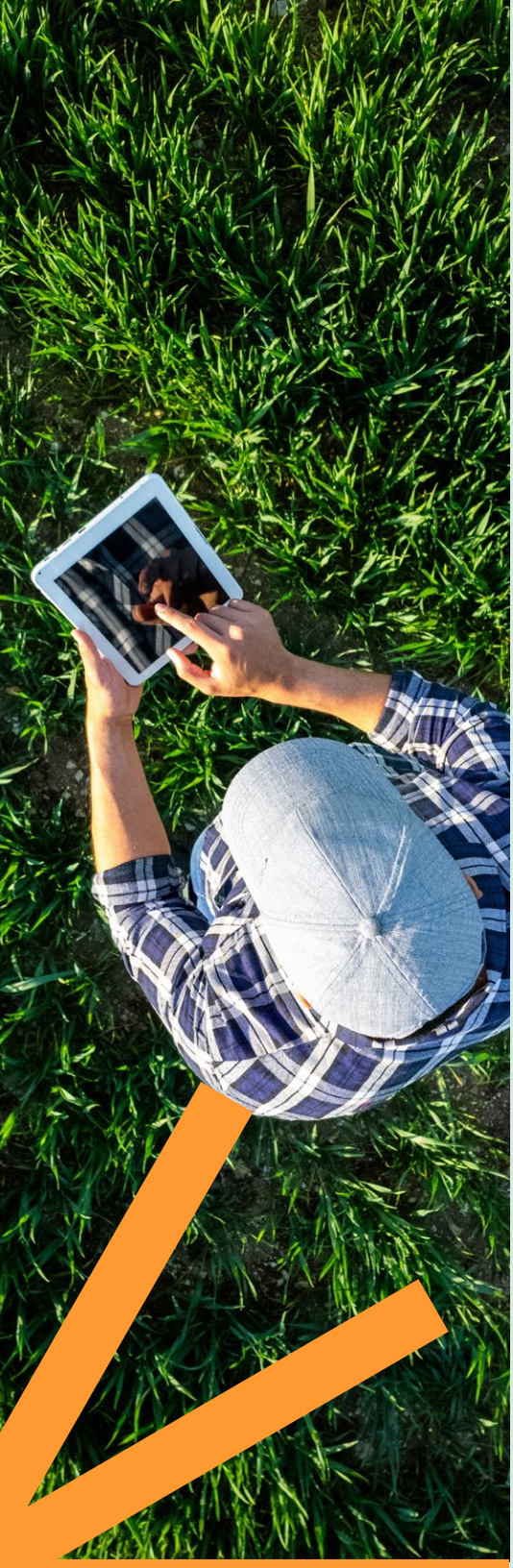
Ideas for action



DECEMBER 2025

Promoting climate transformation in the agri-food chain

Recommendations from multi-stakeholder dialogue

alinnea

alinnea has been an active player in Spain's climate action ecosystem since mid-2024. It is part of IE University and is supported by the European Climate Foundation.

alinnea is an entity specialized in comparative analysis and in identifying solutions for the design and articulation of climate action measures that require the involvement of multiple sectors—from the public and private spheres as well as civil society.

Working under a multi-stakeholder dialogue-research-action framework, it seeks to provide solutions to barriers to the advancement of climate action in a manner that is socially just, economically prosperous, and positive for the environment and the protection of biodiversity. Between June and November 2025, **alinnea** conducted interviews and working sessions with more than thirty strategic actors—from the public and private sectors, multilateral organizations, and academia—with the aim of promoting the climate transformation of the agri-food chain. This participatory process enabled the collection of valuable analyses and practical insights.

Building on these dialogues, this report presents a detailed assessment of the sector's main challenges and offers a set of recommendations to advance its climate transformation.

alinnea.org

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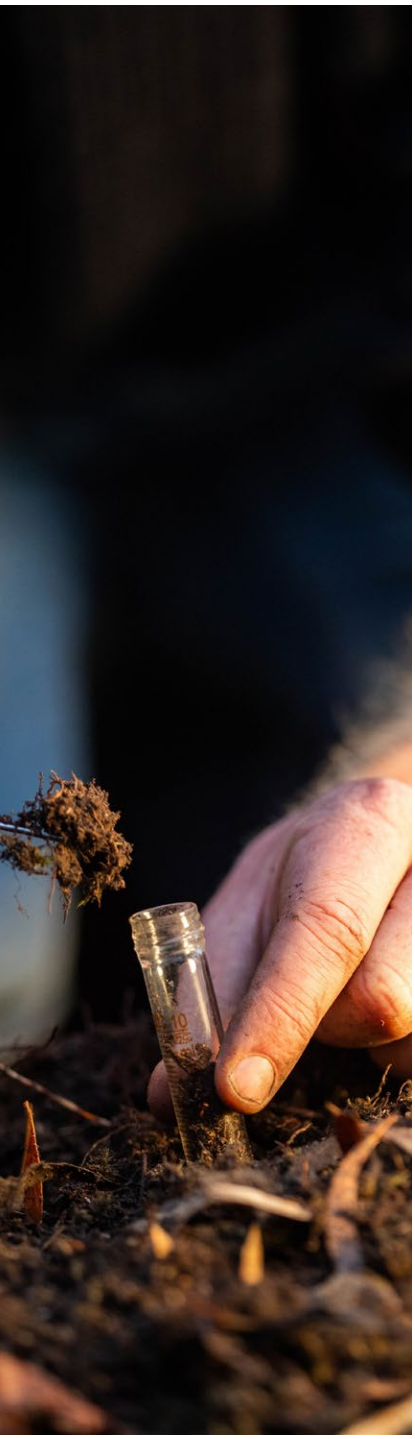
Executive summary 01



Spain is facing a decisive moment in the climate transformation of its agri-food chain. Despite having a highly important productive sector—with a strong cooperative presence and a solid scientific ecosystem—the country is making uneven progress in integrating low-carbon practices, agricultural digitization, and sustainable financing mechanisms. The European context—marked by Vision 2040, the new Carbon Removal Certification Framework (CRCF), and the renewal of the CAP—is redefining the environmental and competitive requirements of the agri-food system, placing Spain in a position where it must adapt its production model to a scenario in which sustainability, resilience, and profitability must advance simultaneously.

Although the country has significant capabilities—such as pioneering *carbon farming* projects, leadership in water digitization, and a cooperative network with high aggregation potential—structural barriers remain: regulatory complexity, lack of standardization in certification methodologies, difficulties in accessing financing, inequality in technical capacities in the production sector, and a significant gap between European climate requirements and the operational reality of small and medium-sized farms.

