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Closing the gap:

An analysis of the costs and incentives for regenerative agriculture in Europe

March 2025

Foreword

Our current agricultural supply chains are at risk with climate change and intensive agricultural practices leading to more volatile and decreasing agricultural yields globally. This will not only affect the agricultural sector but will also impact economic systems and governments. Implementing regenerative agriculture practices is part of the solution as it contributes to more resource efficient agricultural production that can protect and restore soil, biodiversity, water and reduce carbon.

Members of One Planet Business for Biodiversity (OP2B), including Unilever and PepsiCo, have put forward ambitious targets to implement regenerative agriculture principles and practices across Europe and beyond. Deloitte has supported various agricultural players in implementing regenerative agriculture strategies. They have identified the lack of a viable economic model for the adoption of regenerative agriculture practices, and more specifically the gap in incentives available, as a major bottleneck to scaling the implementation of regenerative agriculture practices in Europe.

This report investigates the economic impact of implementing regenerative agriculture practices at farm level, catalogues available incentives, and articulates the financing gap which farmers face when transitioning. Scope wise, six regenerative agriculture practices and 34 crop-country combinations, based on 10 different countries and 12 different crops are considered. The report also provides guidance and concrete recommendations for all actors, including value chain players, farmer associations, regenerative agriculture implementors, input and equipment providers, financial institutions and government institutions, to collaborate and help farmers improve the business case by supplying additional as well as fit-for-purpose funding. The incentives represented in this study are by no means exhaustive, as there were issues related to transparency and competitiveness when collecting data on private incentives, and many public schemes are yet to be defined. This challenge of limited data availability and transparency of incentives has also been noticed by the farmers and other value chain experts, and is one of the takeaways of this investigation as well.

Deloitte.

Building on its 175-plus year history, Deloitte provides industry-leading audit and assurance, tax and legal, consulting, financial advisory, and risk advisory services to nearly 90% of the Fortune Global 500® and thousands of private companies. Our people deliver measurable and lasting results that help reinforce public trust in capital markets, enable clients to transform and thrive, and lead the way toward a stronger economy, a more equitable society, and a sustainable world.

At Deloitte, we believe the future of food should be sustainable, regenerative and resilient. Achieving this requires leaders across industries to show courage and collaboration. Together with clients and alliances, Deloitte is helping to transform the food ecosystem. We are committed to bringing our advisory and technology capabilities and influence to meeting the challenges of addressing climate change and biodiversity loss while improving food security for a growing population. Globally, we have made substantial investments in the capability of our people and the development of technology solutions to improve climate smart practices across the food ecosystem.

Unilever

Established over 100 years ago, we are one of the world's largest consumer goods companies. We are known for our great brands and our belief that doing business the right way drives superior performance. Our strategy begins with a purpose that places consumers at the heart of everything we do: brighten everyday life for all. Our products are sold in 190 countries, and enjoyed by 3.4 billion consumers every day. In 2024, Unilever generated €60.8 billion in revenue.

We are committed to making a greater impact, across 4 main sustainability pillars: Climate, Nature, Plastics and Livelihoods. Implementation of regenerative agriculture practices across 1 million hectares by 2030 is part of our Nature pillar, and contributes to Climate and Livelihoods commitments. The projects are designed to address the most material environmental and climate issues faced by farmers, with practices selected to fit the local context and farmer knowledge. Every project is designed to address a range of relevant metrics covering biodiversity, climate and other ecosystem changes via our Measure, Report, Verify (MRV) framework, which generates output- and outcome-level data annually. Since we published our Regenerative Agriculture Principles in 2021, we've been collaborating with farmers and suppliers to implement a range of practices, including using cover crops and crop rotation, reducing tillage and substituting synthetic fertilisers with natural alternatives. We have 23 regenerative agriculture projects operating across almost 130,000 hectares, with plans place to increase the implementation of our regenerative agriculture programmes to more than 200,000 hectares in 2025. All Unilever's activities in this key pillar are funded through the Climate and Nature Fund. Our Foods business group is spearheading our regenerative agriculture efforts, with the aim of covering 650,000 hectares by 2027; approximately 50% of our land footprint in Foods.

PEPSICO

PepsiCo products are enjoyed by consumers more than one billion times a day in more than 200 countries and territories around the world. PepsiCo generated more than USD $91 billion in net revenue in 2023, driven by a complementary beverage and convenient foods portfolio that includes Lay's, Doritos, Cheetos, Gatorade, Pepsi-Cola, Mountain Dew, Quaker, and SodaStream. PepsiCo's product portfolio includes a wide range of enjoyable foods and beverages, including many iconic brands that generate more than $1 billion each in estimated annual retail sales.

Guiding PepsiCo is our vision to Be the Global Leader in Beverages and Convenient Foods by Winning with pep+ (PepsiCo Positive). pep+ is our strategic end-to-end transformation that puts sustainability and human capital at the centre of how we will create value and growth by operating within planetary boundaries and inspiring positive change for planet and people.

Since its launch in 2021, the importance of our pep+ strategy has only grown clearer. We are dependent on the earth, relying on its resources to grow crops and produce the foods, snacks and drinks that bring joy and smiles to millions of people every day. We're on a journey to transform how we grow our ingredients, how we make, move, sell and package our products, and how we inspire people through our brands. We're working to source our crops and ingredients in ways that restore the earth and strengthen farming communities; helping to build a circular and inclusive value chain; and inspiring people through our brands to make choices that create more smiles for them and the planet.

Tens of thousands of farmers from more than 60 countries provide more than 35 agricultural crops and ingredients. These farmers ensure our portfolio of products continues to be enjoyed more than one billion times a day in more than 200 countries and territories around the world. As part of pep+, our goal is to spread regenerative farming practices across 7 million acres of the land used around the world to grow our crops and ingredients for our products[1], and sustainably source 100% of our key ingredients, expanding to include not only our grower-sourced crops, but also key crops from third parties, such as vegetable oils and grains[2].

op2b one planet business for biodiversity

The UN Climate Action Summit saw the launch of the One Planet Business for Biodiversity (OP2B) coalition in 2019 as part of the One Planet Lab. Since 2021, OP2B has been a programme of the World Business Council for Sustainable Development (WBCSD). Now comprised of 26 companies representing a collective market value of more than USD $893 billion, OP2B is an international, cross-sectoral and action-oriented business coalition on biodiversity with a specific focus on regenerative agriculture. We are determined to transform agricultural models and catalyse action to protect and restore cultivated and natural biodiversity in agricultural value chains. The Coalition focuses on scaling up regenerative agriculture through three key levers:

1. Harmonising measurement, reporting and accounting methods to attract investments
2. Scaling transition finance to support farmers with flexible financing and assistance
3. Fostering public and private sector collaborations to create an enabling environment and harmonise guidelines.

We are working to create the conditions that will enable all farmers to adopt practices that improve soil health and water resources, enhance biodiversity, increase carbon sequestration in soil, reduce greenhouse gas emissions and improve farming livelihoods.

World Business Council for Sustainable Development

The World Business Council for Sustainable Development (WBCSD) is a global community of over 220 of the world's leading businesses, representing combined revenue of more than USD $8.5 trillion and 19 million employees. Together, we transform the systems we work in to limit the impact of the climate crisis, restore nature and tackle inequality. We accelerate value chain transformation across key sectors and reshape the financial system to reward sustainable leadership and action through a lower cost of capital. Through the exchange of best practices, improving performance, accessing education, forming partnerships and shaping the policy agenda, we drive progress in businesses and sharpen the accountability of their performance.

1 PepsiCo considers an acre as delivering regenerative impact when the adoption of regenerative agriculture practices results in quantified improvements across at least two of the environmental outcome areas, with a strong preference for removing or reducing GHG emissions to be one impact area. Refer to PepsiCo's Regenerative Agriculture Practice Bank for a comprehensive listing of practices directly or indirectly linked to the five impact areas. Regenerative acres reported represent the annual count in each year presented based on actions undertaken since 2021.

2 For grower-sourced crops, sustainable sourcing refers to meeting the independently verified environmental, social and economic principles of PepsiCo's Sustainable Farming Program (SFP). For supplier-sourced crops, sustainable sourcing is achieved through a third-party standard that has been benchmarked as equivalent to the SFP or, in limited regions, a continuous improvement program addressing the main environmental and social risks with growing the relevant crop. Sustainably sourced volumes are verified by third parties, including Roundtable on Sustainable Palm Oil (RSPO) - certified palm oil and Bonsucro-certified (or equivalent) cane sugar. Certain legal and systemic barriers will challenge us as we strive toward our goal of sustainably sourcing 100% of our key ingredients. For example, certain jurisdictions prohibit farmers from holding legal rights to the land they farm (a component of our sustainable sourcing definition). Our Sustainable Sourcing goal applies to areas where PepsiCo has purchasing control and excludes joint ventures, franchises, co-manufacturers and co-packers and other third parties over which we do not hold purchasing control. Key ingredients are listed in the Agriculture ESG Topics A-Z page.

Table of Contents

How to read the report

This report has four chapters: (1) Introduction, (2) Costs and financing need for transitioning to regenerative agriculture practices in Europe, (3) De-risking the transition through incentivisation, and (4) Conclusion and call to action.

Chapter 1: 'Introduction' sets the scene and provides the broader context and background behind regenerative agriculture and incentives.

Chapter 2: 'Costs and financing need for transitioning to regenerative agriculture practices in Europe' discusses the costs associated with implementing regenerative agriculture practices for various crops and countries, financing needs, and importance of crop rotation for farmer profitability.

Chapter 3: 'De-risking the transition through incentivisation' takes the cost discussion further by introducing incentives into the equation, and discusses the difference in financing needs of Net Profit Impact for farmers with and without incentives. It also presents the key incentives available based on data gathered, and highlights gaps or challenges associated with incentives in Europe.

Chapter 4: 'Conclusion and call to action' summarises the overall study and presents solutions for different stakeholders in the value chain, and some successful collaboration models. In addition to these five chapters, details on list of incentives, assumptions, and sources are included in the appendix.

Executive summary

Our findings on the farmer business case are based on a quantitative model for costs, yield impact and investments associated with implementing regenerative agriculture practices for 34 unique country-crop combinations[3] versus conventional practices, based on expert interviews with farmers, regenerative agriculture implementers and advisors[4]. The findings on incentives are based on available public and private incentives, based on direct approach to incentives providers and supplemented with desk research.

Farmer business case and funding needs

- Based on our research, we found that the **farmer business case** (Net Profit Impact) for implementing the six most common regenerative agriculture practices is **positive after 3 to 5 years** for all farm sizes versus conventional practices (for the crops in scope of this study). The main drivers of higher profitability are projected yield increases and reduction of costs.

- We encountered differences in profitability which can mostly be explained by **crop types, rotation schemes, farm sizes, and stage of transition** to regenerative agriculture practices. Profitability is higher for high yield density crops (such as potato, tomato), for crop rotations and for large farms (>55ha). For similar crops grown across countries, variation in profitability is mainly due to differences in average farm sizes, but is also influenced by yield, crop prices and input costs.

- Especially **small and medium-sized farms** can only reach a positive business case by taking prudent investment decisions (e.g., equipment sharing or use of agricultural services to limit investments in equipment) and alternating with more profitable crops in rotations. These farmers need **support to manage the transition profitably**.

- Irrespective of the Net Profit Impact, farmers are confronted with **significant investments** before implementing regenerative agriculture practices.

  According to our research, upfront investments range from **~€2000/ha to ~5000/ha** (pre-incentives) depending on the farmer's decisions to buy or share required equipment or use agricultural services. When these upfront investments are accounted for, payback period for farmers is approximately 9 years, with a ~4% 10-year IRR[5] (p.a.) only, even with investments on the lower end of the range.

Incentives

- When looking at the available incentives, we can conclude that there are **not sufficient incentives available** to cover the costs of the transition at farm level: By applying available incentives, the payback time can decrease from 9 years to 5 years. However, farmers will still have a funding need between ~1400 to 4100 €/ha (post-incentives) depending on the extent of investments made.

- Also at a macro-level, there is a **significant funding gap with only ~2 to 6% of total funding needs** for a transition to regenerative agriculture practices in arable farming in Europe currently being covered. We however encountered differences in incentives identified between countries in scope with a greater number of incentives identified in countries such as UK, Germany and France, and fewer incentives for regenerative agriculture identified in Serbia, Greece, Turkey and Poland.

- Moreover, we found that current incentives are **not fit-for purpose**. They focus mainly on supporting ongoing costs rather than the much-needed funding for upfront investments, and are often not built around specific farmer needs and desired outcomes of the regenerative agriculture practices, leading to undesired consequences such as mono cropping.

- Finally, we have also observed a **lack of transparency** and access to incentives, as well as a **lack of accountability** to monitor and steer the incentive landscape for implementing regenerative agriculture practices across Europe.

3 As shown at the end of Executive Summary.
4 and supplemented by desk research (see list of sources used in appendix).
5 Internal Rate of Return per annum of cash flows over first 10 years.

Summary of recommendations

To take the risk of financing the transition off the farmers' shoulders, we propose a set of recommendations focusing on improving the farmer Return on Investment, attracting more funding to the regenerative agriculture transition, developing fit-for-purpose funding models and improving transparency and availability of funding. These nine major recommendations below call for individual as well as collective actions across all stakeholders:

Financing needs: Optimise farmer Return on Investment

1. Ensure farmer support on agronomic and financial advice on regenerative agriculture implementation
2. Foster equipment sharing (especially with small and medium-sized farms)
3. Align on conditions for monetisation of ecosystem services as additional revenue stream

Sufficiency: Increase returns and reduce risk for investors

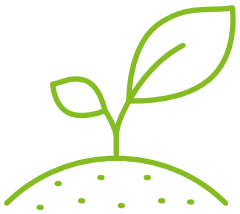
4. Attract new investors (incl. institutional investors) through combining risk-reward expectations, e.g., in blended finance constructions and PPP
5. Close the information gap on business case for investors to increase confidence in investments

Suitability: Develop fit-for-purpose funding models

6. Grow funding for capital expenditures and initial costs
7. Collaborate across stakeholders to share expertise in order to develop fit-for-purpose funding and respective E2E farmer support model

Transparency and accountability: Report, track and adjust funding

8. Develop incentive platform for farmers and value chain players
9. Monitor, track, identify gaps, and adjust incentives accordingly



Crops and country scope

	France	Germany	Greece	Italy	Poland	Romania	Serbia	Spain	Turkey	UK
Barley										■
Corn						■	■	■	■	
Cotton			■					■	■	
Oats										■
Onion	■									
Potatoes	■				■	■		■		■
Rapeseed oil	■				■	■	■	■	■	■
Rice				■						
Sugar beet	■				■				■	
Sunflower	■									
Tomatoes				■				■		
Wheat	■						■			■

Introduction 1

To safeguard agricultural supply chains, actors across the value chain and enablers of the system, such as financial services and governments, need to collaborate to de-risk the transition for farmers who are currently bearing more than their fair share.

Agricultural supply chains at risk leading to economic pressures across stakeholders

Our agricultural supply chains are at risk: decreasing soil quality due to intensive agricultural practices, global warming, droughts and other more extreme weather events are leading to more volatile and declining agricultural yields globally. A reduction in global crop yield is estimated of up to 3–12% by mid-century and 11–25% by end of the century, due to climate change in the most extreme RCP8.5[6] scenario, even though the actual yield impact will be different per geography and crop[7]. Deloitte has estimated that climate damages alone would reduce the value of primary food production industries (such as crops, livestock, dairy and fisheries) by USD $13 trillion (in present value terms) between 2025 and 2070[8], driven by agricultural output decline, reduced labour productivity, and damage to land. Volatile and declining yields of the agricultural system will result in severe economic pressure, globally and at farm level, where reduced incomes and value of the land driven by soil deterioration are threatening the long-term earning capacity of farmers.

