deal-call-%E2%82%AC1-billion-investment-boost-green-and-digital

There are already various projects in place that can be used to begin, or accelerate, the transition:

- BRIDE Project: Have payments for farmers for the biodiversity project
- RBaps: Reward payment scheme for farmers who increase biodiversity. The amount of money paid reflects the quality of wildlife that is delivered to their farmland.
- Teagasc: advice on how to choose and plant multi-species swards

Multi-species Sward

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