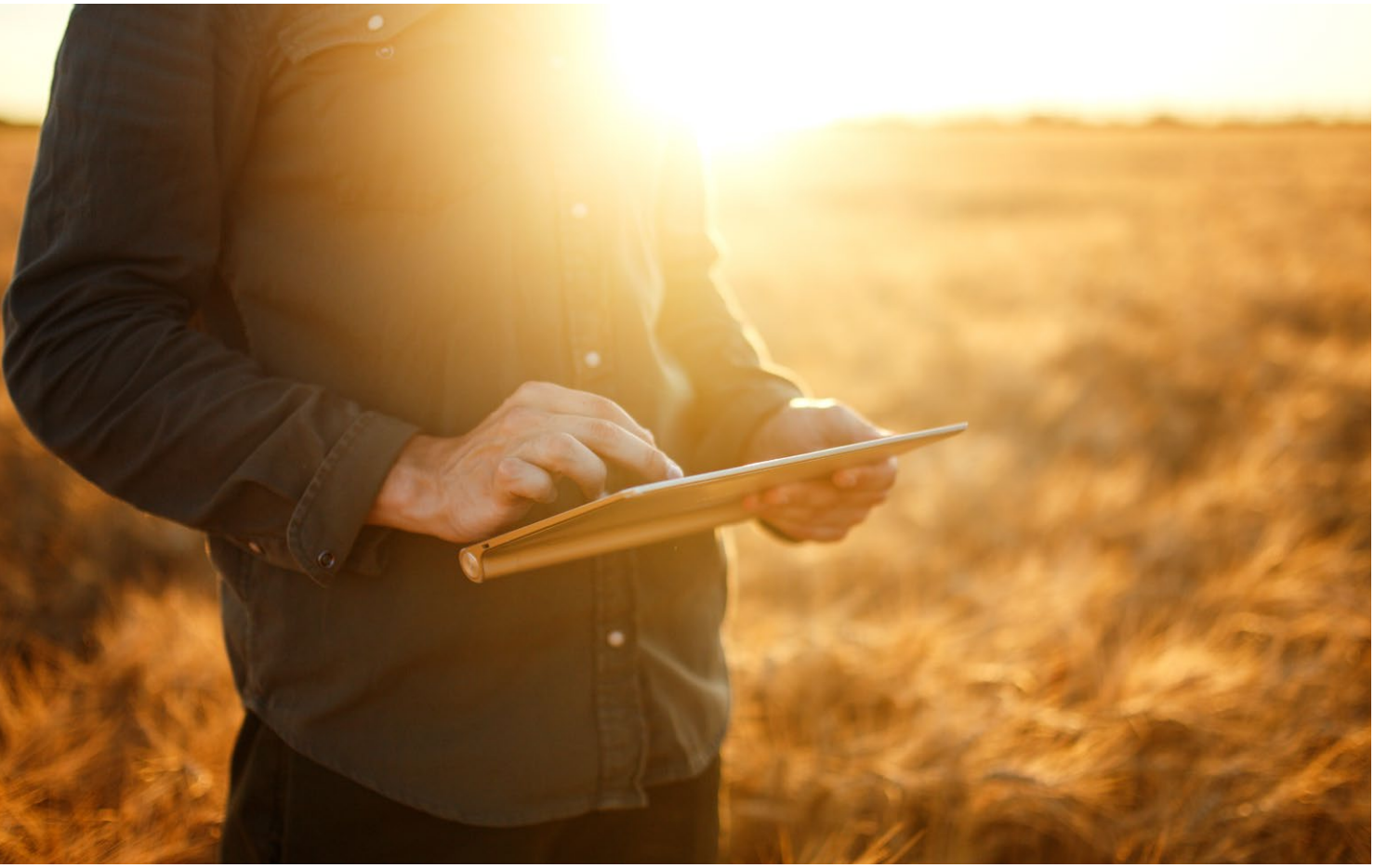
The report highlights that Spain is facing a strategic opportunity. The convergence of the CRCF, the CAP 2023–2027, the LIFE and Horizon Europe programs, and the Agri-Food Strategic Project for Economic Recovery and Transformation (PERTE) makes it possible to articulate a competitive agri-food model based on technological innovation, sustainable soil management, digitization, and public-private partnerships.

However, this window of opportunity coexists with significant weaknesses. *Carbon farming* faces conceptual obstacles—additionality and baseline—and high technical complexity in monitoring and verification systems. Corporate climate action is advancing, but it is limited by regulatory instability, the difficulty of scaling up pilot projects, and the lack of uniform metrics that would allow for comparing impacts and facilitating access to green financing. Additionally, structural disconnect between sustainability and the end consumer reduces the economic return on sustainable practices and prevents the consolidation of low-carbon differential markets.

Financing is emerging as one of the critical issues. Although relevant instruments exist—CAP, EAFRD, NextGenerationEU, and ICO Green Lines—access to them is perceived as complex and poorly adapted to the scale of farms. Voluntary carbon markets offer significant potential, but lack of transparency, training price volatility, and competition from international standards limit their ability to generate stable income. The sector therefore needs specific financial mechanisms, ongoing technical advice, and products adapted to different models (intensive, extensive, and mixed), preventing the climate transition from exacerbating territorial or productive inequalities.

The report, prepared by **alinnea** through a multi-stakeholder dialogue process with more than thirty experts—from the public and private sectors, academia, financial institutions, and agricultural organization—identifies the main obstacles hindering the climate transition of the Spanish agri-food sector and formulates specific recommendations to overcome them. Among the areas analyzed are

(i) the deployment of *carbon farming* and the need to clarify concepts and methodologies;
(ii) the integration of climate action into business strategies;
(iii) the strengthening of climate finance mechanisms; and
(iv) digitalization as a technical infrastructure for sustainability.



The diagnosis identifies cross-cutting challenges: the absence of a common conceptual and methodological framework; the technical complexity and high costs of MRV systems; difficulties in scaling up regenerative practices and pilot projects; lack of coordination between administrations; barriers to access to financing; inequality in technical skills; weakness of agricultural advisory services; and disconnect between sustainability and consumer demand. These obstacles limit the sector's ability to move towards climate neutrality and capture emerging economic opportunities in Europe.

Given this scenario, the report proposes moving towards a common definition of regenerative agriculture and *carbon farming*; accessible and standardized measurement and certification methodologies; financial instruments adapted to productive diversity; continuity models that prevent projects from disappearing after their pilot phase; territorialized technical support networks; and alliances between producers, industry, and distribution to consolidate low-carbon value chains. It also highlights the importance of strengthening the link between sustainability and the end consumer through traceability and good communication.

The climate transformation of the agri-food system represents a historic opportunity to modernize the Spanish countryside, increase its resilience, and ensure the social and economic viability of rural areas.

Achieving the EU's climate goals will require a coordinated strategy that combines clear governance, technological innovation, adequate financing, and territorial justice. Only a planned, inclusive, and impact-oriented transition will enable Spain not only to adapt to the new European context but also to lead it from its own agroecological and productive model.

Introduction 02

The report provides an analysis of the current situation of Spain's agri-food chain, aiming to identify the main challenges that hinder the sector's development and its role in the transition to a more sustainable production and climate model. Based on this, the report proposes a series of concrete measures responding to these challenges, promoting technological innovation, diversification of business models, and access to climate finance mechanisms that strengthen the sector's resilience and competitiveness.

We would like to express our deep appreciation to the members of this working group (see Annex) for sharing their ideas, reflections, and time, as well as to the experts who generously contributed their knowledge through their presentations.

The findings, analyses, and conclusions presented in this report are based on available information—obtained from primary sources or other research cited in the report—considered accurate and reliable. It should be noted that none of the collaborating individuals or institutions can be held responsible for how the information contained in this document is interpreted, nor for any losses arising from decisions of any kind made based on this report. Likewise, acknowledgment or thanks extended to any organization does not imply its endorsement of the final text.

2.1. Objectives of the working group

The purpose of this report is to provide a comprehensive diagnosis of the agri-food system in Spain, identifying the main challenges, barriers, and opportunities that condition its transformation, and proposing specific measures to accelerate the transition to a low-carbon, resilient, and competitive production model.

Specifically, this document aims to:

- Analyze the current situation of the Spanish agri-food sector, with special attention to primary production, the processing industry, and distribution, identifying the impacts of climate change on its productivity, sustainability, and food security.
- Evaluate the regulatory framework and public policies that affect the sector's climate transition, including the Common Agricultural Policy (CAP), European funds, and national financing and support instruments.
- Map the key players in the agri-food ecosystem, including producers, cooperatives, industry, distribution, financial institutions, research centers, and public administrations, to understand their role in the ecological transition.
- Examine the regional distribution of production and the main agro-industrial clusters, identifying the areas with the greatest climate vulnerability and potential for the adoption of sustainable practices.
- Propose effective incentive structures that favor green investment and the adoption of sustainable business models, including payment schemes for ecosystem services, tax credits, and public-private co-financing mechanisms.
- Explore the innovation, digitization, and technology adoption capabilities of the Spanish agri-food sector in the European and international context, with a special focus on regenerative agriculture, digital traceability, and the circular economy.
- Assess the impact of the green transition on rural employment and skills development, identifying opportunities for job creation, professional training, and attracting talent to rural areas.

Taken together, these objectives mean that this report seeks to lay the foundations for a framework for action that will enable the Spanish agri-food system to move decisively towards decarbonization and modernization, in line with the commitments of **the European Green Deal** and the **CAP Strategic Plan 2023–2027**, contributing to the consolidation of a more sustainable, innovative, and resilient agriculture and food industry.

2.2. Methodology

This report is based on a comprehensive analysis of the current situation of the agri-food chain in Spain, combining a review of the literature with information obtained from the sessions of the working group *"Transforming Spain's agri-food chain: innovation, business models, and climate finance,"* coordinated by **alinnea**.

The methodological process included:

- **Documentary and bibliographic review**, incorporating official data from different bodies such as the Ministry of Agriculture, Fisheries and Food (MAPA), the National Statistics Institute (INE), the European Commission, etc. Reference reports produced by research centers and sectoral studies on sustainability, digitalization, and green financing in the agri-food sector were also consulted.