This economic pressure will impact the agricultural sector as well as affiliated industries, financial systems and governments. Agricultural off-takers in food, feed, fibre, fuel and more are dependent on agriculture and have a vested interest in reducing risk and building resilience. Financial services players see farmer incomes at risk, especially with smaller farmers located in regions subject to droughts. At the same time, these players are also faced with the pressure to reduce their environmental footprint in their fields of activities where agriculture plays a major role.

Moreover, governments see billions of agricultural subsidies being spent with farmers increasingly under pressure in an unsustainable agricultural model: recent reports from WWF and University of Leiden show that 60% of EU CAP subsidies, equalling approximately €32 billion per year, is spent on activities that encourage large-scale unsustainable farming[9] and 80% is spent on high-emission animal product value chains[10].

6 RCP8.5 (Representative Concentration Pathways) is the most aggressive IPPC climate change scenario. While it was often considered 'business as usual' scenario in the past, scientists argue that its likelihood to occur has decreased over the last years.
7 Global vulnerability of crop yields to climate change - ScienceDirect.
8 Turning point: Feeding the world sustainably | Deloitte Global.
9 Member States use billions of EU subsidies to fund nature harming activities - new WWF study | WWF.
10 How EU farm subsidies favour high-emission animal products - Leiden University.

All stakeholders required to enable positive economic perspectives for farmers

Implementing regenerative agriculture practices can help reduce the economic impact of climate change and intensive agricultural practices. It contributes to more resource efficient agricultural production that can protect and restore soil, biodiversity, water and reduce carbon.

Despite the potential of implementing regenerative agriculture practices, farmers are currently facing significant challenges to transition and need a broad range of support that cannot be provided by any single actor or sector on its own. This includes advising on agronomic and financial considerations at the farm, offering a solid MRV[11] framework as basis for monetisation and ecosystem services, access to suitable inputs and equipment as well as a viable economic model. A few private players along the value chain have already taken steps to support the implementation of regenerative agriculture practices. For instance, OP2B members have invested USD $3.6 billion, engaging 300.000 farmers, and covering 3.9 million hectares of land under regenerative agriculture practices between 2019 and 2023. By 2030, OP2B members' collective goal is to implement regenerative agriculture practices on 12.5 million hectares of land, an area roughly the size of England. However, other value chain players as well as financial services companies need to step up as they are still unaware of their risk exposure, especially those outside of the direct procurement relationship, leaving room to undermine the impact and collective investment.

Acknowledging the significant challenges that farmers are currently facing, this report focuses on the financial incentives for farmers in exchange for adopting a regenerative practice or achieving an outcome. The economic model for farming is already under pressure with low margins and an increasing set of sustainability regulations to comply with. As previous studies[12,13] have shown, the implementation of regenerative agriculture practices on average can lead to higher net income than conventional agriculture after 3 to 5 years for selected crops and regions. However, farmers experience a financing gap for critical upfront investments, as well as increased risk exposure to crop failure or yield losses. Currently, farmers bear most of this financial risk themselves. Additionally, there are no formal requirements towards suppliers signaling clear evolving market demands for regenerative practices, monetisation of ecosystem services is still in its infancy, and financial sector investments in mostly short-term yields are insufficient to finance the longer-term transition. While this report focuses on the financial incentives, we want to highlight that all elements of farmer support (agronomic and financial advice, MRV framework and access to equipment and inputs) need to be in place for financial incentives to work.

The objectives of this report are to:

a. Highlight the cost of the transition and quantify the scale of risk that farmers are taking on in a comprehensive way, focusing on 34 unique crop-country combinations based on 12 crops and 10 countries

b. Establish transparency of available incentives to farmers across these crop-country combinations

c. Highlight the gap in funding needed associated with the adoption of regenerative agriculture practices

d. Serve as inspiration and provide a 'call to action' for all players in the value chain, including public and financial actors such as banks and insurance providers on how to accelerate funding

11 MRV: Measurement, Reporting and Verification of outcomes of regenerative agriculture practices.
12 "Scaling regenerative agriculture in the Netherlands (Deloitte 2024: Scaling regenerative agriculture in the Netherlands); "The case for regenerative agriculture in Germany - and beyond (BCG 2023: The Case for Regenerative Agriculture in Germany—and Beyond | BCG).
13 100 Million Farmers: Breakthrough Models for Financing a Sustainability Transition | World Economic Forum

Regenerative agriculture

Historically, food production has kept pace with population growth, albeit at the expense of the environment. For centuries, humankind has found ways to improve agricultural production and support a growing global population. However, the agricultural practices that have been adopted by most farmers during this era, have taken their toll: from an environmental perspective, agriculture and related land use emissions account for approximately 17% of global GHG emissions from all sectors[14]. We have lost nearly half of the global topsoil already on which we depend for growing 95% of our food on[15]. The remaining soil is less able to capture sufficient water and nutrients, increasing the threat of droughts and yield decreases. Deteriorating soil quality and use of chemicals have a devastating effect on biodiversity and the quality of our ground water.

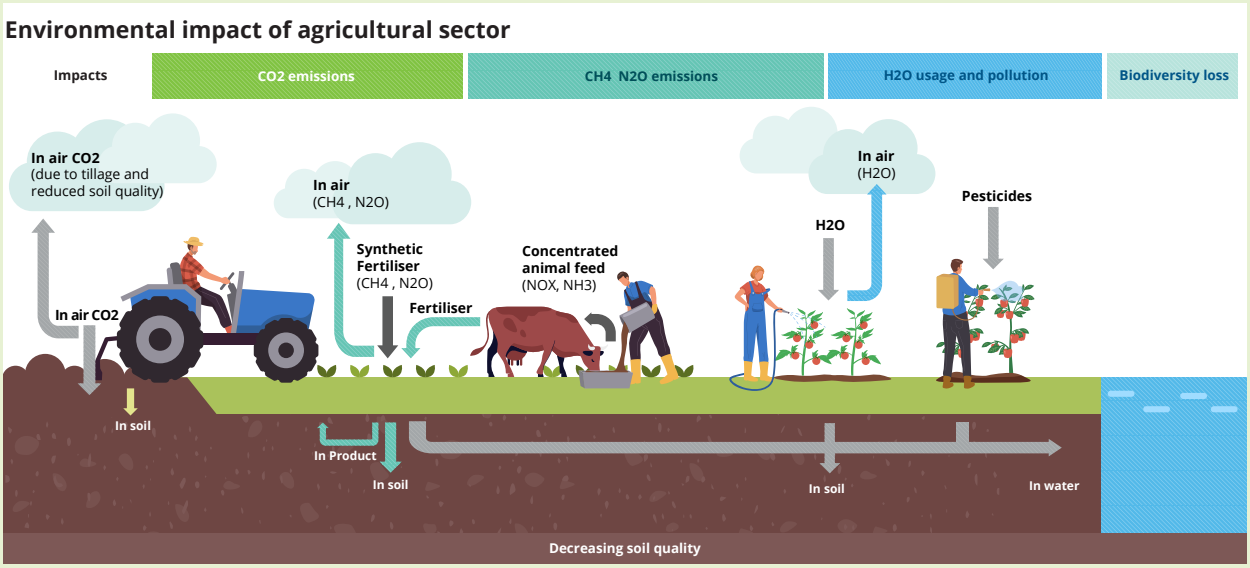
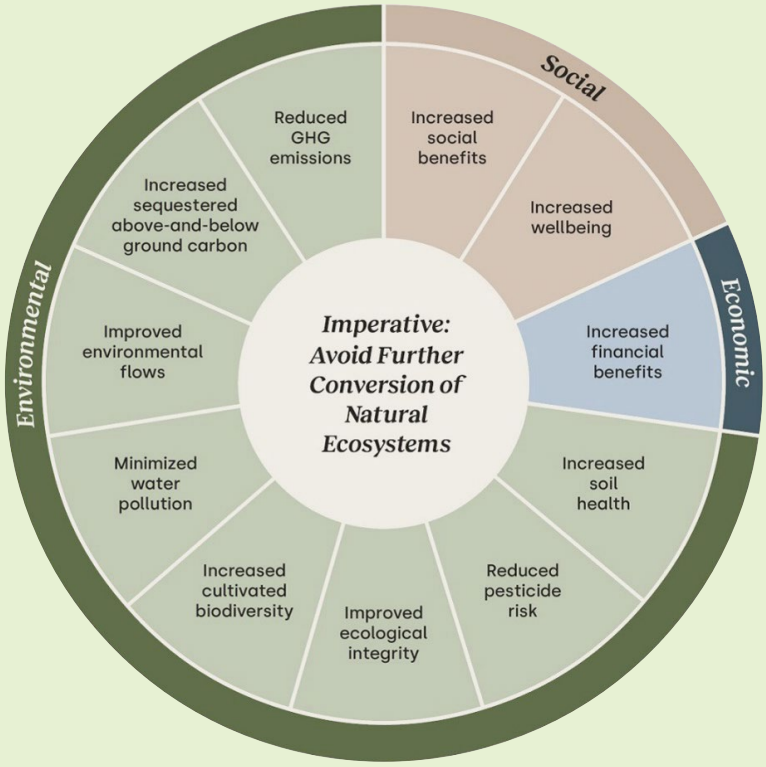


Figure 1: Depiction of the environmental impact of the agri-food sector

Major industry players across the agri-food chains have been aligning on a shared vision for regenerative agriculture and a set of outcomes that allows for the implementation of regenerative practices. One Planet Business for Biodiversity (OP2B), which is a cross-sectoral business coalition representing 26 companies, defines regenerative agriculture as a holistic, outcome-based farming approach that generates agricultural products while measurably having net-positive impacts on soil health, biodiversity, climate, water resources and farming livelihoods at the farm and landscape levels as depicted in figure 2.

14 Emissions due to agriculture.
15 What is Erosion? Effects of Soil Erosion and Land Degradation.



Outcomes	Indicators
Reduced GHG emissions	GHG emissions
Increased sequestered above-and-below ground carbon	Soil carbon sequestration Total carbon sequestration
Increased soil health	Soil organic carbon
Improved environmental flows	Blue water withdrawal
Minimised water pollution	Nutrient Use Efficiency
Increased cultivated biodiversity	Crop diversity
Improved ecological integrity	Natural/restored habitat in agricultural landscapes
Reduced pesticide	Pesticide risk
Increased financial benefits	Farmer net income
Increased social benefits	
Increased wellbeing	

Figure 2: Regenerative agriculture outcomes and corresponding indicators, as aligned by WBCSD and OP2B as part of the collective vision developed in 2024[16].

Farmers can choose between a range of farming practices contributing to one or more of the outcomes. The choice of practices typically depends on the desired outcomes, crop rotations and the local environment and challenges (e.g., soil, climate, and pollinators) and farmer economic situation to invest in practices with or without incentives. As an example, a farmer located in an area with high risk of droughts would include practices that support farming with less water needed.

16 https://www.wbcsd.org/actions/a-shared-vision-for-regenerative-agriculture/

Costs and financing need for transitioning to regenerative agriculture practices in Europe

2

Major findings

- Based on our research, we found that the **farmer business case** (Net Profit Impact) for implementing the six most common regenerative agriculture practices is **positive after 3 to 5 years** for all farm sizes versus conventional practices (for the crops in scope of this study). The main drivers of higher profitability are projected yield increases and reduction of costs.
- We encountered differences in profitability which can mostly be explained by **crop types, rotation schemes, farm sizes, and stage of transition** to regenerative agriculture practices. Profitability is higher for high yield density crops (such as potato, tomato), for crop rotations and for large farms (>55 ha). For similar crops grown across countries, variation in profitability is mainly due to differences in average farm sizes, but is also influenced by yield, crop prices and input costs.
- **Crop rotation supports overall profitability**. Combining low yield density crops (barley, oat, wheat, rapeseed oil) with a high yield density crop (potato) on an average UK farm, can deliver on average ~€70/ha/year profit impact more than a conventional agricultural system over the first 5 years, and ~€210/ha/year in the subsequent 5 years (versus -€81/ha/year for first 5 years and €11/ha/year for next 5 years for hypothetical oat mono-cropping).
- Especially **small and medium-sized farms** can only reach a positive business case by taking prudent investment decisions (e.g., equipment sharing or use of agricultural services to limit investments in equipment) and alternating with more profitable crops in rotations. These farmers need **support to manage the transition profitably**.
- Irrespective of the Net Profit Impact, farmers are confronted with **significant investments** before implementing regenerative agriculture practices. According to our research, upfront investments range from **~€2000/ha to ~€5000/ha** (pre-incentives) depending on the farmer's decisions to buy or share the required equipment or use agricultural services. When these upfront investments are accounted for, payback period for farmers is approximately 9 years, with a ~4% 10-year IRR[16] (p.a.) only, even with investments on the low end of the range. Therefore, incentives are critical to support farmers with transitioning to regenerative agriculture, which is elaborated further in the next chapter.

Transitioning to regenerative agriculture practices means replacing conventional farming practices with regenerative agriculture practices. While the regenerative agriculture practices are beneficial to the soil, the replacement needs to be economically viable for the farmer as well. Therefore, it is necessary to determine the economic impact or Net Profit Impact (from here onwards) associated with regenerative agriculture practices, and how it varies across crops, countries and practices.

Net Profit Impact is mainly driven by changes in production costs and yields compared to conventional systems.

Changes in production costs result from additional investments needed (for e.g., machinery), variations in operating costs due to shifts in labour, machine and material inputs, and associated cost savings from the (partial) replacement of conventional practices with regenerative agricultural practices. Yield changes are tied to the gradual improvements in soil health. During the early stages of transition (typically 1 to 4 years), yields often decline as the soil regenerates and adapts. However, in the mature stage (from year 5 onwards), yields recover and surpass the levels observed in conventional farming[18].

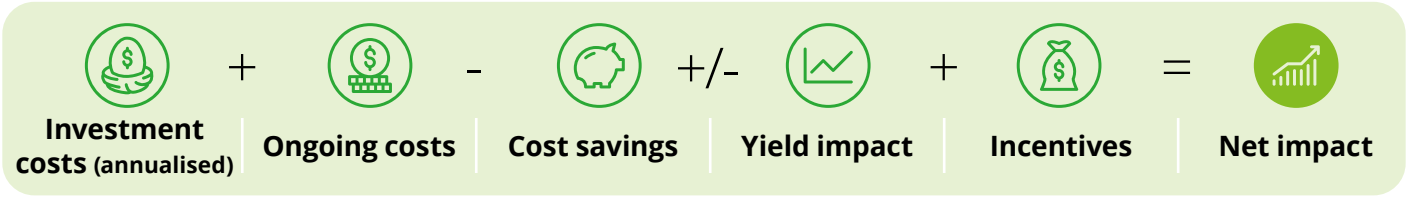


Figure 3: Net Profit Impact equation based on Investment Costs (annualised), Ongoing Costs, Cost Savings, Yield Impact and Incentives. In this chapter, the focus is on the first four drivers. Incentives are considered in the following chapter.
*Yield impact can be positive or negative, hence indicated as '+/-'

17 Internal Rate of Return per annum of cash flows over first 10 years.
18 Irrespective of regenerative agriculture, historically yields have either been increasing or decreasing.

When cost and yield factors alone cannot establish the economic viability of implementing regenerative agriculture practices, financial support will be needed, thus making incentives a deciding factor in the Net Profit Impact equation as well. As a result, five key factors collectively influence Net Profit Impact: (i) Investment costs, (ii) Operating costs, (iii) Cost savings, (iv) Yield impact, and (v) Incentives. This chapter will focus on the first four factors. Incentives and their role in shaping Net Profit Impact will be discussed in the next chapter.

Methodology and scope of the study

The Net Profit Impact has been estimated for a set of six regenerative agriculture practices[19], applicable to 34 unique crop-country combinations based on 12 crops and 10 countries (as presented in appendix A). For the estimation, a model was developed based on desk research, and direct inputs from experts[20] through interviews and data collection sheets. These estimates were exclusive to implementing regenerative agriculture practices - costs that a farmer would incur in a conventional system regardless were not taken into account. The outcomes of the model were validated in light of scientific studies[21], and with farmers, arable farming advisors, regenerative agriculture implementers, and experts from FMCG companies. It is important to note that our model includes data on average impact, based on the implementation of six common practices. The actual choice of practices and the impact of these practices, especially on yield, will vary depending on local challenges and priorities.

Although the regenerative agriculture definition is broad, encompassing a myriad of practices that restore and protect soil health, only six practices pertaining purely to the arable system, and those commonly commissioned by FMCG companies[22] were considered. These six practices are:

I. **Cover Crops:** Growing a crop that covers the soil between two crop cycles

II. **Reduced Tillage:** Reduction in the intensity of tillage or elimination of tillage altogether

III. **Crop Rotation:** Planting at least three different crops sequentially on the same plot of land.

IV. **Organic Fertilisation:** Optimising plant nutrition strategies by reducing the use of synthetic fertiliser and replacing with bio-inputs (e.g., manure, compost, digestate, and biostimulants)

V. **Irrigation Efficiency:** Planned irrigation to match crop water needs and reduce water wastage

VI. **Enhancing (on-farm) Biodiversity:** Implementation of flower strips, hedges and trees to promote biodiversity at the farm

The approach to financing the implementation of these practices varies per farmer. Some farmers may have the necessary resources[23] in place, while others may prefer to partially invest in resources and rely on contractors to perform agricultural activities for which they lack equipment. Alternatively, some farmers may prefer to implement all the practices independently by making investments in all the required resources. To represent this variation, three scenarios were considered.

I. **No investment scenario**, where a farmer is assumed to not invest in any resources (e.g., buying of machinery). Regenerative agriculture practices can still be implemented as the farmer would either have the resources already in possession or would rely fully on agricultural services.

II. **Limited investment scenario**, where a farmer would make investments in tillage machinery, flower strips and hedges, and drip irrigation in case of root crops and tomatoes only. Organic fertilisation would be implemented through contractors and no investment in trees would be made.

III. **Full investment scenario**, where a farmer would implement all practices by making investments in all the required resources. Thus, the farmer would buy necessary equipment for tillage, organic fertilisation, invest in trees along with hedges and flowers, and install a drip irrigation system in case of root crops and tomatoes only.

Among these three scenarios, the Limited Investment Scenario is considered the most realistic, as farmers typically invest in tillage machinery when transitioning to regenerative agriculture practices. Basic biodiversity practices, such as flower strips and hedges, are also included in this scenario, as they require relatively low investments. No machinery investments for manure spreading are assumed, as this is commonly outsourced to contractors. Drip irrigation systems are considered only for root crops and tomatoes.

19 Rationale for selecting six practices is explained in the following section.
20 Farmers, regenerative agriculture implementers and regenerative agriculture advisors.
21 IEEP: The costs and benefits of transitioning to sustainable agriculture in the EU.
22 Determined based on interviews conducted with farmers, FMCG companies and regenerative agriculture experts.
23 E.g., equipment, machinery, trees, hedges, flower strips, and irrigation system.

Net Profit composition on the example of sugar beet production in France

Based on these modelling choices[24] and to better understand the build-up of Net Profit Impact from cost and yield factors, figure 4 shows an example of sugar beet production in France in the mature stage of implementation of regenerative agriculture practices, under a Limited Investment Scenario. To analyse the impact per crop, the practice of crop rotation is excluded from this analysis for the time being.

Looking first at **Cover Crops**, there are no associated investment costs as cover crops can typically be implemented with existing equipment. The ongoing costs are mainly related to seed mixture and plantation. For cost savings, only reduction in fertiliser needs on the following cash crop were considered, and no proceeds from cover crops were assumed[25].

For **Reduced Tillage**, investment costs are associated with the buying of suitable tillage equipment. Ongoing costs are associated with labour hours needed for tilling and fuel usage. Cost savings result from the reduction in fuel usage and man-hours due to reduced tillage[26], and also includes proceeds from sales of used conventional tillage equipment.

Investments in **Organic Fertilisation** are associated with the buying of a manure spreader. Ongoing costs are related to the procurement and spreading of manure[27] needed to address 40% of crop's nutrition requirement, and cost savings are associated with the equivalent replacement/reduction of synthetic fertiliser.

In case of **Biodiversity** practices, the investment costs are associated with the implementation of perennial flower strips, hedges and trees, and ongoing costs are for maintaining and managing them. Cost savings are mainly achieved through a reduction in the usage of insectisides.

Finally for **Irrigation Efficiency**, investment costs are for the implementation of drip irrigation system, ongoing costs are to maintain the system, and cost savings are achieved through savings in water usage.

The yield impact in a mature stage assumes improved soil health that results in an increased yield for sugar beet by 10% on top of the average baseline yield of 85 tons/ha in France[28]. The financial benefit associated with the increased yield is 488 €/ha along with cost savings of 369 €/ha achieved through implementing regenerative agriculture practices. These benefits allow a farmer to offset the total costs of 730 €/ha, ultimately resulting in a net positive impact of 126 €/ha in the mature stage. In addition to the benefits associated with yield increase, there is more financial upside available such as subsidies and grants, price premiums or monetisation of ecosystem services (e.g., Carbon), which are not considered in this chapter.

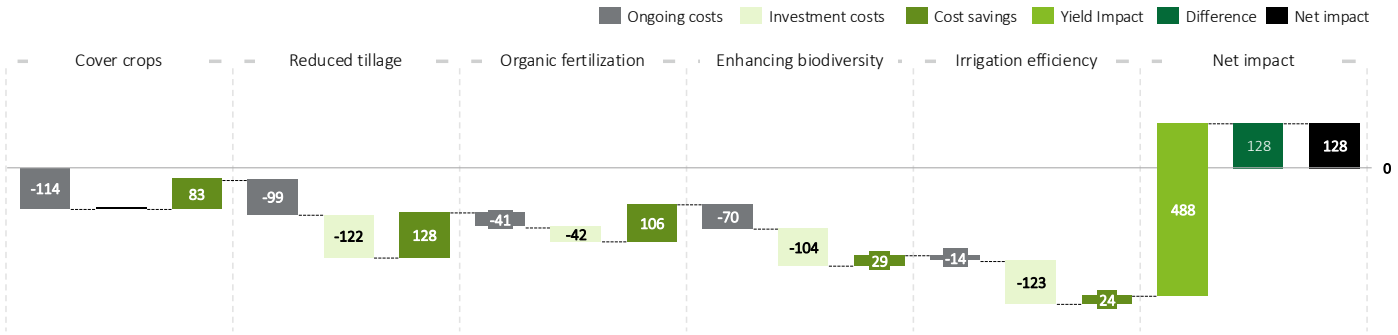


Figure 4: Estimated average Net Profit Impact based on five regenerative agriculture practices (versus conventional) in €/ha/year. Estimates are for an average farm size of 60 ha in France, for sugar beet production in a mature stage.

24 Only the major modelling choices are mentioned here. See appendix for a detailed list of modelling choices, assumptions and limitations.
25 Some farmers use cover crops for selling/fodder/own use. However, the majority of the farmers in the EU do not harvest as per JRC technical report titled "Adoption of cover crops for climate change mitigation in the EU".
26 Or no-till for non-root crops.
27 Assuming that the farmer would have access to manure to fulfil 40% of sugar beet's nutritional requirement using Poultry manure with 60% dry matter.
28 Details on yield impact for all the crops can be found in Appendix C.

Summarised Net Profit Impact across all crops and countries (excluding incentives)

Based on the logic described above for sugar beet in France, Figure 5 presents the average yearly Net Profit Impact estimates excluding incentives, for all the crop-country combinations in scope[29], in a Limited Investment Scenario for early and mature stage.

Farm sizes, crop yield density and transition phase are the key determinants of Net Profit Impact

As it can be observed, there are variations in Net Profit Impact estimates across crops and countries. This variation is generally influenced by three major factors:

I. **Farm sizes:** Average farm sizes vary across countries, with the UK, Germany, and France having larger farms. The other countries in scope have relatively smaller farms. For such smaller farms, investment costs per hectare are relatively higher due to the lack of economies of scale.

II. **Crop yield density:** Certain vegetables/root crops such as Potatoes, Sugar beet, Onion and Tomatoes have a higher yield per hectare (>35 tons), compared to other cereal or commodity crops that have a relatively lower yield per hectare (2 to 10 tons).

III. **Stage of regenerative agriculture:** In the early stages of regenerative agriculture, yield typically declines, whereas in the mature stage, yield increases lead to profits.

Besides these three major factors, other factors that influence the Net Profit Impact estimates include access to and sharing of resources and the extent of practice implementation (e.g., 20% fertilisation using organic sources vs. 40%).

Additionally, when the crop is similar and countries are different, there are other factors whose influence is greater. These are: average yield, crop prices, differences in input, labour and fuel costs, variation in machinery rates, and interest rates.

For example, average net profit impact in the mature stage of regenerative agriculture for **Rapeseed oil is estimated at**

206 €/ha in France, compared to 59 €/ha in the UK.

Although France and the UK both have comparatively larger farms, this difference of 147 €/ha between the two countries is influenced by average yield per hectare and price per ton. In France, the average yield is 3.7 tons/ha and price is 542 €/ton, whereas in the UK, it is 3.2 tons/ha and 400 €/ton.

		Low yield density crops																High yield density crops							
		Barley		Oats		Wheat		Rice		Rapeseed Oil		Corn		Sunflower		Cotton		Onion		Potato		Sugar beet		Tomatoes	
Avg. farm size	Country	ES	MS	ES	MS	ES	MS	ES	MS	ES	MS	ES	MS	ES	MS	ES	MS	ES	MS	ES	MS	ES	MS	ES	MS
Large (55 ha+)	France (1)					-163	53			-12	206			-104	59			-270	982	-408	1065	-244	325		(3)
	Germany					-168	23			-126	12														
	UK	-87	2	-81	11	-143	46			-54	59									328	2477				
Medium (25 ha+)	Spain (2)									-243	-219	-278	-97			-273	-284			-810	1161			258	1505
Small (5 - 10ha)	Greece															-228	-223								
	Italy							-116	119															104	653
	Poland									-285	-227									-596	942	-231	16		
	Romania									-381	-377	-364	-396							-312	265				
	Serbia					-120	-85			-93	-75	-78	-48												
	Turkey									-426	-386	-430	-346			-461	-453					-350	-42		

High density MS All positive in MS
High density ES Mostly negative except tomatoes and potato in UK
Low density: ES All negative in ES
Low density: MS Mostly positive except for Cotton, Corn in Romania, Rapeseed oil in RO, ES and TK

Figure 5: Estimated average yearly Net Profit Impact of regenerative agriculture implementation versus conventional (in €/ha/year) for 34 crop/country combinations in a Limited Investment Scenario for early stage (ES) i.e. 1-4 years and mature stage (MS) i.e. year 5 onwards. Values are approximate and may vary between a +/- 25% range. Net Profit Impact for low yield density crops in smaller farms is mainly negative as such farms do not have economies of scale advantage (additional details in the following paragraphs and appendix).

29 See appendix A.

Overall, the Net Profit Impact estimates assume a level of predictability and normality in crop production and standardise Net Profit Impact per country due to the averaging of farm sizes. However, in reality the actual impact changes from farm to farm, heavily influenced by local conditions relating to soil, climate, pests, pollinators, and unforeseen weather events.

Observing the average Net Profit Impact for early and mature stage (in figure 5), and the year in which the Net Profit Impact turns positive (figure 6), the following findings can be derived:

1. **Low yield density crops in (countries with) larger farms:** The average Net Profit Impact turns positive in the mature stage i.e., by year 4 or 5 for low yield density crops in countries with larger farms. In the early stage, Net Profit Impact is mainly negative due to accumulation of costs associated with the implementation of regenerative agriculture practices as well as yield declines.
2. **Low yield density crops in (countries with) smaller farms:** Net Profit Impact is mainly negative in the early as well as the mature stage for low yield density crops in smaller farms. This is because smaller farms experience greater costs of investment per hectare due to a lack of economies of scale. Moreover, marginal yield improvements achieved with low yield density crops are insufficient to offset investments exclusively made for those crops. Therefore, such low yield density crops must be combined with high density crops in a rotation scheme to ensure profitability (explained further later).

   However, Rice, despite being a low yield density crop, is an exception as it generally commands a higher price per ton compared to other crops in its category.
3. **High yield density crops in all countries for all farm sizes:** The average Net Profit Impact turns positive by year 3 or 4 for all farm sizes. This is because higher yield density crops, even with a marginal yield increase, have a greater Net Profit Impact, as the costs of implementing regenerative agriculture practices can be covered with the higher yield per hectare.

Crop rotation as a key practice to achieve profitability for low yield density crops in early stages

Reflecting on the findings above, the main challenge with regards to Net Profit Impact is for low yield density crops in (countries with) smaller farms. One of the ways to address this challenge is by rotating low yield density crops with high yield density crops. Crop rotation not only helps with achieving a positive Net Profit Impact over the course of the rotation, but it also helps prevent crop diseases and supports additional yield improvements.

Typically, a rotation scheme occurs over a period of time (e.g., 3 to 5 years) switching between low yield density and high yield density crops. Figure 7 indicates a five-year Crop rotation scheme for the UK, where low yield density crops such as Barley, Oats, Wheat, and Rapeseed oil are grown in years 1, 2, 3 and 4 respectively, and a high yield density root crop i.e., Potato is grown in year 5.

		Low yield density crops								High yield density crops			
Avg. farm size	**Country**	**Barley**	**Oats**	**Wheat**	**Rice**	**Rapeseed Oil**	**Corn**	**Sunflower**	**Cotton**	**Onion**	**Potato**	**Sugar beet**	**Tomatoes**
Large (55 ha+)	France	1		5		4		5		4	4	4	3
	Germany			5		5							
	UK	5	5	5		5					3		
Medium (25 ha+)	Spain	2				Never	Never		Never		4		3
Small (5 - 10ha)	Greece								Never				
	Italy				4								3
	Poland					Never					4	5	
	Romania					Never	Never				5		
	Serbia			Never		Never	Never						
	Turkey					Never	Never		Never			Never	

Figure 6: Indication of year in which the Net Profit Impact turns positive. Green cells indicate positive impact with year number written within.

As shown in figure 7, the significant Net Profit Impact of 781 €/ha achieved with a high yield density crop like Potato in year 5, complements the cumulative negative Net Profit Impact of -437 €/ha[30] resulting from low yield density crops such as Barley, Oats, Wheat, and Rapeseed oil. By year 5, a farmer gains a positive Net Profit Impact of 344 €/ha[31] or an average of 70 €/ha/year over the first five years. Similarly, crop rotation also boosts the average Net Profit Impact in the mature stage to €210/ha/year.

Although the average Net Profit Impact is positive over a period of 5 years, a farmer still has to operate with a negative Net Profit Impact of about -438 €/ha for the first 3 years[32]. Moreover, from a financing need perspective, investments made in year 0 amount to about -2168 €/ha, which is about -€140.000 for an average arable farm of 65 hectares in the UK. With the operational cash flow example below, the payback period for a farmer is about 9 years, with a 10-year IRR of 4% (p.a.) only, thus indicating the critical need for incentivisation (from private as well as public bodies, which is elaborated further in the following chapter).