- **Multi-stakeholder workshops were held**, with the participation of representatives from agri-food companies, cooperatives, financial institutions, public administrations, agricultural organizations, universities, and research centers. The contributions of these stakeholders made it possible to verify the technical information and build a shared vision of the challenges and opportunities facing the sector in the face of climate change.

  Between June and November 2025, three multi-stakeholder dialogue sessions were held, followed by a final joint review of the content included in this final report prior to its publication. The sessions followed the Chatham House rules, ensuring an open and constructive exchange.

  Throughout the sessions, three complementary thematic areas were addressed:

  (i) **innovative financing instruments** applicable to the agri-food sector, with a special focus on the potential of *carbon farming* as a complementary income mechanism for rural areas;

  (ii) **the integration of climate action into business strategies**, including climate risk management and the adoption of regenerative agriculture practices; and

  (iii) **the financing and governance mechanisms** needed to scale up sustainable investments, exploring the role of the Common Agricultural Policy (CAP), European funds, and green banking in the transformation of the agri-food system.

- **Collection and systematization of qualitative evidence** derived from the discussions and conclusions of the three working group sessions:

  (i) innovative financing instruments and carbon farming;

  (ii) climate action in business strategies and risk management; and

  (iii) climate finance mechanisms and natural capital methodologies.

The first three sessions featured presentations from the following entities and topics, whom we thank for their time and work.

- **Soil as a climate ally How much carbon can agriculture sequester? Monitoring COS in Spain: design and initial results.**
  José Luis Gabriel Pérez, Researcher at the National Institute for Agricultural and Food Research and Technology.
- **Comprehensive support for livestock farmers.**
  Matilde Moro, Manager, ASOPROVAC.
- **European CREDIBLE project.**
  Tristano Bacchetti De Gregoris, Founder and Director of SAE Innova.
- **The role that cooperatives can play in carbon farming.**
  Juan Sagarna, Director of the Department of Sustainability, Quality, and Innovation at Cooperativas Agroalimentarias de España.
- **Getting out of the carbon tunnel: the role of microbiology in living soils.**
  Entretantos Foundation. Patricia Jiménez Amat, Associate Professor at IE University.
- **Soil: a living ecosystem essential for agricultural sustainability.**
  Carme Huguet, Associate Professor at IE University.
- **Carbon in soil.** Jorge Álvaro Fuentes CSIC, Coordinator of the Remedia Network.
- **Business strategy and risk management at Importaco.**
  Lucía Donnini and Claudia Esteban, Importaco.
- **Business strategy and risk management at Carrefour.**
  Isabel Villalón Varona, Head of PFT Groupe Carrefour.
- **Decarbonization initiative in the dairy sector.**
  Mari Carmen Pertíñez, 30 by 30 Alliance at Cooperativas Agroalimentarias de España.
- **Improving food together.** Amparo San José, Director of Network and Business Development for Southern Europe at EIT Food.
- **Presentation of the report "The Common Agricultural Policy 2028–2034: budgetary framework and policy options to accelerate the climate transformation of the agri-food chain."**
  Jabier Ruiz Mirazo, Expert in agricultural policy, Collaborator with alinnea.

The working group received technical support from Inmaculada Batalla, Research Fellow at BC3 Basque Centre for Climate Change, alinnea's collaborator, and Cristina Monge Lasierra, who facilitated the working sessions.

Diagnosis of the situation 03

Diagnosis of the situation 03

3.1. European carbon framework in agriculture

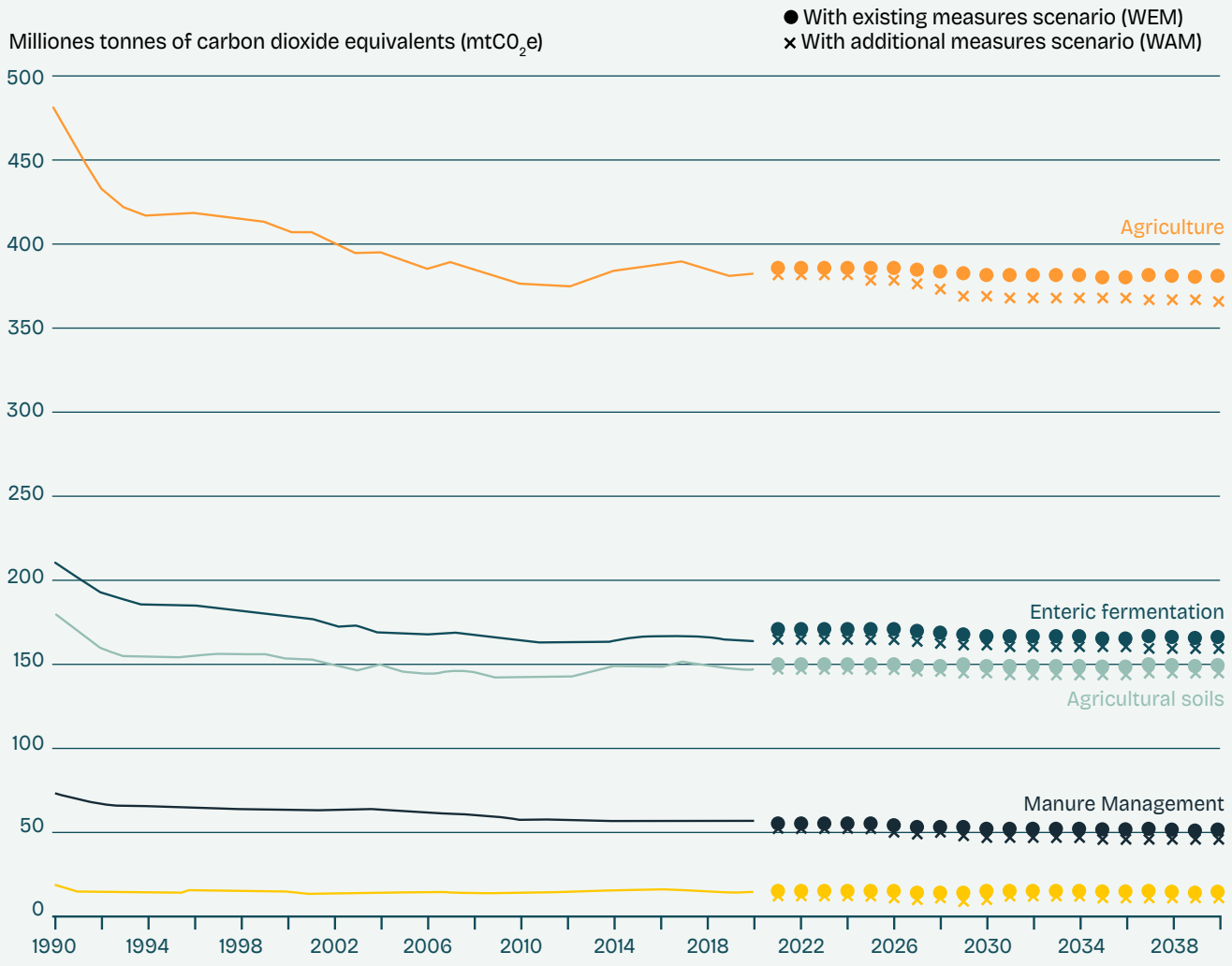
Agriculture is becoming an essential ecological pillar and a key economic instrument for achieving the Paris Agreements by integrating environmental sustainability, territorial resilience and competitive productivity.

The European Union's climate governance is based on a regulatory architecture that pursues climate neutrality by 2050, established in the European Climate Law and developed through the European Green Deal *(COM(2019) 640)*. This strategic framework sets the roadmap for the structural transformation of the European economy, combining sustainability, competitiveness, and territorial cohesion. In this context, the agricultural sector is no longer perceived solely as a net emitter of greenhouse gases but is increasingly positioning itself as an active agent of mitigation and a carbon sink. Agriculture is therefore becoming an essential ecological pillar and a key economic instrument for achieving the Paris Agreements by integrating environmental sustainability, territorial resilience, and competitive productivity.