Chapter summary

In summary, implementing the common regenerative agriculture practices impacts production costs and yield. The Net Profit Impact varies across crops and countries depending on farm size, crop yield density and stage of the transition. In the early stage of the transition, crops usually experience a negative Net Profit Impact. In the mature stage, crops with higher yield density are profitable for all farm sizes, whereas crops with lower yield density are profitable for large farms only (i.e., not for smaller farms). One of the ways to ensure profitability for lower yield density crops is by rotating them with higher yield density crops. Additional solutions to improve Net Profit Impact such as incentives and cost sharing are discussed in the following chapters.

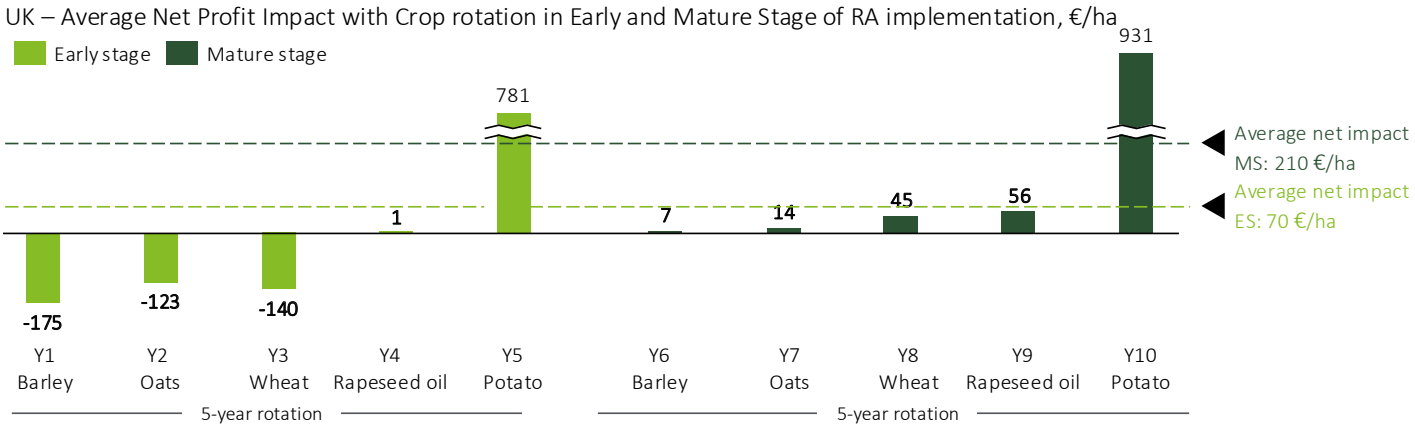


Figure 7: Crop rotation scheme for the UK indicating the average Net Profit Impact in early and mature stage of regenerative agriculture implementation.

	Impact driver	Calculation	Y0	Y1-BL	Y2-OT	Y3-WT	Y4-RS	Y5-PT	Y6-BL	Y7-OT	Y8-WT	Y9-RS	Y10-PT
A.	Ongoing costs, €/ha/yr	-		-204	-203	-210	-207	-1444	-204	-203	-210	-207	-1444
B.	Annualised Investments (AI) costs , €/ha/yr	(H) ÷ 10 yrs		-217	-217	-217	-217	-217	-217	-217	-217	-217	-217
C.	Subtotal costs, €/ha/yr	(A) + (B)		-353	-352	-359	-356	-1593	-353	-352	-359	-356	-1593
D.	Yield Impact, €/ha/yr	-		-21	27	0	138	2106	160	164	185	192	2257
E.	Cost savings, €/ha/yr	-		199	202	219	219	267	199	202	219	219	267
F.	Net Profit Impact, €/ha/yr	(C) + (D) + (E)		-175	-123	-140	1	780	6	14	45	55	931
G.	Net Profit Impact* (excl. AI), €/ha/yr	(A) + (D) + (E)		-26	26	9	150	929	155	163	194	204	1080
H.	Investment costs , €/ha	(B)	-2168										
I.	Cumulative cash, €/ha/yr	(I**) + (G)	-2168	-2194	-2168	-2159	-2009	-1080	-925	-762	-568	-364	716

Table 1: Net Profit Impact analysis for limited investment scenario taking into account Ongoing costs, Investment costs, Cost savings and Yield impact for a 5-year crop rotation with Barley (BL), Oats (OT), Wheat (WT), Rapeseed oil (RS), and Potato (PT) in the UK. The rotation indicated here corresponds to figure 7 as well. AI stands for annualised investment. *Proxy for operational cash flow. **Of the previous year. E.g., -2168-26=-2194

30 Calculated as: -175-123-140+1 = -437 €/ha.
31 Calculated as, 781-437=344 €/ha.
32 See row F in table 1 and add from Y1 till Y3 (-175-123-140=-438).

De-risking the transition through incentivisation

3

Major findings

- When looking at the available incentives, we can conclude that there are **not sufficient incentives available** to cover the costs of the transition, neither at farm level nor at a European level. By applying available incentives, the payback time can decrease from 9 years to 5 years. However, farmers will still have a funding need between ~1400 to 4100 €/ha (post-incentives) depending on the extent of investments made.
- Also at a macro-level, there is a **significant funding gap with only ~2 to 6% of total funding needs** for a transition to regenerative agriculture practices in arable farming in Europe currently being covered. We however encountered **differences in incentives identified** between the countries in scope with a greater number of incentives identified in countries such as UK, Germany and France, and fewer incentives for regenerative agriculture identified in Serbia, Greece, Turkey, and Poland.
- Moreover, we found that current incentives are **not fit-for purpose**. They focus mainly on supporting ongoing costs rather than the much-needed funding for upfront investments. Additionally, they are often not built around specific farmer needs and desired outcomes of the regenerative agriculture practices, leading to undesired consequences such as mono cropping.
- **Transparency** on incentives for farmers within Europe is low. Companies having private incentivisation programmes are mostly unwilling to share incentive details due to concerns regarding data privacy and competitiveness. Many public schemes are yet to be defined and hard to access. Lack of transparency on incentives also leads to Pareto inefficiencies for incentive providers.
- Nearly all **incentives available** are constructed **in isolation** by one or two parties only (e.g., FMCG company and implementer), often with limited scope and reach.
- Finally, **Accountability** of incentives needs to improve through better monitoring, reporting, and tracking, so that precise gaps and contribution of funding to EU Green deal targets can be identified and addressed at a member state level.

Overview of incentive schemes in market

Implementing regenerative agriculture practices, as discussed in the previous chapter, leads to a financial gap for farmers in the early stages of the transition, and more so for lower yield density crops and smaller farms (as also highlighted by the new reforms on EU CAP focusing on smaller farms[33]). In order to support farmers with the implementation of regenerative agriculture practices, financial incentivisation for farmers is necessary. Different types of incentives have appeared in the regenerative agriculture value chain, offered by public and private entities which address both cost and yield impacts. Overall, these incentives can be categorised into five types:

1. **Recurring support:** Recurring payments to cover ongoing costs (OPEX) associated with running or maintaining regenerative agriculture practices. These types of incentives are common among public and private bodies and are usually paid annually per practice and per hectare. The Sustainable Farming Incentive (SFI) in the UK is a well-known public incentive example for this category.

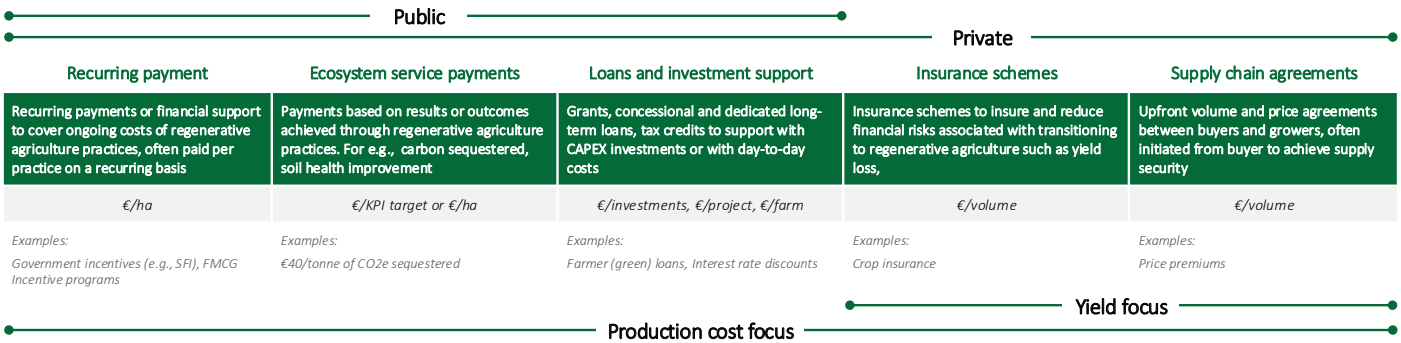


Figure 8: Categorisation of common incentives in the regenerative agriculture value chain

33 EU's new agriculture chief seeks more funds for small farmers.

2. **Ecosystem service payments:** These payments are made based on results or outcomes achieved through implementing regenerative agriculture practices, thus providing flexibility with practice implementation, and leaving the risk of achieving the results with the farmer/ implementer. For instance, payments made per ton of CO_{2e} sequestered[34].
3. **Loans and investment support:** Grants, concessional and dedicated[35] long term loans, or tax credits mainly to support farmers with CAPEX investments through favourable lending terms. Such incentives can either be provided by public or private bodies, or as joint initiatives between them.
4. **Insurance schemes:** Schemes to insure and reduce financial risks associated with transitioning to regenerative agriculture practices, especially against potential yield loss or based on not delivering the expected outcomes.
5. **Supply chain agreements:** Agreements that are often initiated by buyers, and exist either between buyers and suppliers (e.g., processor) or between suppliers and growers, with the aim to secure the supply of commodities through volume, price, and delivery arrangements. Such agreements can coexist with other incentive types such as recurring support, ecosystem payments or loans and investments.

Methodology and scope of the study

As hinted above, the focus of this report was to identify key public and private incentives[36] which are directly applicable and accessible for farmers, and cover the 34 crop-country combinations and six practices in scope[37]. For public incentives, the focus was on major/well known incentives, and data for these incentives was primarily gathered through desk research. Private incentives were sourced directly from organisations[38].

Key observations and findings relating to the identified farmer incentive schemes

Based on the information gathered, in total 128 farmer incentives were identified. Out of which, 60% (78) were identified as private incentives, 36% (46) as public incentives and 4% (5) as public-private incentives.

Although the data is not exhaustive, these insights are still reasonable, as private incentives are provided by a broader set of stakeholders such as consumer goods companies, food processors, farmer cooperatives, regenerative agriculture implementers, retailers, banks, insurance companies, impact funds, philanthropic organisations, and NGOs. Whereas public incentives are provided by a smaller set of stakeholders such as the EU, country authorities or local municipalities. A joint public-private incentives were also found, examples of which are gradually emerging[39].

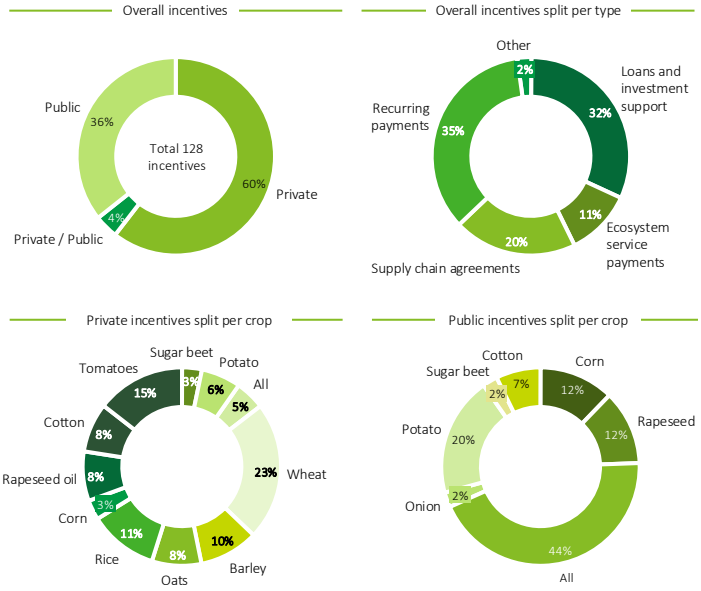


Figure 7: Summary of public and private incentives split per crop collected through desk research and inputs from private organisations. Incentives are non-exhaustive

34 Carbon sequestration can be a result of regenerative agriculture implementation, thus an outcome that can be tracked and incentivised.
35 Loans tied and personalised to the stage and progress achieved in regenerative agriculture.
36 Although public and private incentives were in scope, the focus of identification was more inclined towards private incentives, as data on private incentives is not readily available. Overall, the list of incentives identified is not exhaustive.
37 See appendix A for full scope.
38 Major companies sourcing crops from countries in scope.
39 E.g., Re-Ge-NL, where private sectors add to the public investments for farmers in transition.

The availability of public incentives varies across countries. In some countries such as France, Germany, and the UK, more incentives can be found, and the information provided is clearer and well organised (e.g., the SFI in the UK). In contrast, other countries provide fewer incentives, often accompanied by unclear or incomplete information (e.g., Greece, Serbia). Furthermore, some countries have either delayed budget allocations or are yet to finalise incentive definitions (e.g., Poland).

With regards to incentive types, majority i.e., 35% of the incentives belong to Recurring payments category. 20% of the identified incentives apply to Supply chain agreements, and 11% apply to Ecosystem service payments. Jointly, these three categories cover two thirds of the identified incentives, mainly applicable to ongoing costs on an annual/recurring basis. Besides these, about 32% of the identified incentives apply to Loans and investment support category. A few other incentives such as Insurance schemes[40] also exist. However, they are not yet common.

In general, most of the incentives are stackable, meaning they can be combined with other incentives. However, incentives relating to Loan and investment support, and Supply chain agreements have a relatively lower 'Stackability' rate.

This is likely due to specific credit rating or loan repayment obligations, and presence of exclusivity clauses in Supply chain agreements.

Looking at the split per crop, public incentives often do not differentiate per crop. The majority of them (~44%) apply to almost all crops, an observation also echoed by experts during interviews. In contrast, private incentives are more targeted and evenly distributed across crops with a significant portion (~55%) focused on low yield density cereals which often experience a negative Net Profit Impact (in the early stage of implementing regenerative agriculture practices).

Practices supported and payments offered

In terms of practices and payments, as shown in table 2, private organisations generally offer higher payments for common/multiple regenerative agriculture practices, ranging from 70 to 150 €/ha. Payments made for single practices are comparatively lower, ranging from 30 to 70 €/ha. Price premiums offered as part of Supply chain agreement typically range between 12 to 28 €/ton of agricultural output. Payments for ecosystem services, particularly for Carbon sequestration, were found to be in the range of 25 to 45 €/tonCO_{2e} sequestered.

Incentive type	Practices applicable	Impact type	Payment***	Units
Recurring payment	Common / multiple practices*	Ongoing costs	70 To 150	€/Ha/year
Supply chain agreement	Common / multiple practices*	Ongoing costs	12 To 28	€/Tons output
Recurring payment	Reduced or no tillage	Ongoing costs	50 To 70	€/Ha/year
Recurring payment	Cover crops	Ongoing costs	30 To 60**	€/Ha/year
Recurring payment	Organic fertilisation	Ongoing costs	30 To 40**	€/Ha/year
Ecosystem service	Common / multiple practices*	-	25 To 45**	€/Ton CO_{2e}
Loans and investment	Common / multiple practices*	Investment costs	25k - 500k	€/Investment

Table 2: Non-exhaustive list of private incentives offered within EU-28, Turkey and Serbia applicable to various crops. Detailed list of incentives in appendix B. *E.g., Reduced tillage, cover crops, reduced chemical fertiliser, crop rotation, optionally biodiversity; **Estimate or based on limited data points; *** Payment amount differs depending on country / crop

40 Swiss Re carbon offset insurance.

Table 3 provides a non-exhaustive overview of public incentives which mainly stem from Common Agricultural Policy (CAP), and the Multiannual Financial Framework (MFF). Although some of these incentives are for organic farming, they are also applicable to regenerative agriculture (e.g., Romania and Germany). Payments here range between 218 to 548 €/ha, depending on the crops, practices, and yield impacts. Similar to private incentives, payments are generally higher when multiple practices are implemented rather than a single practice. Lastly, loan and investment support schemes often have an upper limit, or only partially subsidise investments. For instance, FranceAgriMer covers approximately 20% to 40% of farmers' investments for selected projects.

Incentive type	Practices applicable	Impact type	Payment	Units	Country examples
Recurring payment	Reduced tillage, organic fertilisation	Ongoing costs	128 to 279	€/ha/year	RO
Recurring payment	Organic farming	Ongoing costs	218 to 500	€/ha/year	RO
Recurring payment	Organic farming	Ongoing costs	423 to 548	€/ha/year	DE
Recurring payment	Cover crops	Ongoing costs	42 to 161	€/ha/year	ES, UK
Recurring payment	Reduced tillage	Ongoing costs	47 to 151	€/ha/year	ES, UK
Recurring payment	Flower strips	Ongoing costs	798*	€/ha/year	UK
Loan and investment	Multiple practices	Investment costs	20% - 40%	%	FR, UK
Loan and investment	Multiple practices	Investment costs	300.000	€/investment	RO

Table 3: Non-exhaustive list of public incentives offered within EU applicable to various crops. Detailed list of incentives can be found in the appendix B. *The amount is for a full hectare planted with flower strips. Realistically, when 5-10% of the land is planted with flower strips, these incentives range between 40 to 80 €/ha.

Key discussions on incentives

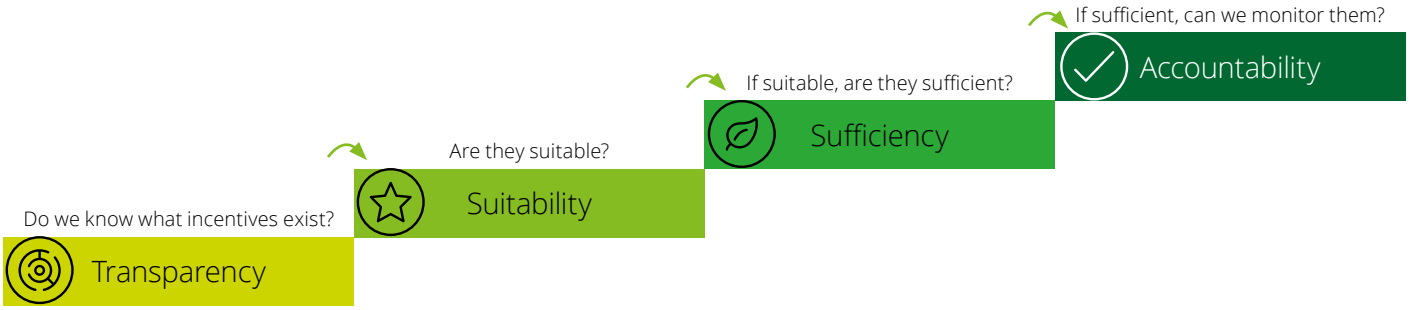
Based on the data collection and processing exercise, the identified incentives were analysed from four angles.

I. **Transparency:** to determine whether the information on incentives (including payment amounts) is accessible to all the stakeholders in the value chain (especially farmers)

II. **Suitability:** to determine whether the incentives are fit for purpose and cater to farmer needs at the different stages of implementing regenerative agriculture practices

III. **Sufficiency:** to establish whether incentives are sufficient at an individual farmer and collective level

IV. **Accountability:** to determine the extent to which incentives can be monitored and reported in order to track their contribution to the broader policy objectives



Incentive transparency

Data on public incentives is transparent (in principle), but the level of clarity differs across countries. For some countries, information is scattered across multiple policy documents, making it difficult to identify and navigate. Research with farmers also revealed that not only identifying the right incentive scheme is challenging, but also the application process, often in a competitive setting, presents an obstacle for farmers. When it comes to private incentives, gathering data was particularly challenging, as most companies either do not have an incentivisation programme, or do not disclose their incentivisation schemes, citing concerns regarding anti-trust laws, market competitiveness, or supplier/buyer contractual obligations. The current mismatch between high demand for regenerative agriculture products by food companies and limited supply also adds to the non-transparency. Intermediaries and trading houses who have a closer relationship with farmers, see nontransparency in incentives as a competitive advantage, and have little motivation to share data about their programmes. Despite following an anti-trust compliant process and contacting over 70 major EU Food and Agri companies, the success rate for obtaining information was less than 20%.

In contrast, companies operating in North America generally publish financial details of their regenerative agriculture incentive programmes publicly while withholding the same when it comes to Europe. This lack of transparency has also been recognised by the European Commission[21].

Lack of transparency creates information asymmetry in the regenerative agriculture value chain, which not only results in Pareto inefficiency for incentive providers but is also an indication of market failure. Consequently, value chain stakeholders, mainly public and private incentive providers, struggle to develop and execute their incentivisation strategies in a competitive and efficient manner.

Incentive suitability

Almost two thirds of the 128 incentives that were identified are related to Recurring payments (35%), Supply chain Agreements (20%) and Ecosystem service payments (11%) which mainly apply after regenerative agricultural practices have been implemented, however schemes related to investments to kick start the regenerative agriculture journey are less prevalent. Similarly, insurance schemes specifically tailored to regenerative agriculture, insuring against yield losses are scarce as well.

In general, we have also observed that incentives programmes are being initiated and run by only one or two parties along the value chain: neither do these programmes leverage knowledge across the value chain nor do they leverage scale to diversify and de-risk across different crops, regions, and practices. According to a 2022 study by EDF and Deloitte with 167 finance institutions across the world, 29% of agricultural finance institutions mentioned that support from partner organisations would help them take greater action on climate risks and opportunities, and 26% stated pre-competitive industry collaboration groups as a key driver[41]. By combining different expertise and skillsets, more fit-to-purpose incentives can be developed and more holistic transformation support to farmers can be provided.

			Applicability and need across stages		
Incentive provider	Schemes	Prevalence	Year 0	Year 1-5	Year 5+
Value chain players	Price premium and/or annual pay	◑	○	●	●
	Volume guarantees	◔	●	●	●
Offtakers	Ecosystem service pay	◑	○	●	●
Impact investors	Concessional lending	◔	●	●	○
Financial services	(Yield) insurance	○	●	●	●
	Commercial loans and asset investing	○	●	○	○
Government	Grants	◔	●	○	○
	Sustainable loans	◔	●	●	○
	Subsidies	◑	○	●	●
Farmer associations	Cost / Investment sharing	◔	●	●	●

○ Not applicable ● Partially suitable ● Most suitable

Figure 10: Prevalence of schemes, and their applicability and need across the different regenerative agriculture stages.

41 impacts-climate-change-agricultural-finance-survey.pdf

Finally, we have observed that many of the current private and public incentive amounts are not differentiated per crop, practice, country, and farm archetypes. Additionally, many incentives support practices rather than outcomes, which might lead to inefficient incentives and unintended countereffects (e.g., cessation of crops or incentivisation of unintended practices).

Incentive sufficiency from an individual farmer perspective

Overall, there are some incentives that are suitable and useful. However, they must be sufficient as well. In order to understand their sufficiency for an individual farmer, three SFI incentives relating to cover crops, reduced tillage and flower strips, and one incentive relating to investment costs are applied to the UK crop rotation model[42]. Figure 11 presents the resulting Net Profit Impact analysis and payback period, with and without incentives.

From a financing needs perspective where investments are accounted for in year 1, the payback period is 5 years. Despite receiving incentives[43], it takes a farmer about 5 years for the operational cashflows to recuperate for the investments. In the full investment scenario as shown in figure 12, the payback period is even longer, reaching about 9 years.

Although incentives applicable to investments have been taken into account, as mentioned earlier (in incentive suitability section), incentives that apply to investments are less prevalent, often have a low success rate for farmers due to their (stringent) qualification criteria and are reported to have low accessibility due to complex and bureaucratic application processes[44].

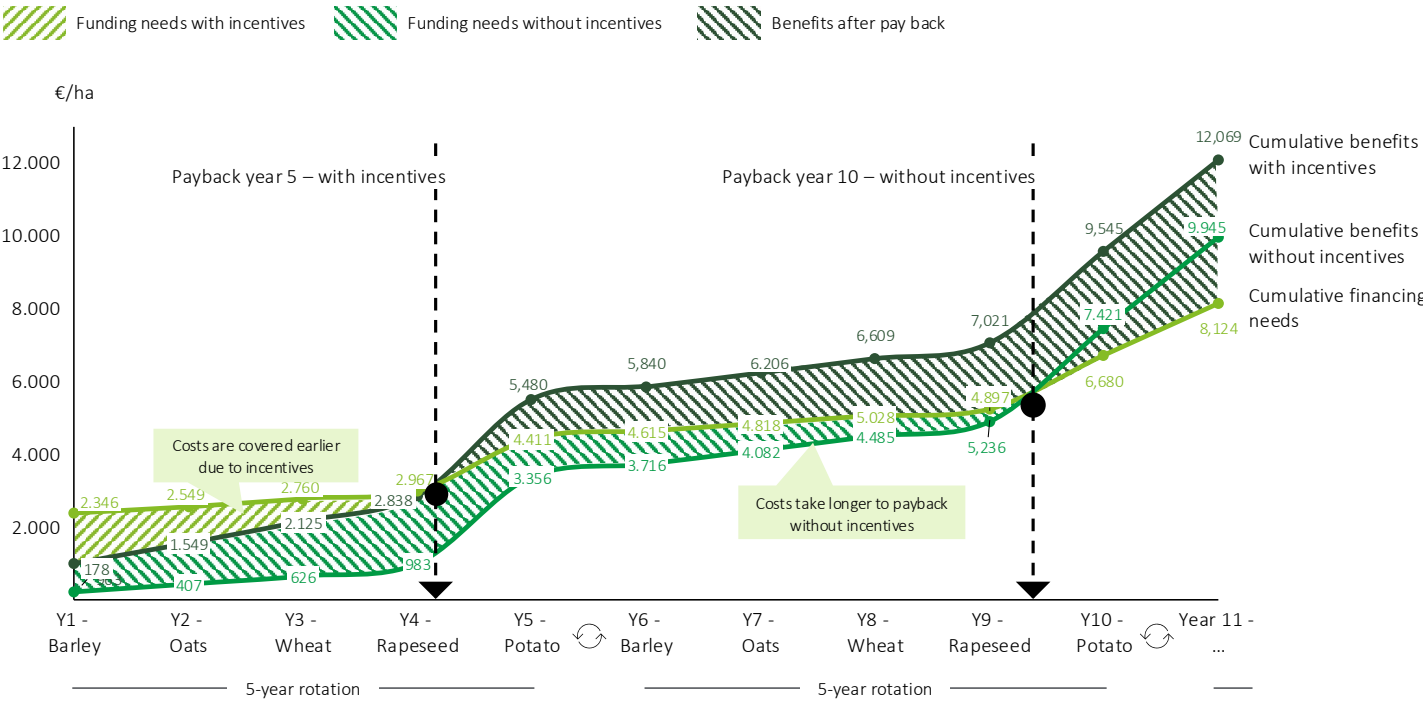


Figure 11: Payback period for limited investment scenario considering Investment and ongoing costs, Cost savings, Yield Impact & incentives for a 5-year crop rotation in the UK.

42 See figure 5 or table 1 which presents the 5-year crop rotation scheme in the UK, involving four low yield density commodity crops and one root crop.
43 £129 per ha for cover crops, £73 per ha for no-till and £112 per ha for flower strips (based on 12% of land coverage).
44 The European council in its latest press release dated December 9, 2024, has emphasised that support for investments is needed to promote sustainability in the food chain. See EC press release from the 9th of Dec 2024.

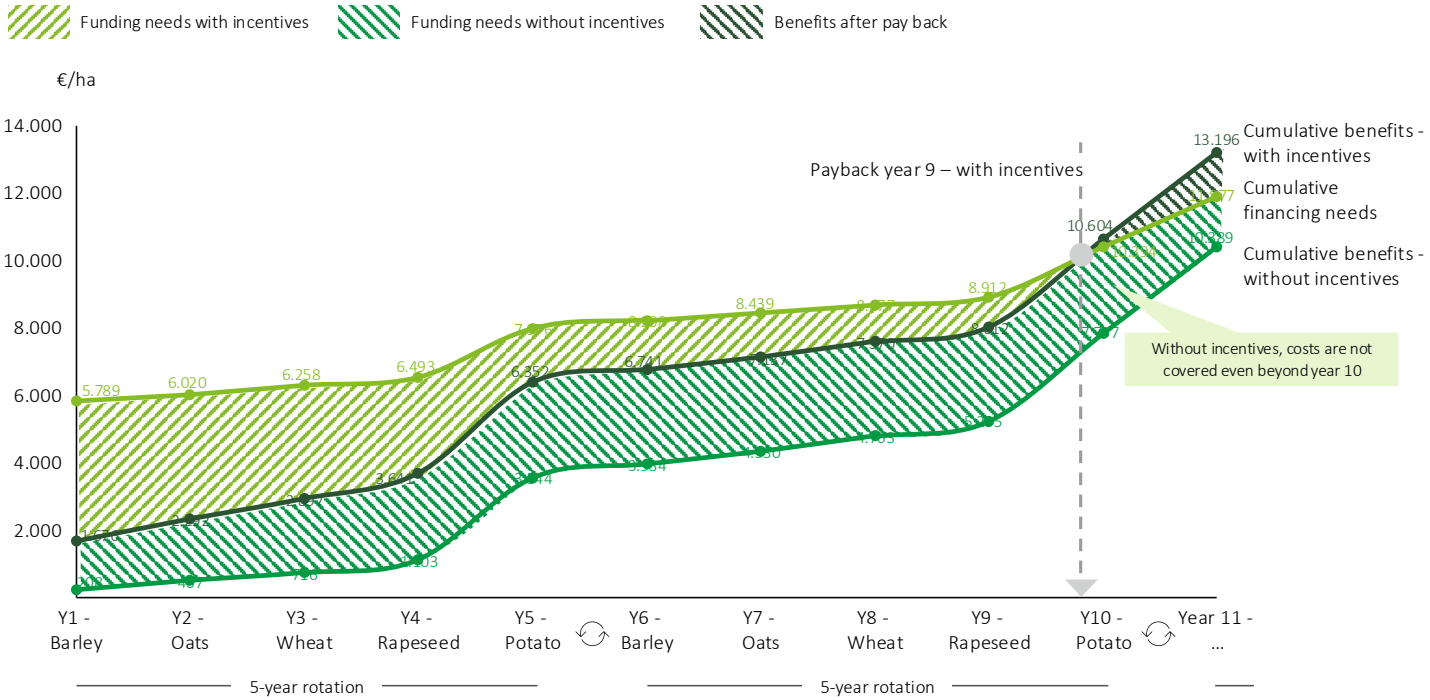


Figure 12: Payback period for full investment scenario considering Investment and ongoing costs, Cost savings, Yield Impact & incentives for a 5-year crop rotation in the UK.