Policies aimed at creating sustainable carbon cycles (*COM(2021) 800)* support this approach by encouraging a shift toward reducing reliance on fossil carbon, recycling biogenic carbon, and expanding natural CO_2 absorption. This includes carbon farming, understood as a strategy that combines mitigation, profitability, and environmental regeneration. This model transforms the relationship between agricultural and climate policy by recognizing soil and biomass as climate assets capable of generating economic value through certified carbon capture. As a result, the Common Agricultural Policy and associated financial instruments are increasingly aligned with European climate objectives, incorporating incentive mechanisms, payments for ecosystem services, and market schemes that reward sustainable land management.

The European Green Deal and its Farm to Fork Strategy set out this vision with ambitious targets for 2030: a 55-60% reduction in net emissions compared to 1990, a 20% reduction in fertilizer use, a 50% reduction in pesticide use, and 25% of agricultural land dedicated to organic production (European Commission, 2020). In line with these guidelines, Spain, through its Integrated National Energy and Climate Plan (PNIEC), sets a target of reducing total emissions by 23% for 2030 and climate neutrality by 2050, positioning the agricultural sector as a key player in emissions mitigation, strengthening carbon sinks, and transitioning to a more sustainable and resilient production model.

Figure 1.
Historical and projected evolution of emissions from the agricultural sector in the EU-27



Source: EEA, 2022

The **European agri-food system accounts** for approximately 11% of total greenhouse gas emissions (EEA, 2022). However, reductions in this sector have been slower than in others, remaining virtually stagnant since 2005. This behavior is due both to the sustained increase in demand for agricultural products and to the structural complexity of a value chain that ranges from production and processing to transport, consumption, and waste management. Reducing emissions in this area requires coordinated and systemic action to improve energy efficiency, optimize the use of inputs, promote the circular economy, and address indirect emissions from transport, energy use, inputs, and waste management.

The agri-food sector is emerging s a strategic component of the European climate transition, both for its mitigation potential ad its capacity to generate new economic opportunities.

Unlike other economic sectors where CO_2 is the dominant greenhouse gas, agriculture is characterized by a higher share of methane (43%)—mainly from enteric fermentation in livestock—and nitrous oxide (38%), which originates from fertilizer use and agricultural soils. CO_2 plays a smaller role in the sector and is largely linked to fossil fuel combustion and land-use change (EEA, 2022). In Spain, the subsectors with the highest emissions coincide with those with the highest energy consumption: feed production (40.22%), fruits and vegetables (26.17%), and oil (8.07%). This reflects the sector's strong dependence on energy- and fertilizer-intensive processes (FIAB & MAPA, 2022, p. 3).

Despite the progress made, total greenhouse gas emissions in the European Union have fallen by approximately one-third since 1990. However, under current policies, only an additional 1.5% reduction is projected between 2020 and 2040 (EEA, 2022), highlighting the need to accelerate the decarbonization of the agri-food system. This sector is emerging as a strategic component of the European climate transition, both for its mitigation potential and its capacity to generate new economic opportunities linked to sustainable carbon management and the regeneration of rural ecosystems.

Figure 1.
Value chain of the agri-food sector in Spain based on the Sustainability Reports published in 2021 by FIAB

Raw materials
Supply of agricultural inputs.

Primary sector
Production in agriculture, fisheries, and livestock.

Food and Beverage Industry (FBI)
Processing in the food and beverage industry.

Transport and storage
Transport, distribution, and storage of food products.

Marketing
Wholesale and retail trade.

Consumption
Final consumption.

Source:
FIAB y MAPA, 2022

3.2. European policies and strategies for decarbonization in the agri-food sector

The transformation of the European agri-food system is conceived as a modernization strategy that transcends a strictly environmental approach. The Vision for Agriculture and Food 2040 (European Commission, 2025) consolidates the sector as a strategic axis for the competitiveness, sustainability, and social cohesion of the EU. This new political architecture proposes a convergence between climate neutrality and food security, considering that both are interdependent conditions for the economic and ecological stability of the continent.

Faced with the challenges of climate change, rising production costs, and international competition, the European Commission promotes a model of rural development that links agricultural productivity with the preservation of natural resources. This vision expands the scope of the Common Agricultural Policy (CAP), integrating objectives of mitigation, adaptation, and social justice. Thus, the agri-food system is shifting from a set of sectoral support policies to a mechanism for structural transition, pursuing not only food production, but also territorial resilience, ecological stability, and the maintenance of ecosystem services.

Policies aimed at creating sustainable carbon cycles (COM(2021) 800) reinforce this approach by proposing a transition to a production model based on reducing dependence on fossil carbon, recycling biogenic carbon, and expanding natural CO_2 absorption solutions.

The European agri-food transition is supported by a policy framework that combines environmental governance, technological innovation, and sustainable financing. The European Green Deal, the Sustainable Carbon Cycles Strategy, Vision 2040, and the Carbon Removal Certification Framework (CRCF) form an integrated system that links agricultural production with climate action and social cohesion. Spain, with its institutional management capacity and productive diversity, has become a space for the advanced implementation of this model.

The European framework, Regulation (EU) 2024/3012 of the European Parliament and of the Council, articulates three complementary dimensions: carbon management through certification and low-emission agriculture; digital modernization as a driver of efficiency; and territorial cohesion, guaranteed by the CAP and structural funds. In the case of Spain, these policies converge in an agri-food transition agenda that combines innovation, sustainability, and competitiveness.

3.2.1. THE CARBON FARMING MODEL

Carbon farming is presented as an innovative strategy in green business models, whose main objective is to financially reward land managers for adopting practices that promote carbon sequestration or reduce greenhouse gas emissions.

The carbon farming model integrates a set of practices —reduced tillage, cover crops, agroforestry, and wetland restoration—that increase carbon sequestration and improve biodiversity and soil structure. In this context, carbon farming is presented as an innovative strategy in green business models, whose main objective is to financially reward land managers— farmers, ranchers, and foresters—for adopting practices that promote carbon sequestration or reduce greenhouse gas emissions. These practices encompass sustainable land use management, increasing the carbon stored in living biomass, dead organic matter, and soils. Funding sources can be public—such as the CAP or LIFE programs—or private, through voluntary carbon markets. In addition to reducing emissions, they generate environmental co-benefits such as improved biodiversity, climate resilience, and soil health.

At the regulatory level, carbon farming is framed as a key tool for achieving the European Union's climate goals. In 2021, the European Commission published the Communication on Sustainable Carbon Cycles (COM(2021) 800), followed in November 2022 by the Proposal for a Regulation with QU.A.L.ITY criteria (*Quantification, Additionality, Long-term storage, Sustainability*), which are fundamental for project validation and compatibility between methodologies. This process culminated in the adoption of Regulation (EU) 2024/3012, which establishes the Union Certification Framework for Carbon Removals (CRCF). This regulation sets quality standards that ensure that each ton of carbon captured is quantifiable, additional, stored long-term, and compatible with biodiversity, paving the way for a European agricultural carbon credit market based on transparency and competitiveness.

The European Commission envisages this instrument as a results-based market mechanism, supported by robust monitoring, reporting, and verification (MRV) systems. Its implementation aims to achieve a net removal of 310 million tons of CO_2 equivalent by 2030, with verified data available to all land managers by 2028. This approach makes agricultural climate action a measurable, verifiable, and economically traceable policy.

Among the key initiatives for the implementation of this framework is the CREDIBLE project, an EU-funded coordination and support action bringing together twenty-one research and development entities. Led by the Spanish firm "Soluciones Agrícolas Ecoinnovadoras"—SAE INNOVA—its objective is to generate scientific and technical consensus on methodologies for quantifying and monitoring carbon in agricultural soils, maximizing their capacity as sinks, and providing knowledge for the practical application of the CRCF. This approach reinforces evidence-based climate governance geared towards financing verifiable results.

In Spain, progress has been made in applying this model, due to its agroecological diversity and its public-private cooperation network. Projects such as LIFE Carbon Farming, MARVIC, LILA4SOILS, Carbono Olivar, and the Oliver Project illustrate how certification and innovation converge in real agricultural systems. These initiatives connect administrations, cooperatives, and technology centers, demonstrating that climate governance can translate into tangible economic opportunities.