Incentives sufficiency from collective perspective

Besides the individual level, incentives must also be sufficient from a collective perspective, as the total funds allocated towards implementing regenerative agriculture practices should enable transition at scale. Based on the Minimum Investment Scenario for a 5-year crop rotation considered in the UK (see figure 9 and 10 above), the cumulative financing need i.e., aggregated costs until payback period range between 2168 €/ha in a Limited Investment Scenario to 5581 €/ha in a Full Investment Scenario. Hypothetically, if 4.1 million hectares[45] of arable land in the UK would need to be transformed into regenerative agriculture practices, this would amount to ~€9 to €23 billion. Assuming the SFI budget is accessible for three years, totalling ~£7.5 billion, and 47% is allocated to arable land[46], then the remaining £4.1 billion would only suffice for a 18% to 45% adoption of regenerative agriculture practices.

In the EU, the funding gap is worse: with an arable land of about 98 million hectares, assuming similar funding needs[47] and a transition period of about 3 years, the annual funding needs for a full transition to regenerative agriculture practices amount to ~€212 to ~€547 billion. From the total available funding of €24 billion for regenerative agriculture as determined by the Anthesis report[48], assuming 40% of this funding is applicable to arable farmers[49], the remaining €12 billion would only enable a transition to regenerative agriculture practices within Europe of about 2 to 5%. Therefore, for EU and UK combined, only 2% to 6% of the funds needed seem to be supplied currently. The Pollination-Rockefeller report on financing regenerative agriculture transitions[50] estimates that currently, only ~10% of annual funding needs are being supplied globally. The European Investment Bank estimated a financing gap for EU agriculture between €19.8 billion and €46.6 billion in 2020[51]. The European Council has also acknowledged the need for better incentives to support EU's green agricultural transition in its recent press release[20]. Similarly, OECD has also highlighted the need for governments to create incentives in order to reduce environmental pressures and achieve sustainable productivity growth[52].

45 Agricultural Land Use in United Kingdom at 1 June 2024 - GOV.UK.
46 Agricultural land use in England at 1 June 2024 - GOV.UK.
47 €2168/ha for limited investment scenario and €5.581/ha for a full investment scenario.
48 Financing regenerative agriculture in Europe | WBCSD.
49 After discounting the share of livestock farming by 40% and assuming only 70% of the funding identified is applicable to farmers (as it includes fundings for corporates as well).
50 Financing-for-Regenerative-Agriculture-Final.pdf
51 Financial needs in the agriculture and agri-food sectors: 24 fi-compass Country Reports published.
52 The challenge of measuring and achieving sustainable agricultural productivity growth | OECD.

Many value chain players do not have programmes yet or are just starting with pilots. Reluctance from corporates is mainly driven by the many unknowns around farmer business cases, including payment amounts and duration of funding. Corporates that have programmes often do not pay enough to de-risk farmers in the first years, especially for low-yield-density crops, due to a lack of knowledge about the actual cost needs, commercial threats, and the inability to monetise.

The appetite of well-funded parties - such as insurers, institutional investors, and development and impact finance institutions - to invest, despite their increasingly vocal commitments to sustainability, remains limited. The Rockefeller-Pollination-TIFs 2024 report highlights failures in pricing externalities, policies, data and evidence, as well as farm-level implementation challenges, as key factors undermining financiers' confidence that such financing will meet their risk and reward standards[53]. From a public funding perspective, large parts of funding still flow into conventional practices. However, the implementation of the new CAP in EU countries will likely allocate more budget for regenerative practices, which is not covered in this report.

Incentive accountability

In order to ensure the sufficiency of incentives, it is crucial for them to be properly monitored, reported and tracked, as this monitoring will help identify precise gaps in incentives at a member state level. Additionally, it will also help in understanding how these incentives contribute to the broader EU goals, such as the 2030 Green Deal targets. In their recent audit, the European Court of Auditors reviewed agriculture subsidies and also identified a "noticeable gap" between farming incentives and the EU's green targets[54].

53 https://www.rockefellerfoundation.org/wp-content/uploads/2024/06/Financing-for-Regenerative-Agriculture-Final.pdf
54 Major gaps between EU farming incentives and Green Deal goals, ECA says | Reuters.

Conclusion and call to action

4

Our research has resulted in good and bad news. The good news is that the business case to enable the transition to regenerative agriculture practices (for the countries and crops in scope) is already positive for most of the farmers today. Attention is needed on the words 'for most of the farmers', as the **actual business case for farmers has a broad range,** which depends heavily on local conditions (soil, climate, pests, pollinators, and unforeseen weather events), crops, individual practices chosen, and the size of the farm.

Farmers need financial support especially in early years of transition

The **farmer business case** (Net Profit Impact) for implementing regenerative agriculture practices **is positive after 3 to 5 years** for most of the farmers, where profitability is mainly influenced by choice of crop and rotations (with low yield density crops such as most of the cereals hardly reaching profitability). Size of the farm and corresponding ability to bear or share investments also influence profitability.

Special attention needs to be paid **to small and medium-sized farms** (<55ha) growing low yield density crops. Especially if these crops are assumed to be grown monoculturally, it would result in a negative Net Profit Impact even in a mature stage, as upfront investments per hectare are higher for smaller farms and cannot be offset by the marginal yield increase from low yield density crops. However, there is a clear path to profitability after 4 to 5 years by taking prudent investment decisions (e.g., equipment sharing or use of agricultural services) and alternating with more profitable crops in rotations. These farmers can especially benefit from agroeconomic and financial support.

Although there is a path to profitability, farmers will still be confronted with **immense investments** needs before implementing regenerative agriculture practices, ranging between **~€2000/ha to ~5000/ha**, depending on the practices implemented and investment strategies. Including upfront investments, the payback period for farmers is approximately 9 years, with a ~4% 10-year IRR (p.a.) only.

Current incentives are insufficient, not fit-for-purpose and non-transparent

The bad news is that the current incentives identified in his study are insufficient, non-transparent and often not suitable for farmer needs. Estimates in this research show that by applying available incentives, the payback time can decrease from 9 years to 5 years. Currently **available incentives are therefore insufficient** to support farmers during the first ~5 years, when a farmer has significant investments needs and experiences potential yield loss, while being exposed to other risks that stem from changing practices on farm. Also at a macro-level, there is a **significant funding gap for arable farming, with only ~2 to 6% of total funding needs** in Europe currently being covered.

Additionally, the incentives landscape in Europe is **non-transparent**, especially private incentives. Companies are unwilling to share the (financial) details of their incentive programmes, due to which there is unclarity on the extent to which they cater to the needs of the farmers. Of the **public and private funding** identified in the research, **more than two thirds** focus **on annual contributions** that offset operating costs rather than supporting upfront investments (e.g., new machinery or biodiversity strips). Many of the current incentives are **not differentiated** per crop, practice, country, and farm archetypes. Additionally, many incentives support practices rather than outcomes, which might lead to inefficient outcomes and unintended countereffects (e.g., cessation of crops or incentivisation of unintended practices). On top of that, **nearly all incentives available** are constructed **in isolation** by one or two parties (e.g., FMCG company and implementer), often with limited scope and reach. By combining different expertise and skillsets, more fit-to-purpose incentives can be developed and holistic transformation support can be provided to farmers. Finally, incentives need to be **properly monitored, reported and tracked** as this will help identify precise gaps at member state level relating to fundings needs as well as meeting the broader EU Green Deal targets.

Recommendations and call to action for private and public institutions

In order to address the challenges associated with the costs of implementing regenerative practices and incentivisation, 9 recommendations are proposed. These recommendations are structured across four categories: Optimise farmer return on investment, Increase returns and reduce risk for investors, Develop fit-for-purpose funding, and Report, track and adjust funding.

9 major recommendations to help farmers achieve a positive economic model

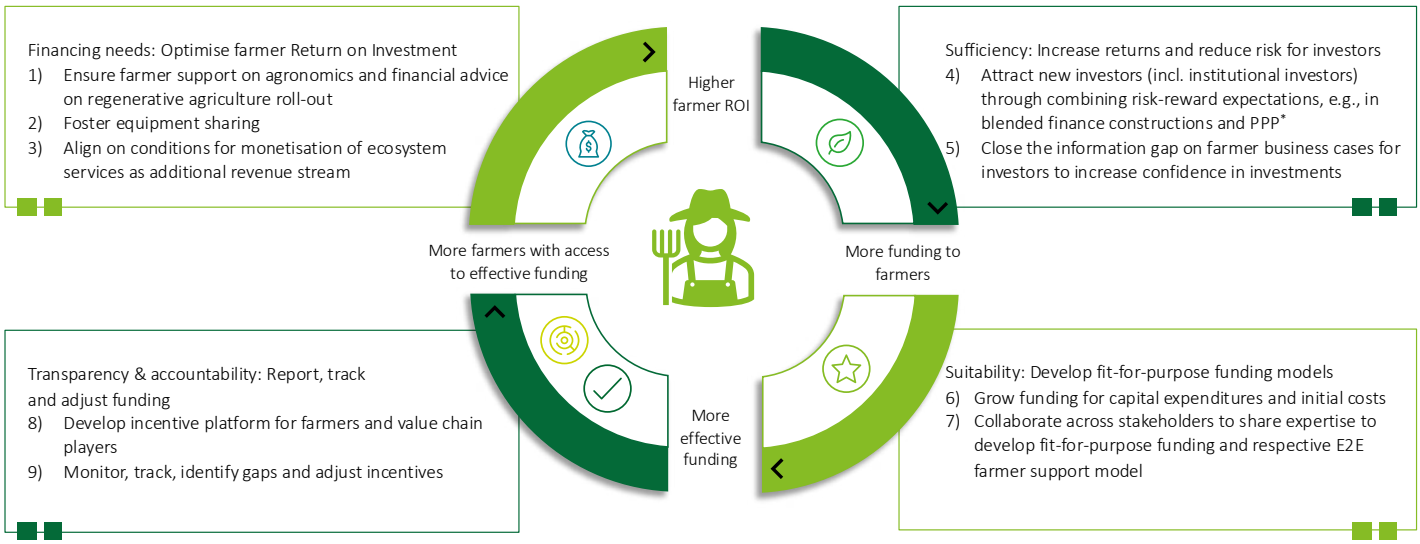


Figure 13: Major recommendations Notes: *Public-private partnerships

The first category '**Optimise farmer return on investment**' deals with helping farmers improve the business case and thereby increasing confidence of investment in the business case. The second category **'Increase returns and reduce risk for investors**' addresses the insufficiency of funding and provides recommendations on the need to increase the size of the funding pool for farmers. The third category '**Develop fit-for-purpose funding**' addresses the issue of suitability and calls for aligning incentives with farmer needs. Finally, the fourth category '**Report, track and monitor funding**' helps address the lack of transparency and accountability.

Optimise farmer return on investment

1. **Ensure farmer support on agronomics and financial advice on regenerative agriculture roll-out:** As discussed earlier, the Net Profit Impact is mainly negative in the early stages of the transition. However, the magnitude of impact can be reduced by planning the roll-out of practices and crops in rotations, taking prudent investment decisions and utilising cost efficient inputs. This is especially important to small and medium-sized farmers. Therefore, farmers must have access to trusted advisory services to ensure that positive yield impacts from changes in practices are achieved, and opportunities to reduce costs (such as dependencies on inputs) are identified. For instance, this can be enabled by a free business advice fund, which is provided by the Farming Resilience Fund in the UK.
2. **Foster equipment sharing:** Especially small and medium-sized farmers often cannot bear the necessary upfront investments. However, these investment costs (per hectare) can be brought down significantly by sharing equipment. Therefore, farmers may benefit from this and engage in equipment sharing. Nodes in the network such as local authorities (e.g., municipalities), cooperatives, and private arable advisors may help facilitate this by creating equipment sharing platforms.
3. **Align on conditions for monetisation of ecosystem services as additional revenue stream:** Aligned outcome metrics, MRV standards, and supporting frameworks are foundational to accelerate the monetisation of ecosystem services. Therefore, governments, value chain players and regenerative agriculture experts will have to collaborate to come to aligned metrics, standards and frameworks. This is a prerequisite to ensure that incentives designed to support regenerative agriculture practices are not acting against its practical implementation. Moreover, offering cost-efficient MRV technologies and automated processes will have a positive contribution to the farmer business case.

Increase returns and reduce risk for investors

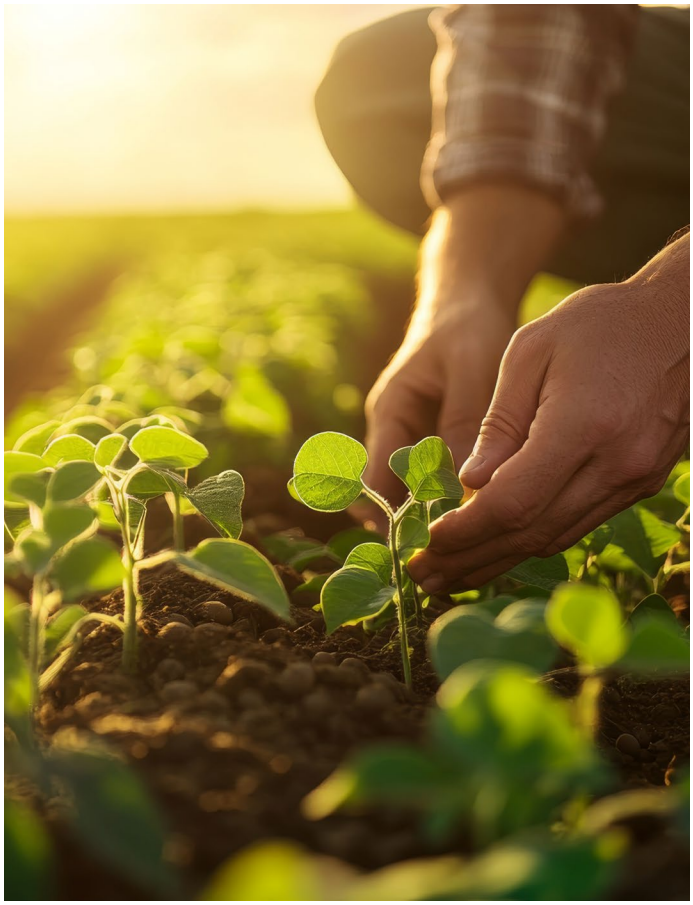
4. **Attract new investors:** The development of new investment vehicles which align the risk-reward expectations of the different investors can attract largely new investors such as banks, institutional investors, and insurance companies. Public investment, e.g., via national banks, world bank plays an important role here to de-risk the investment case for new investors via public-private partnerships.
5. **Close the information gap on farmer business cases for investors to increase confidence in investments:** Reluctance from investors to engage in regenerative agriculture is also due to the information gap on regenerative agriculture business cases, for different crops and countries and the corresponding funding requirements. Clarity on business cases and funding needs will not only increase the confidence of investors, but will also help substantiate the farmer business cases, and allow for the development of fit-for-purpose incentives. To enable this, farmer associations, value chain partners and implementers should exchange data, supported by scientific institutions and public bodies.