Table 1.
Examples of carbon farming projects and lines of work in Spain

Project	General information	Sector	Contact in Spain
CREDIBLE Project	Coordination action funded by the EU. Working towards methodological consensus on carbon sequestration estimation.		SAE Innova (coordinator) Agri-Food Cooperatives of Spain
LIFE Carbon Farming	Project to promote practices in different beef cattle systems to reduce emissions and certify low-carbon farms. Within the context of the project, work is being done on a harmonized MRV system to achieve a unified European framework.	Beef cattle	* ASOPROVAC * AINTA * SERIDA * GLOBAL FACTOR * AGACAL * LORRA * LACTIBER * NEIKER * COVAP
MARVIC	European project for the design of carbon sequestration monitoring systems to support the EU CRCF Framework regulations.	29 case studies on cropland, grassland, and agroforestry systems in 12 countries.	* SAE innovates * CSIC
LILA4SOILS	European project to promote carbon farming practices in 5 living labs in 6 European countries and collaboration in the standardization of an MRV system for future carbon markets.	Agricultural, livestock, and agroforestry. The Iberian living lab (IBERSOILL) experiments with rainfed systems, extensive crops, vineyards, traditional olive groves, livestock systems, pastures, and woodlands.	* EIT Food (project coordinator) * URCACyL * ITACyL * NEIKER * CSIC
MRV4SOC	European project that aims to assess the impact of different agricultural practices on carbon storage in soils and provide economic incentives to develop a robust MRV protocol.	Work on nine types of land use in Europe.	* ICIFOR-INIA-CSIC * University of Vigo * Evenor Tech SL.
Carbon Farming HUB	Promote awareness among young people and stakeholders about European strategies for ecological transition and climate action. Establish a network of living labs on carbon farming in several countries. Encourage participation and exchange of best practices through informal collaborative support.	Agricultural	* ECOVALIA * SEAE (partner) * SAE Innova (partner) * Aragonese Rural Development Network * ARA * Galician Agency for Rural Development

Project	General information	Sector	Contact in Spain
ABSORCABOLIVO	Operational Group. Objective: to develop a carbon credit certification system.	Olivar	* University of Jaén * Consule Group * Santa Teresa de Jesús Andalusian Cooperative Society * Territorial Innovation Hub
Oliver Project	European project to develop a methodology for estimating carbon credits generated by Mediterranean olive groves and their commercialization in the voluntary market.	Olivar	* University of Jaén * ASAJA Jaén * IFAPA
Carbono Olivar	Operational Group promoting practices that improve carbon sequestration in olive cultivation, standardization of quantification methodology, and generation of carbon credits.	Intensive olive groves Super-intensive olive groves	* CSIC-IAS * University of Jaén * ASAJA Seville * Evenor tech * DOP Estepa * Doñana Biological Station CSIC
Carbon FARMING Med	European Interreg Project. Create a carbon farming framework adapted to Mediterranean conditions.		* BETA. Universidad de VIC * Azolla Projects * Euroregio

Source: own elaboration based on information from national and European projects (Horizon Europe, LIFE, Interreg, EAFRD, operational groups, 2025)

Carbon farming offers a strategic opportunity to move towards more sustainable and resilient agriculture.

As Table 1 shows, Spanish carbon farming projects cover different productive sectors and reflect growing cooperation between public institutions, private companies, and agricultural organizations. Overall, carbon farming offers a strategic opportunity to move towards more sustainable and resilient agriculture, but its consolidation will depend on a clear regulatory environment, effective financial incentives, and verification tools that are accessible to producers. Integrating these elements will allow the Spanish agricultural and livestock sector to consolidate its position as a key ally in the fight against climate change and a benchmark in the implementation of the European carbon farming model.

The Spanish experience shows that carbon farming can transform the agricultural paradigm: by linking environmental sustainability and profitability, soil ceases to be a simple productive resource and becomes a financial and ecological asset. In practice, the new model turns farmers into climate service managers, integrating science, politics, and the market under a single green transition strategy.

3.2.2. SUSTAINABILITY AND THE PRINCIPLE OF "WORKING WITH NATURE"

The principle of "working with nature" is at the heart of the new European agricultural policy. This approach seeks to restore ecosystems without compromising the profitability of farms. The European Commission proposes that sustainability should be integrated into all links in the agri-food chain, strengthening the links between productivity, conservation, and social well-being (European Commission, 2019; European Commission, 2020).

The Nature Restoration Law (European Parliament and Council of the European Union, 2024) sets legally binding targets for the recovery of degraded ecosystems and the improvement of agricultural soil quality. Complementarily, the Farm to Fork and Biodiversity strategies (European Commission, 2020) introduce targets for reducing fertilizers and pesticides and expanding organic farming. Vision 2040 also incorporates the *on-farm sustainability compass*, a voluntary tool that allows farms to measure their environmental performance and facilitate access to financial incentives.

Sustainability is no longer a regulatory burden but an economic asset, in line with the European Green Deal and the European Strategy on Adaptation to Climate Change.
(European Commission, 2021)

This set of policies positions environmental sustainability as a factor of competitiveness, where soil protection and efficient management of natural resources translate into market advantages, preferential access to financing, and improved corporate reputation. As a result, sustainability is no longer a regulatory burden but an economic asset, in line with the European Green Deal and the European Strategy on Adaptation to Climate Change (European Commission, 2021).

The implementation of sustainability in the field is supported by specific financial instruments such as the LIFE program and the European Agricultural Fund for Rural Development (EAFRD), which facilitate the adoption of agri-environmental practices and restoration projects. In Spain, initiatives such as LIFE Carbon Farming and Carbono Olivar demonstrate the viability of integrating sustainability and productivity (LIFE Carbon Farming, 2025). These experiences show that the success of the "working with nature" principle depends on results-based governance and the active participation of cooperatives and regional administrations, which act as mediators between European policy and local action.

3.2.3. COMPETITIVENESS AND A SUSTAINABLE FOOD CHAIN

The climate transition of the European agri-food system is supported by technological innovation and the efficiency of production processes. EU policies promote the adoption of precision fertilization, biopesticides, diversified crop rotations, and smart irrigation techniques, along with the digitization of farms (European Commission, 2023). These innovations enable smarter, more predictable, and more adaptable agriculture based on real-time data collection and analysis.

However, economic sustainability is an essential condition for the green transition. The European Commission warns that environmental objectives will only be achievable if the sector is profitable (European Commission, 2025). For this reason, Vision 2040 includes a structural reform of the agri-food value chain, aimed at a fairer distribution of added value. The creation of the Agri-Food Chain Observatory (AFCO) seeks to ensure transparency in price formation and cost traceability, while the strengthening of Directive (EU) 2019/633 on Unfair Commercial Practices (European Parliament and Council of the European Union, 2019) aims to prevent below-cost selling.

The future competitiveness of the sector is based on integrating innovation, economic stability, and regulatory compliance, reinforcing a model where ecological compliance generates profitability and social legitimacy.

These measures reinforce the idea that economic equity and environmental sustainability are interdependent. In fact, the future competitiveness of the sector is based on integrating innovation, economic stability, and regulatory compliance, reinforcing a model where ecological compliance generates profitability and social legitimacy.

In Spain, the implementation of the agri-food PERTE (Strategic Projects for Economic Recovery and Transformation) and rural digitization plans promoted by the Ministry of Agriculture, Fisheries, and Food, and the Ministry of Economy (Government of Spain, 2023) bring this competitiveness agenda to fruition. These policies encourage innovation in logistics, traceability, and energy efficiency in the food chain, linking environmental compliance with tax advantages and access to green financing. Likewise, the European Investment Fund (EIF) and the InvestEU Program offer guarantees for sustainable agro-industrial projects, consolidating the role of financing as a driver of climate transition (European Commission, 2022). This institutional framework transforms sustainability into a lever of competitiveness for the entire European agri-food sector. The long-term competitiveness of the European agri-food system will depend on its ability to adapt to changing climatic conditions, integrating resilience as a structural variable of productivity.

3.2.4. ADAPTATION AND RESILIENCE TO CLIMATE CHANGE

The intensification of extreme weather events—droughts, floods, and heat waves—has made adaptation to climate change a structural priority of European agricultural policy (European Commission, 2021). Particularly, Mediterranean regions, including Spain, face a growing risk of desertification and loss of soil fertility, which requires integrated preventive and corrective strategies.

In this context, Vision 2040 introduces investments aimed at improving water management, wetland restoration, and crop diversification as pillars of resilience. The European Commission also promotes the circular bioeconomy and the use of agricultural by-products, encouraging the production of biomaterials and renewable energy from waste (European Commission, 2022). These measures seek to reduce dependence on fossil inputs, increase self-sufficiency, and diversify farmers' sources of income.

The climate resilience framework is reinforced by the National Climate Change Adaptation Plan 2021–2030 (PNACC), which integrates water management, ecosystem restoration, and productive diversification measures (MITECO, 2020). In Spain, the experience gained in smart irrigation networks and rural modernization programs —such as those managed by SEIASA or the Supra-Autonomous Operational Groups—illustrates the effectiveness of combining European funding and local knowledge. These actions are aligned with the objectives of the Bioeconomy Strategy 2030, promoting self-sufficiency and the circular use of resources (Government of Spain, 2022). Taken together, they demonstrate that adaptation is not only an environmental requirement but also an element of competitiveness and economic stability.

3.2.5. SOCIAL SUSTAINABILITY AND GENERATIONAL RENEWAL

The social dimension is a structural pillar of the climate transition of the European agri-food system. The aging of the countryside—only 12% of farmers are under 40—jeopardizes the continuity of the sector (Eurostat, 2023). The European Strategy for Generational Renewal (2025) (European Commission, 2025b) introduces *starter packs* for setting up, agricultural succession programs, and measures for access to land and credit, integrated into the new CAP and EAFRD funds.

These instruments seek to reverse the demographic trend and promote rural entrepreneurship, positioning young farmers as agents of technological innovation and sustainability. The incorporation of new generations ensures the renewal of knowledge and the consolidation of more advanced agroecological practices. At the same time, European social policy emphasizes gender equality and digital inclusion in rural areas, integrating the green transition with territorial cohesion (European Commission, 2024).

The social dimension of the agri-food transition is complemented by policies supporting technical training and youth innovation. The EAFRD Operational Groups, the training programs of the National Institute for Agricultural and Food Research and Technology (INIA-CSIC), and the actions of the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) are examples of how public-private cooperation promotes the professionalization of generational renewal. In Spain, cooperatives and financial institutions such as AgroBank and Ibercaja Agro are actively involved in financing young farmers, linking green transition objectives with rural economic development (in line with the European Strategy for Generational Renewal, European Commission, 2025b). This comprehensive approach reinforces the idea that social sustainability is a structural condition for environmental sustainability.

3.3. Digital innovation and technological sustainability

Digital innovation is the operational backbone of the climate transition in the European agri-food sector. The European Commission understands digitalization as a horizontal policy that connects productivity, sustainability, and territorial equity. According to the report by the Joint Research Center (JRC, 2025), the degree of technological adoption varies between countries and types of farms, but its structural impact is clear: digitization reduces emissions, optimizes resource use, and enables full traceability of the food chain.

3.3.1. DIGITIZATION TRENDS IN EUROPEAN AGRICULTURE

Precision agriculture, automation, and artificial intelligence are redefining the management of agricultural resources. Technologies such as moisture sensors, satellite remote sensing, and drones for crop monitoring enable data-driven decisions and efficient management of water and inputs (JRC, 2025). The information generated feeds into environmental verification systems, facilitating compliance with the criteria of the Corporate Sustainability Reporting Directive (CSRD) and the green taxonomy (European Parliament and Council of the European Union, 2024).

Digitalization, therefore, not only increases productivity but also provides the technical infrastructure that underpins European climate policy.

Digitalization, therefore, not only increases productivity but also provides the technical infrastructure that underpins European climate policy. Its integration into agri-food chains promotes adaptive management, reduces production uncertainty, and generates a common data framework that improves environmental performance assessment and carbon traceability throughout the value chain.

However, the digital transformation process faces significant challenges. The cost of investment and the lack of digital skills are the main factors slowing adoption, along with limited interoperability between systems and uncertainty about data ownership (European Commission, 2025). The creation of the European Agriculture Data Space seeks to resolve these asymmetries, ensuring transparency and security in the use of agricultural information. The key is to ensure that the value generated by the data is returned to producers, strengthening their position in the chain and their access to green financing.

According to the *JRC (2025)*, poor connectivity in rural areas and the small size of many farms limit the viability of technological investments. The solution lies in collaborative models—such as cooperative platforms and shared data services—that democratize access to innovation and distribute digital benefits across the territory (Tur Cardona et al., 2025).

3.3.2. EUROPEAN SUPPORT PROGRAMS AND KNOWLEDGE TRANSFER

The rollout of agricultural digitization is supported by a combination of EU instruments. The Digital Europe Program (2021–2027) funds artificial intelligence and supercomputing projects applied to the agricultural sector, while Horizon Europe—Cluster 6 promotes research in agroecology, smart agriculture, and sustainable supply chains (European Commission, 2023). Similarly, the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) encourages collaboration between science and agricultural practice through the *Operational Groups* for rural innovation.

In addition, the actions of the **Digital Innovation Hubs** and the **CAP Network**, which channel knowledge and technical advice on digitization and sustainability. These programs help ensure that digital modernization reaches not only large farms but also small and medium-sized rural businesses, reducing territorial and social gaps.

3.3.3. TECHNOLOGICAL INTEGRATION IN THE CAP AND VISION 2040

Digital policy is not complementary to climate policy but one of its most effective tools.

European policy addresses digital challenges through three lines of action: training and knowledge transfer through the CAP Network and Digital Innovation Hubs; investment in rural connectivity through the Digital Europe Program; and integration of digitization into Vision 2040, which envisages a future *European Digital Strategy for Agriculture* (European Commission, 2025). This approach confirms that digital policy is not complementary to climate policy but one of its most effective tools.

Digitalization thus becomes the operational instrument that connects technological innovation, productive efficiency, and environmental sustainability. Technology directly integrates into CAP incentive systems and the European green finance architecture by enabling the monitoring, verification, and quantification of climate practices.

3.3.4. APPLICATION IN SPAIN

Spain plays a leading role in the practical application of these strategies. Rural innovation *living labs*—such as AgriDigital and IBERSOILL—artificial intelligence projects applied to water management, and cooperative food traceability platforms are examples of how digitization can combine economic efficiency and ecological transition.

The integration of science, business, and government has created an innovation ecosystem that strengthens the sector's competitiveness and territorial cohesion.

The integration of science, business, and government has created an innovation ecosystem that strengthens the sector's competitiveness and territorial cohesion. Coordination between public entities, universities, cooperatives, and technology companies has made it possible to consolidate a participatory governance structure that translates digital innovation into tangible social and environmental benefits.

Overall, digitization is consolidating its position as the backbone of the new European agri-food model. It enables actors to measure, verify, and monetize climate progress and turns sustainability into a manageable process.

3.4. Financing the European agri-food transition in the Spanish context

The viability of the European agri-food transformation depends directly on the mobilization of financial resources. The European Union has developed a climate finance ecosystem that combines public structural funds with sustainable investment instruments and green capital markets. These mechanisms not only support climate change mitigation and adaptation but also enable private investment to be directed towards projects that generate positive environmental and social impact in rural areas.

a) Public financing and the structural role of the CAP

In its 2023–2027 framework, the Common Agricultural Policy (CAP) allocates at least 40% of its total budget to climate and environmental actions.

The Common Agricultural Policy (CAP) is the central financial pillar of the agri-food transition. In its 2023–2027 framework, it allocates at least 40% of its total budget to climate and environmental actions, fully integrating the commitments of the **European Green Deal** and the *Farm to Fork* strategy. Its two levels of intervention are complementary: direct payments and eco-schemes reward the adoption of sustainable practices—crop rotation, extensive grazing, and conservation agriculture—while the EAFRD promotes investment in innovation, renewable energy, and rural digitization.

Vision 2040 proposes moving towards a simpler, more results-oriented CAP, shifting the focus from compliance to incentives and giving Member States greater responsibility for achieving environmental objectives. This change makes the CAP an instrument of climate policy and not just agricultural policy: its role is no longer to compensate incomes but to stimulate structural change in the agri-food system.

The CAP is complemented by other public instruments that reinforce its impact:

- **The Recovery and Resilience Facility (NextGenerationEU)**, which finances projects for agro-industrial modernization, energy transition, and sustainable water management.
- **The Innovation Fund**, linked to the Emissions Trading System (EU ETS), which supports clean technologies and carbon sequestration projects consistent with the CRCF.
- The **LIFE** programs and the **Nature Restoration La**w, which prioritize the regeneration of soils and agricultural ecosystems.