Develop fit-for-purpose funding models

6. **Grow funding for capital expenditures and initial costs:** Schemes related to investments to kick start the regenerative agriculture journey are less prevalent as almost two thirds of the incentives identified are related to recurring annual payments. Therefore, additional funding as well as financial products such as dedicated concessional loans or grants that support upfront investments are needed. Similarly, insurance schemes tailored to regenerative agriculture and stage of transition, to insure against potential yield losses are needed as well.
7. **Develop differentiated funding and respective E2E farmer support model:** Incentives hardly differ across crops and practices, let alone the differences in farmer archetypes (farm size, ownership, and economic situation as well as local farming conditions). By combining the various skillsets of the different actors (e.g., implementers, financial services, FMCG, farmer association), more fit-for-purpose incentives can be developed and more holistic end-to-end support models can be offered to farmers. This combination of skills requires closer collaboration across the different stakeholders.

Report, track and adjust funding

8. **Develop incentive platform for farmers and value chain players:** Currently, there is information asymmetry where neither farmers nor value chain players have transparency and clarity on what incentives are being offered across the different crops, countries, and practices. Due to this, the incentivisation strategies are inefficient for incentive providers and users. Therefore, an EU-wide open platform that provides transparency on incentives for all stakeholders (including farmers) needs to be developed. US federal incentive disclosure mandates which leads to mor efficient private incentive pricing could serve as an example here. As OECD mentions, achieving sustainable growth in agriculture "begins with measurement"[48].
9. **Monitor, track, identify gaps and adjust incentives:** The platform mentioned above not only helps with transparency, but will also help match incentives with farmer needs, assess sufficiency, and ensure that incentives address and work in favour of the broader EU Green Deal targets, as well as help address gaps at a member state level.



Examples of different collaboration models

Farmer Return on Investment: Unilever, Tikehau Capital and AXA regenerative agriculture impact fund (Equity investment collaboration)

Worldwide insurance and asset management company AXA, global consumer goods company Unilever, and global alternative asset management group Tikehau Capital, created a private equity impact fund dedicated to accelerating and scaling the regenerative agriculture transition. Together, they are investing in companies providing solutions to enable the transition of agriculture to regenerative practices, with the ambition to generate a positive impact on soil health and environmental resource. Their first transaction was with Biobest, a global leader in biological-control products in agriculture.

Sufficiency: Fractal Agriculture (Bringing in institutional investors)

US-based Fractal Agriculture is a farmland investment firm which co-invests with (US) farmers and provides discounts for approved regenerative agriculture practices. Fractal Agriculture provides a platform for institutional investors and drives returns by using their technology platform to best value land, pricing in critical economic and impact drivers such as climate change and regenerative agriculture in order to align incentives among investors. The firm helps drive systemic change in farmland management, aligning the interests of investors and farmers for a more sustainable future.

Suitability: PepsiCo and Growers Edge partnership (yield loss warranties)

This collaboration between PepsiCo and Growers Edge aims to enhance sustainability in the agricultural sector by providing farmers with financial tools designed to reduce the uncertainty and risks associated with crop production. Through customised sustainable crop plans, farmers receive guidance on best practices for growing crops in environmentally responsible ways, while also receiving financial protection against unexpected yield losses.

Transparency and accountability: Soil Association Exchange (Farmer access to funding opportunities)

UK based Soil Association Exchange helps farmers to assess, improve and monitor their sustainability performance. On top, the platform gives farmers information on the different financial opportunities available for farming more sustainably, including subsidies and natural capital markets (e.g., carbon). In its 'Exchange Market' pilot, Soil Association Exchange partners with 12 industry partners to assess nearly 240,000 hectares of UK farmland in order to develop a clear roadmap for improving soil health, reducing carbon emissions, and supporting biodiversity including making payments to farmers over sustained periods to support them in transitioning to more sustainable practices.

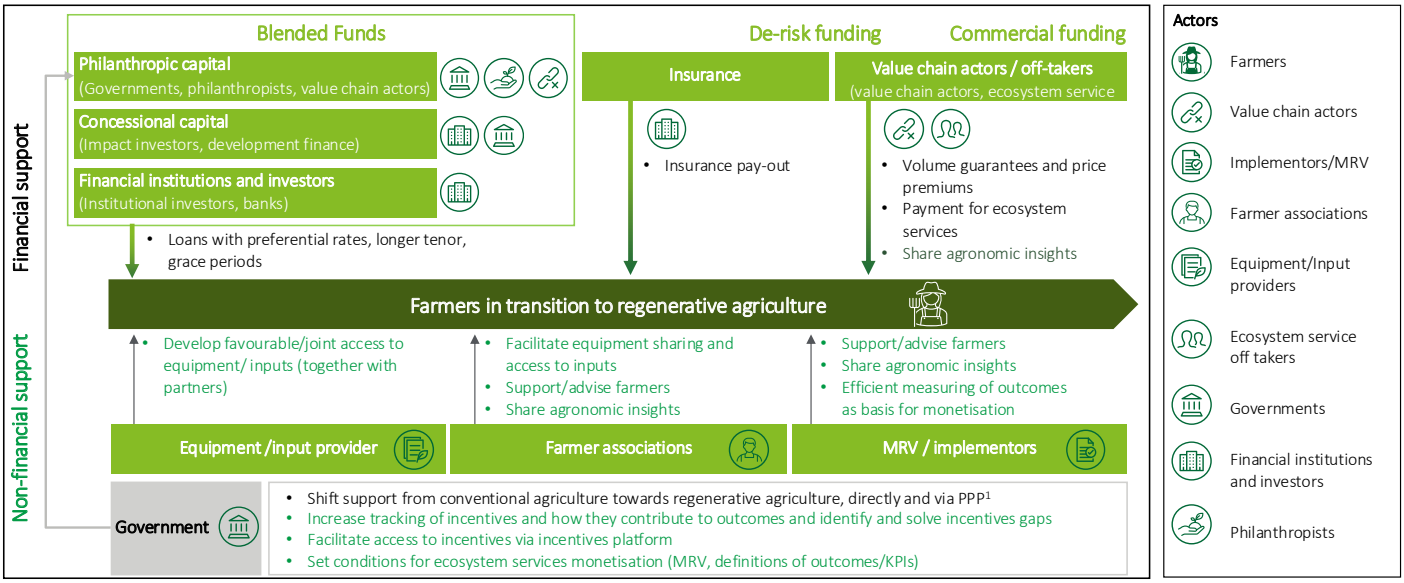
Public-private investment and cross value chain collaboration: EIT Regenerative Innovation Portfolio

The EIT Regenerative Innovation Portfolio, executed by EIT Food and Foodvalley NL and co-funded by off-takers, seeks to create a replicable model across Europe by focusing on selected regenerative landscape projects across Europe. Their first project, Navarro 360°, will invest €3M over three years to support 80 farmers in northern Spain, to implement regenerative agriculture practices in their crop rotation systems by coordinating the value chain actors to address specific regional transition barriers, helping to make farmers aware of incentives that are available to them, and building alignment around place-based KPIs and outcomes reporting.

Example of cross-value chain collaboration

In the model below, different stakeholders play different roles to ensure a viable economic model for farmers throughout the transition to regenerative agriculture practices. For the coming years, philanthropic and concessional capital is required to boost engagement of commercial investors, before the transitions at the farms get more informed, monetisation of ecosystems is becoming more standardised, and the farmer business cases are getting less risky. Public investment (e.g., via national banks/world bank) plays an important role here to de-risk the investment case for new investors via public-private-partnerships. In addition to that, yield or output insurances, volume guarantees, and price premiums by off-takers will be required for the first few years of the transition at farms. Equipment providers as well as farmer associations can play a major role in facilitating shared investments. Implementers are not only crucial in helping individual farmers transition successfully, but can also contribute to faster break-even periods for all farmers by sharing farm data insights to accelerate the learnings across crops, countries, practices, and implementers.

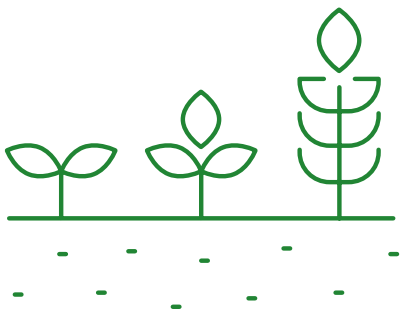
Cross-value chain collaboration to support farmer economic model



Notes: 1. Public-private partnerships → Flow of funds

Figure 14: Illustrative model of cross value chain collaboration to support farmer economic model

While there are steps to take for each player along the value chain, increased collaboration and transparency serves as foundation and as a multiplier of success. Treating regenerative agriculture as a competitive opportunity is short-sightedness – the transition to regenerative agriculture practices contains enough benefits for all players along the value chain.



Appendix

Appendix A

Crops and country scope

	France	Germany	Greece	Italy	Poland	Romania	Serbia	Spain	Turkey	UK
Barley										■
Corn						■	■	■	■	
Cotton			■					■	■	
Oats										■
Onion	■									
Potatoes	■				■	■		■		■
Rapeseed oil	■				■	■	■	■	■	■
Rice				■						
Sugar beet	■				■				■	
Sunflower	■									
Tomatoes				■				■		
Wheat	■						■			■

Appendix B

Non exhaustive list of public incentives identified. Private-public incentives are indicated with an asterix in the programme name column

#	Incentive type	Source type	Source name	Programme name	Applicable Region	Crop applicability	Practice supported	Funding limits, in €	Payment amount	Payment units	Stack-ability
1	Ecosystem service payments	Local authority	Administration	Echoschems	Poland	All	-	-	-	-	-
2	Ecosystem service payments	Food Company/ Local Authority	Purina, Pepsi, Diageo, Cereal Partners UK, Anglian Water, Affinity Water, Yorkshire Water, British Sugar, Cargill, North West Hants Council, Yorkshire,	LENs (UK)*	UK	Wheat	All	-	-	-	Yes
3	Ecosystem service payments	Food Company/ Local Authority	Purina, Pepsi, Diageo, Cereal Partners UK, Anglian Water, Affinity Water, Yorkshire Water, British Sugar, Cargill, North West Hants Council, Yorkshire,	LENs (UK)*	UK	Rapeseed oil	All	-	-	-	Yes

#	Incentive type	Source type	Source name	Programme name	Applicable Region	Crop applicability	Practice supported	Funding limits, in €	Payment amount	Payment units	Stack-ability
4	Ecosystem service payments	Food Company/ Local Authority	Purina, Pepsi, Diageo, Cereal Partners UK, Anglian Water, Affinity Water, Yorkshire Water, British Sugar, Cargill, North West Hants Council, Yorkshire,	LENs (UK)*	UK	Sugar beet	All	-	-	-	Yes
5	Loans and investment support	Country	France	Multiple	France	All	-	-	-	-	Yes
6	Loans and investment support	Country	France	Territorial Projects	France	All	-	-	40% - 50%	%	Yes
7	Loans and investment support	Country	France	Storage and spreading equipment with lower emissions	France	All	-	-	40	%	Yes
8	Loans and investment support	Country	France	Support for investments in innovative orchard agricultural equipment solutions - France 2030 - Fruit and Vegetable Sector Sovereignty Plan	France	Onion	All	-	40	%	Yes
9	Loans and investment support	Country	France	Support for investments in innovative orchard agricultural equipment solutions - France 2030 - Fruit and Vegetable Sector Sovereignty Plan	France	Potato	All	-	40	%	Yes
10	Loans and investment support	Country	France	Support for investments in innovative orchard agricultural equipment solutions - France 2030 - Fruit and Vegetable Sector Sovereignty Plan	France	Sugar beet	All	-	40	%	Yes
11	Loans and investment support	Country	Greece	Support for investments in the processing/ marketing and/ or development of agricultural products under the Strategic Plan of the Common Agricultural Policy (CAP) of Greece 2023–2027-Ministry of Rural Development and Food	Greece	Cotton	-	5,000,000	65	%	No
12	Loans and investment support	Country	Greece	Installation of young farmers- Ministry of Rural Development and Food	Greece	Cotton	-	42,000	42,000	€/ investment	Yes
13	Loans and investment support	Country	Greece	"Agri-food - Primary Production and Processing of Agricultural Products - Fisheries - Aquaculture" scheme under Law 4887/2022	Greece	Cotton	-	3,500,000	-	-	No

#	Incentive type	Source type	Source name	Programme name	Applicable Region	Crop applicability	Practice supported	Funding limits, in €	Payment amount	Payment units	Stack-ability
14	Loans and investment support	Country	Poland	Polish Strategic Plan for CAP	Poland	All	-	17,000,000,000	-	-	No
15	Loans and investment support	EU	Romania - APIA	DR 13 - Purchase of agricultural machinery for the plant sector	Romania	Rapeseed oil	-	100,000,000	300,000	€/ investment	Yes
16	Loans and investment support	EU	Romania - APIA	DR 13 - Purchase of agricultural machinery for the plant sector	Romania	Potato	-	100,000,000	300,000	€/ investment	Yes
17	Loans and investment support	EU	Romania - APIA	DR 13 - Purchase of agricultural machinery for the plant sector	Romania	Corn	-	100,000,000	300,000	€/ investment	Yes
18	Loans and investment support	EU	Romania - APIA	DR 16 Investments in vegetable and/or potato fields	Romania	Potato	-	151,380,000	2,000,000	€/ investment	Yes
19	Loans and investment support	Country	Turkey	Good agricultural practices (GAP) programme	Turkey	All	All	-	-	-	-
20	Loans and investment support	EU	European Agriculture Fund for Rural Development (EAFRD)	European Agriculture Fund for Rural Development (EAFRD)	EU	Most likely all	-	95,510,000,000	-	-	Yes
21	Loans and investment support	EU	European Agriculture Guarantee Fund (EAGF)	European Agriculture Guarantee Fund (EAGF)	EU	Most likely all	-	291,100,000,000	-	-	No
22	Loans and investment support	Bank	European Bank for Reconstruction and Development (EBRD)	European Bank for Reconstruction and Development (EBRD)	Poland	Most likely all	-	500,000	-	-	Yes
23	Loans and investment support	EU	Horizon Europe	Horizon Europe	EU	Most likely all	-	93,500,000,000	-	-	Yes
24	Loans and investment support	EU	NextGenerationEU	NextGenerationEU	EU	Most likely all	-	806,900,000,000	-	-	-
25	Loans and investment support	Impact Fund	Agri 3 Fund	Agri 3 Fund*	All	Most likely all	-	1,000,000,000	1,500,000	€/ investment	Yes
26	Other	Food processor	Farm Frites	Regenerative Agriculture	Poland	Potato	-	-	-	-	-
27	Other	Local authority	Regional administrations	Especial incentives for various practices	Spain	All	All	-	-	-	-
28	Recurring payment support	Local authority	Germany - Bavarian State Ministry of Food, Agriculture, Forestry and Tourism	Promotion of organic farming	Germany	All	All	-	350	€/ha	-
29	Recurring payment support	Local authority	Germany - Hessian Ministry of Agriculture and Environment	Promotion of organic farming	Germany	All	All	-	423	€/ha	-
30	Recurring payment support	Local authority	Germany - Lower Saxony Ministry of Food, Agriculture and Consumer Protection	Promotion of organic farming	Germany	All	All	-	548	€/ha	-
31	Recurring payment support	EU	Romania - APIA	DR-02 Agro-environment and climate on arable land	Romania	Rapeseed oil	Reduced tillage	-	279	€/ha	Yes
32	Recurring payment support	EU	Romania - APIA	DR-02 Agro-environment and climate on arable land	Romania	Potato	Reduced tillage	-	279	€/ha	Yes