Climate finance has established itself as an essential tool for driving the sustainable transition of the agri-food system. Through these mechanisms, public and private resources are channeled into projects that contribute to mitigating emissions, adapting production systems to climate change, and promoting a low-carbon economy.

Among the main instruments are European funds such as Agri-Food PERTE, CAP 2023–2027, and Next Generation EU Funds, which finance investments in energy efficiency, digitization, water management, and sustainable agricultural practices. At the national level, the Official Credit Institute (ICO) and various private financial institutions are incorporating green credit lines and climate guarantee programs aimed at the rural sector, expanding access to financing for small and medium-sized farms.

Alongside public funds, new avenues of private financing are emerging, such as green bonds, sustainable investment funds, and voluntary carbon markets, which allow companies to earn additional income from reducing or capturing emissions. However, access to these remains limited due to technical complexity, verification costs, and a lack of specialized advice.

To ensure a fair and inclusive transition, it is essential to strengthen financial support mechanisms, simplify procedures, and promote collaboration between all actors involved.

To ensure a fair and inclusive transition, it is essential to strengthen financial support mechanisms, simplify procedures, and promote collaboration between producers, cooperatives, financial institutions, and public administrations. Only then will it be possible to effectively mobilize the capital needed for real climate action in the Spanish agri-food system.

These mechanisms make the EU the main institutional investor in rural decarbonization, creating stable conditions for private investment and promoting convergence between environmental sustainability and economic profitability.

b) Private financing and sustainable markets

The impetus of the financial sector is essential to scale up the transition. The EU taxonomy, green bonds, and sustainable investment funds provide a common framework for directing private capital towards projects with a positive climate impact.

Voluntary carbon markets, regulated under the CRCF framework, allow for the monetization of certified agricultural and forest carbon removals, generating new sources of income for producers. This mechanism represents a paradigm shift: land becomes a climate asset, and farmers become providers of verifiable environmental services.

Likewise, national financial institutions—such as the Official Credit Institute (ICO) in Spain—and cooperative banks are incorporating green credit lines and climate guarantee programs, facilitating access to financing for agricultural SMEs and cooperatives. The combination of public and private capital reduces investment risk and accelerates the adoption of clean technologies and low-carbon production models.

c) Spanish integrated financing dynamics

Spain exemplifies the convergence of public policy, innovation, and sustainable financing. CAP, NextGenerationEU, and LIFE funds are combined with the Agri-Food PERTE, which focuses on digitization, energy efficiency, and carbon footprint reduction.

The country has launched pilot projects for voluntary carbon markets and MRV certification in olive groves, pastures, and grasslands, creating an operational framework that translates European regulations into concrete mechanisms for rural profitability.

This integrated financial model is characterized by collaboration between administrations, public banks, cooperatives, and technology companies.

The result is an ecosystem where economic incentives, digital innovation, and environmental sustainability converge around a single climate strategy.

Main issues identified 04

Main issues identified 04

This section presents the key issues identified in each of the sessions, which reflect the points of consensus reached among the participants. Highlighting these issues makes it possible to clearly identify the priority areas within the topics discussed and to outline possible actions to overcome the barriers detected throughout the process.

4.1. CARBON FARMING

4.1.1. CONCEPTUAL CONFUSION ABOUT CARBON FARMING (SEQUESTRATION VS. MITIGATION)

Within the group, there is a lack of conceptual clarity regarding the term "carbon farming," which leads to confusion about its objectives, scope, and implementation mechanisms. In general, it tends to be associated mainly with carbon sequestration, understood as the storage of CO_2 in soils and biomass. However, the concept can also be interpreted more broadly, encompassing actions aimed at reducing emissions within the agri-food sector. In this case, the CRCF focuses on carbon sequestration (storage in soils and biomass), but it also covers actions aimed at reducing soil emissions (i.e. protecting peatlands) and emissions resulting from excessive fertilizer use (i.e. nitrous oxide generation). The CRCF also seeks to make it easier for the sequestration and emission reductions generated through carbon farming to be credited toward agri-food companies' carbon footprints. There is confusion, however, about how to distinguish carbon farming from carbon footprint accounting, as well as about how to incorporate other types of emission reductions—for example, those associated with livestock production.

The sector is already very familiar with the term "carbon footprint," and in this sense, reducing that footprint could also be considered part of the approach.

This conceptual ambiguity produces different interpretations of which practices should be prioritized and creates a lack of both conceptual and operational consistency.

4.1.2. REQUIREMENTS FOR PRIVATE COMPANIES IN NON-FINANCIAL REPORTING

Currently, *carbon farming* is mainly interpreted as a carbon certification mechanism with the potential to operate in voluntary markets. However, private companies include emission reduction targets in their non-financial reports with very limited scope for offsetting. Therefore, at first glance, this mechanism may not appear to be a key tool for ensuring compliance with the reduction targets set for 2030 and 2050.

4.1.3. CONCEPTUALIZATION OF THE CONCEPT OF REGENERATIVE AGRICULTURE

During the working sessions, a lack of consensus emerged around the concept of regenerative agriculture, a situation like that observed with the term *carbon farming*. Although the concept has gained prominence recently discourses on sustainability and climate action, there is no unified definition or clear regulatory framework to determine which practices can truly be considered regenerative.

This absence of a common framework has led to different actors having different interpretations. This conceptual diversity creates confusion and can hinder the development of common certification criteria or incentive schemes. In the current context, many companies are adopting the term for communication or environmental positioning purposes, which has raised some concern about the risk of "greenwashing."

4.1.4. ADDITIONALITY AND BASELINE

The sector expressed the perception that only new or intensive practices are recognized or rewarded, leaving those who already apply sustainable or soil improvement practices at a disadvantage.

During the sessions, the difficulty of correctly defining the concepts of additionality and baseline was pointed out, as these are key elements for any carbon measurement system, especially when it is geared towards participation in carbon markets under MRV (Monitoring, Reporting, and Verification) requirements. The sector expressed the perception that only new or intensive practices are recognized or rewarded, leaving those who already apply sustainable or soil improvement practices at a disadvantage.

According to the comments, the current wording of the Criteria Regulation for the Carbon Farming Certification Framework (CRCF) favors more intensive production systems, as they have a greater capacity to generate additionality compared to their initial situation. Similarly, systems with more degraded soils or low carbon levels have greater leeway in defining the baseline, which makes it easier for them to access financing mechanisms compared to farms that are already adding carbon to the soil.

4.1.5. HIGH TECHNICAL COMPLEXITY AND ASSOCIATED COSTS

The high technical complexity of current monitoring, reporting, and verification (MRV) systems is identified as one of the main barriers to participation in the sector.

The high technical complexity of current monitoring, reporting, and verification (MRV) systems is identified as one of the main barriers to participation in the sector, especially for small and medium-sized farms. The initial and recurring costs associated with these processes often exceed the potential income derived from the sale of credits or climate incentives, making participation in these programs economically unviable at present or meaning that the economic return does not offset the administrative and technical burden required.

Without technical and financial support mechanisms, there is a risk that only large corporations or large-scale projects will be able to access these systems, leaving out a large part of the agricultural sector. Paradoxically, it is this segment that could generate the greatest environmental and social benefits.

4.1.6. VOLUNTARY MARKETS: LACK OF TRANSPARENCY AND COMPETITIVE INEQUALITY

Voluntary markets are a key tool, but they currently face significant challenges in terms of transparency, reliability, and international competition. The absence of common standards and uniform verification systems makes it difficult to assess the actual quality of the credits generated.

The coexistence of different certifiers and methodologies (such as Verra and Gold Estandar, among others) leads to disparities in criteria, especially in regions with less institutional control, where implementation and certification costs are lower and, consequently, credit prices are also lower. This could create competitive inequality for projects developed in countries such as Spain, where technical and regulatory requirements are more demanding, increasing costs and making it difficult for them to compete with other markets.