#	Incentive type	Source type	Source name	Programme name	Applicable Region	Crop applicability	Practice supported	Funding limits, in €	Payment amount	Payment units	Stack-ability
33	Recurring payment support	EU	Romania - APIA	DR-02 Agro-environment and climate on arable land	Romania	Corn	Reduced tillage	-	279	€/ha	Yes
34	Recurring payment support	EU	Romania - APIA	DR-02 Agro-environment and climate on arable land	Romania	Rapeseed oil	Organic fertilisation	-	279	€/ha	Yes
35	Recurring payment support	EU	Romania - APIA	DR-02 Agro-environment and climate on arable land	Romania	Potato	Organic fertilisation	-	279	€/ha	Yes
36	Recurring payment support	EU	Romania - APIA	DR-02 Agro-environment and climate on arable land	Romania	Corn	Organic fertilisation	-	279	€/ha	Yes
37	Recurring payment support	EU	EU	DR-04 - Organic farming - conversion	Romania	Rapeseed oil	All	162,600,000	293	€/ha	Yes
38	Recurring payment support	EU	EU	DR-04 - Organic farming - conversion	Romania	Potato	All	162,600,000	500	€/ha	Yes
39	Recurring payment support	EU	EU	DR-04 - Organic farming - conversion	Romania	Corn	All	162,600,000	293	€/ha	Yes
40	Recurring payment support	EU	EU	DR-05 Organic farming maintaining certification.	Romania	Rapeseed oil	All	226,520,000	218	€/ha	Yes
41	Recurring payment support	EU	EU	DR-05 Organic farming maintaining certification.	Romania	Potato	All	226,520,000	431	€/ha	Yes
42	Recurring payment support	EU	EU	DR-05 Organic farming maintaining certification.	Romania	Corn	All	226,520,000	218	€/ha	Yes
43	Recurring payment support	Country	Spain	Various fundings	Spain	All	All	-	-	-	Yes
44	Recurring payment support	Country	England	Sustainable farming incentive (SFI) - Department for Environment, Food & Rural Affairs	UK	All	-	2,400,000,000	55	£/ha	Yes
45	Recurring payment support	Country	England	Sustainable farming incentive (SFI) - Department for Environment, Food & Rural Affairs	UK	All	Cover crops	2,400,000,000	129	£/ha	Yes
46	Recurring payment support	Country	England	Sustainable farming incentive (SFI) - Department for Environment, Food & Rural Affairs	UK	All	Reduced tillage	2,400,000,000	73	£/ha	Yes
47	Recurring payment support	Country	England	Sustainable farming incentive (SFI) - Department for Environment, Food & Rural Affairs	UK	All	Creating biodiversity	2,400,000,000	798	£/ha	Yes
48	Recurring payment support	Local authority	Ministry of agriculture	Ecoschemes P4, P6 and P7	Spain	All	Cover crops	-	162	€/ha	-
49	Recurring payment support	Local authority	Ministry of agriculture	Ecoschemes P4, P6 and P7	Spain	All	Reduced tillage	-	151	€/ha	-
50	Recurring payment support	Impact Fund	Managed by Livelihoods	Managed by Livelihoods*	France	Multiple	All	7,500	80	€/ha	Yes / No

List of private incentives identified - non exhaustive

#	Incentive type	Source type	Applicable Region	Practice supported	Funding limits, in €	Payment amount	Payment units	Stackability
1	Ecosystem service payments	Food and beverage company	UK	Various/ multiple	-	-	-	Yes
2	Ecosystem service payments	Food and beverage company	UK	All	-	-	-	Yes
3	Ecosystem service payments	Association	Poland	-	-	-	-	-
4	Ecosystem service payments	Trading company	UK	All	-	-	-	Yes
5	Ecosystem service payments	Trading company	UK	All	-	-	-	Yes
6	Ecosystem service payments	Trading company	UK	All	-	-	-	Yes
7	Ecosystem service payments	Trading company	UK	All	-	-	-	Yes
8	Ecosystem service payments	Implementer	France	All	4,000,000	28	€/ton	No
9	Ecosystem service payments	Food and beverage company	Poland	All	-	-	-	Yes
10	Ecosystem service payments	Implementer	UK	All	4,000,000	28	€/ton	No
11	Loans and investment support	Impact Fund	EU	-	-	-	-	No
12	Loans and investment support	Bank	EU	-	-	-	-	-
13	Loans and investment support	Impact Fund	Spain	-	-	-	-	Yes
14	Loans and investment support	Impact Fund	Germany	-	-	-	-	Yes
15	Loans and investment support	Impact Fund	Romania	-	-	-	-	Yes
16	Loans and investment support	Impact Fund	France	-	-	-	-	Yes
17	Loans and investment support	Impact Fund	All	-	-	-	-	-
18	Loans and investment support	Impact Fund	All	-	12,400,000,000	-	-	No
19	Loans and investment support	Bank	UK	All	-	-	-	No
20	Loans and investment support	Impact investor	Multiple	-	500,000	100.000 to 500.000	€/project	No
21	Loans and investment support	Food and beverage company	UK	All	-	-	£/investment	-
22	Loans and investment support	Food and beverage company	Italy	Irrigation efficiency	-	-	-	-
23	Loans and investment support	Investor	All	-	-	-	-	-
24	Loans and investment support	Impact investor	Multiple	-	500,000	100.000 to 500.000	€/project	No
25	Loans and investment support	Impact investor	Multiple	-	500,000	100.000 to 500.000	€/project	No
26	Loans and investment support	Food and beverage company	Italy	All	-	-	-	Yes
27	Loans and investment support	Impact investor	UK	-	100,000	-	-	-
28	Loans and investment support	Impact investor	Multiple	-	500,000	100.000 to 500.000	€/project	No
29	Loans and investment support	Impact investor	Multiple	-	500,000	100.000 to 500.000	€/project	No
30	Other	Investor	UK	-	50,000,000	-	-	-
31	Recurring payment support	Food and beverage company	EU	All	-	-	€/ha	-

#	Incentive type	Source type	Applicable Region	Practice supported	Funding limits, in €	Payment amount	Payment units	Stackability
32	Recurring payment support	Food and beverage company	EU	All	-	-	€/ha	-
33	Recurring payment support	Food and beverage company	EU	All	-	-	€/ha	-
34	Recurring payment support	Food and beverage company	EU	All	-	-	€/ha	-
35	Recurring payment support	Food and beverage company	EU	All	-	-	€/ha	-
36	Recurring payment support	Food and beverage company	EU	All	-	-	€/ha	-
37	Recurring payment support	Food and beverage company	EU	All	-	-	€/ha	-
38	Recurring payment support	Food and beverage company	EU	All	-	-	€/ha	-
39	Recurring payment support	Food and beverage company	EU	All	-	-	€/ha	-
40	Recurring payment support	Food and beverage company	EU	All	-	-	€/ha	-
41	Recurring payment support	Food and beverage company	Greece	Cover crops	-	-	€/ha	-
42	Recurring payment support	Food and beverage company	Greece	Organic fertilisation	-	-	€/ha	-
43	Recurring payment support	Food and beverage company	Multiple	All	-	110 to 140	€/ha	NA
44	Recurring payment support	High-End Retailer	Multiple	All	-	110 to 140	€/ha	NA
45	Recurring payment support	Food and beverage company	Multiple	All	-	110 to 140	€/ha	NA
46	Recurring payment support	Food and beverage company	Poland	All	-	70	€/ha	Yes
47	Recurring payment support	Implementer	UK	Reduced tillage	-	80	£/ha	Yes
48	Recurring payment support	Implementer	UK	Reduced tillage	-	80	£/ha	Yes
49	Recurring payment support	Implementer	UK	Cover crops	-	80	£/ha	Yes
50	Recurring payment support	Implementer	UK	Cover crops	-	80	£/ha	Yes
51	Recurring payment support	Food and beverage company	UK	All	4,100	120	£/ha	Yes
52	Recurring payment support	Multiple authorities	UK	Cover crops	-	125	£/ha	Yes / No
53	Supply chain agreements	Food and beverage company	Italy	Organic fertilisation	-	-	-	-
54	Supply chain agreements	Food and beverage company	Italy	Creating biodiversity	-	-	-	-
55	Supply chain agreements	Food and beverage company	Italy	Crop rotation	-	-	-	-
56	Supply chain agreements	Food and beverage company	EU	All	-	35	€/ton	-
57	Supply chain agreements	Food and beverage company	France	All	-	5 to 28	€/ton	Yes

#	Incentive type	Source type	Applicable Region	Practice supported	Funding limits, in €	Payment amount	Payment units	Stackability
58	Supply chain agreements	Food and beverage company	Italy	All	-	-	-	-
59	Supply chain agreements	Food and beverage company	UK	Creating biodiversity	-	-	-	No
60	Supply chain agreements	Food and beverage company	UK	Creating biodiversity	-	-	-	No
61	Supply chain agreements	Food and beverage company	UK	Creating biodiversity	-	-	-	No
62	Supply chain agreements	Food and beverage company	Italy	Creating biodiversity	-	-	-	-
63	Supply chain agreements	Food and beverage company	France	All	-	20	€/ton	Yes
64	Supply chain agreements	Food and beverage company	France	All	-	25	€/ton	Yes
65	Supply chain agreements	Food and beverage company	Italy	Creating biodiversity	-	-	-	-
66	Supply chain agreements	Food and beverage company	Italy	Crop rotation	-	-	-	-
67	Supply chain agreements	Food and beverage company	Italy	Creating biodiversity	-	-	-	-
68	Supply chain agreements	Food and beverage company	Italy	Irrigation efficiency	-	-	-	-
69	Supply chain agreements	Food and beverage company	Italy	Organic fertilisation	-	-	-	-
70	Supply chain agreements	Food and beverage company	Multiple	All	-	110 to 140	-	-
71	Supply chain agreements	Food and beverage company	Poland	All	-	12	€/ton	-
72	Supply chain agreements	Food and beverage company	Italy	Creating biodiversity	-	-	-	-
73	Supply chain agreements	Food and beverage company	UK	All	Until meeting tonnage target per crop	10	£/ton	Yes
74	Supply chain agreements	Food and beverage company	UK	All	-	-	-	No
75	Supply chain agreements	Food and beverage company	UK	All	-	-	-	No
76	Supply chain agreements	Food and beverage company	UK	All	-	-	-	No
77	Supply chain agreements	Food and beverage company	Italy	Irrigation efficiency	-	-	-	-
78	Supply chain agreements	Food and beverage company	UK	All	-	18	€/ton	Yes

Appendix C

Crop yield, mature and early stage yield impact, and crop prices used for estimation

Country	Crop	Average yield - tons/ha	Early stage Impact - relative to avg yield	Mature stage Impact - relative to avg yield	Price - €/ton
France	Sugar Beet	85,0	-15%	10%	50,0
France	Onion	40,0	-10%	9%	300,0
France	Potato	38,1	-15%	9%	295,0
France	Wheat	7,0	-15%	10%	241,0
France	Rapeseed Oil	3,7	-5%	15%	542,0
France	Sunflower	2,1	-10%	15%	612,0
Germany	Wheat	7,6	-15%	10%	200,0
Germany	Rapeseed Oil	4,0	-7%	7%	500,0
Greece	Cotton	1,2	-8%	7%	550,0
Italy	Tomatoes	62,9	-5%	13%	90,0
Italy	Rice	5,7	-7%	7%	633,8
Poland	Sugar Beet	68,0	-10%	7%	46,5
Poland	Potato	30,8	-18%	9%	349,0
Poland	Rapeseed Oil	3,2	-7%	6%	504,5
Romania	Potato	16,7	-15%	9%	293,0
Romania	Corn	4,2	-7%	6%	183,0
Romania	Rapeseed Oil	2,6	-7%	6%	488,0
Serbia	Corn	6,8	-7%	6%	170,0
Serbia	Wheat	4,4	-12%	6%	210,0
Serbia	Rapeseed Oil	2,4	-7%	6%	430,0
Spain	Tomatoes	80,9	-5%	13%	150,0
Spain	Potato	31,3	-18%	9%	433,5
Spain	Corn	11,4	-12%	7%	180,0
Spain	Rapeseed Oil	2,0	-7%	7%	385,0
Spain	Cotton	0,8	-8%	7%	400,0
Turkey	Sugar Beet	62,0	-10%	7%	65,0
Turkey	Corn	12,2	-9%	7%	155,0
Turkey	Rapeseed Oil	3,5	-7%	7%	452,0
Turkey	Cotton	1,7	-8%	7%	680,0
UK	Potato	37,9	-10%	15%	397,0
UK	Wheat	8,6	-10%	10%	215,0
UK	Barley	6,0	-2%	15%	178,0
UK	Oats	5,2	-2%	15%	210,0
UK	Rapeseed Oil	3,2	-2%	15%	400,0

Average farm sizes

Country	Average arable farm size (ha)
France	55
Spain	25
UK	65
Romania	5
Turkey	6
Poland	8
Serbia	5
Germany	60
Italy	7
Greece	10

Table 4: Based on data accessed via Eurostat. See main farm land use by NUTS 2 region [ef_lus_main__custom_14728009]

Note on assumptions

The model used to estimate the Net Profit Impact is based on five key variables: Investment Costs, Ongoing Costs, Cost Savings, Yield Impact, and Incentives. These variables apply to six regenerative agriculture practices, twelve crops, and ten countries. Given that each component incorporates multiple data points and validated assumptions, the complete list of data and assumptions is extensive and therefore not included in this appendix. Readers seeking detailed information on the data points or assumptions are welcome to contact the Deloitte authors.

Appendix D

Notes for future research (non-exhaustive)

The research and analysis presented in this report are based on a mathematical model developed for regenerative agriculture, covering 34 crop-country combinations (as shown in Appendix A) and incorporating six regenerative agriculture practices. The model was developed and validated using inputs from desk research and experts. Like with any study or research, there is scope for improvement, and hence a few notes (not exhaustive) on how these improvements can be made are presented below.

Overall, the model assumes a level of predictability and normality in crop production considering average farm sizes and costs for various inputs at a country or crop level. However, in reality, financial impacts vary from farm to farm, heavily influenced by farming capability, efficiency, access to technology, availability of machinery, crop yields, price agreements, and local conditions such as soil, climate, pests, pollinators, and unforeseen weather events. Therefore, the financial impacts presented in this study should not be treated as precise figures, as they will not apply to every farm. To understand farm-specific impacts, financial modelling should be conducted at the farm level based on conditions unique to each farm. Alternatively, if a study is conducted at the country level, variations across farms can be accounted for based on farm archetypes (e.g., small, medium, large, extra-large farms) applicable to that country.

With regards to regenerative agriculture practices, this research focused on Cover Crops, Reduced Tillage, Crop Rotation, Organic Fertilisation, Irrigation Efficiency, and Enhancing Biodiversity. To enhance the analysis further, additional regenerative agriculture practices related to mixed and livestock farming could also be considered in future research.

Further improvements can also be made at the practice level. For Cover Crops, cost savings or proceeds from sales or fodder use can be factored in. For Reduced Tillage, fuel and time savings can be adjusted based on soil type (e.g., soil hardness), as well as maintenance costs based on machinery age and quality. For Crop Rotation, the overall profit impact varies depending on the rotation scheme. So different schemes can be explored.

For Organic Fertilisation, costs and cost savings depend on bio input accessibility. Mixed farms or those with free access to manure or other bio inputs benefit more, whereas farms without access may find this practice inapplicable. Such nuances should be considered when modelling at the farm level, incorporating geospatial data to indicate farm locations and their access to manure or other bio input sources (e.g., digestate).

Irrigation Efficiency in this analysis is only applied to root crops and tomatoes in a full investment scenario. However, in reality, it depends on rainfall, soil moisture levels, farm location, and unforeseen events like droughts. Even farms growing crops with low water requirements may also benefit from drip irrigation, making farm-specific analysis necessary.

Finally, for Enhancing Biodiversity, only three practices, flowering strips, hedges, and trees were considered. However, other practices that also support on-farm biodiversity can be incorporated into future studies.

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