4.1.7. PECULIARITIES OF THE AGRICULTURAL SECTOR: MEASUREMENT OF BIOGENIC CARBON AND ITS UNCERTAINTIES

The agricultural sector has characteristics that differentiate it significantly from other sectors when it comes to quantifying its carbon emissions and sequestration. While sectors such as energy or industry can quantify greenhouse gas emissions relatively directly—for example, through fossil fuel consumption or industrial processes—agriculture involves biogenic carbon, which originates from living organisms or recently formed biological materials. This biological and variable nature makes project monitoring processes complex, as well as significant levels of uncertainty depending on the measurement method (models vs. direct field measurements). This complexity also carries over to the verification and certification phases of projects. Additionally, there are uncertainties about the permanence of sequestered carbon—especially in the face of climate threats such as fires, droughts, or extreme events—as well as doubts about the real additionality of projects compared to a scenario without intervention.

4.1.8. LACK OF ECOLOGICAL AND AGRONOMIC CONSIDERATIONS

There is a perceived excessive focus on carbon, which can lead to neglecting other ecological and agronomic dimensions that are essential for the long-term sustainability of the agri-food system. The current approach tends to measure climate success almost exclusively in terms of carbon sequestered or emissions avoided, overlooking essential aspects such as overall soil health, biodiversity, the biological and chemical structure of the land, and the resilience of agroecosystems to the background.

However, both scientific evidence and field experience agree that living, diverse, and balanced soil is the basis of any lasting climate strategy. Soil microbiology, for example, plays a crucial role in both natural carbon sequestration and the fertility and stability of the agricultural ecosystem.

Both scientific evidence and field experience agree that living, diverse, and balanced soil is the basis of any lasting climate strategy.

Maintaining soil cover, fostering complete and balanced microbiological food webs, minimizing tillage, and promoting natural soil fertilization are practices that simultaneously help reduce emissions, improve productivity, and strengthen climate adaptation. These practices demonstrate that a vision focused solely on carbon can be limiting if it is not embedded within a broader agroecological approach.

4.2. CLIMATE ACTION IN BUSINESS STRATEGIES

4.2.1. Legal uncertainty and regulatory complexity

One of the main obstacles identified is the lack of clarity and stability in the regulatory framework for sustainability and climate action. The agri-food sector operates in a constantly changing regulatory environment, both nationally and at the European level, which creates legal uncertainty and hinders medium- and long-term strategic planning.

The coexistence of multiple regulations and regulatory frameworks, sometimes with overlapping or even contradictory criteria, creates a complex scenario. This situation not only increases the administrative burden but also discourages the sector's participation in climate or environmental certification initiatives due to the risk of unintentional non-compliance or sudden regulatory changes.

4.2.2. DIFFICULTY IN SCALING UP PILOT PROJECTS

In recent years, numerous innovative pilot projects on climate action have emerged. However, many of them fail to scale up or replicate beyond their initial phase. The main causes identified include a lack of continued funding, the absence of technical and political support instruments, and a disconnect between the fields of research, business, and public administration. This situation limits the possibility of turning these one-off initiatives into large-scale transformation strategies, wasting the sector's existing potential for innovation.

4.2.3. MONITORING AND VERIFICATION COSTS

As with *carbon farming*, any certification process linked to sustainability standards involves high technical and administrative costs, which in many cases can even exceed the potential benefits obtained. Small and medium-sized farms face economic and administrative barriers to accessing certifications such as carbon footprint or international standards (ISO, Global GAP, or other sustainability schemes), which puts them at a competitive disadvantage.

As a result, many of these sustainable initiatives fail to gain visibility or recognition, limiting the recognition of the sector's efforts and reducing its access to markets or incentives linked to environmental criteria.

4.2.4. BARRIERS TO ACCESS TO FINANCING AND PUBLIC AID

Companies in the sector, especially SMEs, face difficulties in accessing green financial instruments or public aid. These barriers are related to the complexity of administrative procedures, the lack of specialized advice, and the scarcity of financial products adapted to their needs and scale.

4.2.5. LACK OF SPECIFIC TECHNICAL TRAINING

There is a lack of technical skills and specialized knowledge in sustainability within the agri-food business sector. This limitation reduces the ability of companies to effectively design, implement, and evaluate climate action strategies, making it difficult for them to adapt to new environmental and market requirements.

4.2.6. DIFFICULTY IN ENSURING LOCAL SOURCING OF CERTAIN PRODUCTS

During the debate, it was pointed out that, although many agri-food companies show a strong commitment to using local products (whether for climatic, social, or corporate image reasons), in practice, current demand and limited domestic production capacity make it difficult to comply. Factors such as seasonality, limited availability of certain raw materials, or the impacts of climate change (droughts, hailstorms, extreme weather events, etc.) exacerbate this situation. In some cases, this forces companies to resort to imports, which can compromise the sustainability or traceability objectives they are trying to promote.

4.2.7. DISCONNECT BETWEEN END CONSUMERS AND THE VALUE OF SUSTAINABILITY

Producers emphasized that, although some consumers value sustainability, they are not always willing to pay more for it. This gap between discourse and purchasing behavior makes it difficult for sustainable practices to scale up in a context of high prices and competition.

4.3. FINANCING MECHANISMS

4.3.1. LOSS OF CLIMATE AMBITION IN THE PROPOSAL FOR THE NEW CAP PERIOD

Within the European Commission's proposal for the post-2027 CAP and the accompanying data for the next Multiannual Financial Framework, there is a perceived reduction in environmental conditionality and a decline in the ambition of eco-schemes. In addition, the proposal increases reliance on national co-financing and raises the risk of widening inequalities among member states.

This issue is examined in greater detail in **alinnea's** report *"The Common Agricultural Policy 2028–2034: Budgetary Framework and Policy Options to Accelerate the Climate Transformation of the Agri-Food Chain."*

4.3.2. LACK OF PREVENTIVE RISK MANAGEMENT STRATEGIES, REACTIVE MEASURES PREDOMINATE

Climate risk management in the sector—supported in Spain by an agricultural insurance system with strong response capacity—is still largely based on reactive strategies to climate-related impacts, which are becoming increasingly frequent and severe. There is a lack of ex-ante strategies that are essential for the sector's adaptation to climate change in future scenarios.

4.3.3. HIGH COST OF LOW-CARBON TECHNOLOGIES (E.G., LIVESTOCK ADDITIVES), AND COSTS THAT NORMALLY FALL ON PRODUCERS

Technological measures are key to the sector's transition. However, implementation costs often exceed the investment capacity of most farms, especially small and medium-sized ones, which limits their adoption without specific support mechanisms or incentives.

4.3.4. LONG-TERM PROJECTS ARE NOT VIABLE

The implementation of projects such as regenerative agriculture is unsustainable without external support once the pilot phase and external financial support, mainly from public sources, have ended. Without a strategy for continuity and viable economic balances, projects fail to consolidate or generate an impact beyond the project ecosystem..

4.3.5. DIFFICULTIES IN CARBON CREDIT CERTIFICATION

Once again, obstacles related to additionality, traceability, and the technical requirements of the credits generated are mentioned, which limits the sector's ability to access instruments with economic returns for climate contributions, such as carbon markets.

4.3.6. NEED FOR MORE TECHNICAL SUPPORT FOR THE PRODUCTION SECTOR

Another recurring issue is evidence of a lack of technical support and training, especially for the production sector.

4.3.7. POOR CONSUMER INTEGRATION

The disconnect between the service generated in the field and consumer perception prevents sustainability efforts from translating into economic returns throughout the value chain.

Identified measures 05

Identified measures 05

Below is a series of proposed measures aimed at addressing the barriers identified in the previous section and facilitating the climate transition of the agri-food sector, contributing to the climate neutrality targets set for 2050.

These measures are structured around the three work blocks established by the group for this year. The measures respond to a comprehensive approach that combines technological innovation, regulatory adaptation, capacity building, and cooperation among all actors in the agri-food value chain.

The set of measures aims to create an operational framework that accelerates climate action in the agri-food sector, facilitating access to tools, knowledge, and financing. Among the main lines of action common to the three blocks are:

* Clarification of concepts and regulatory frameworks.
* Promoting partnerships and cooperation between links in the chain.
* Strengthening financing for climate action and economic incentives adapted to the reality of the sector.
* Improving technical assistance and training to ensure that producers have the necessary resources.

5.1. Carbon farming

5.1.1. CLEAR DEFINITION OF CONCEPTS TO AVOID CONFUSION AND ENSURE LEGAL CONSISTENCY

What it consists of

The term "regenerative agriculture" or "regenerative livestock farming" is currently used in different contexts, including or excluding certain agricultural practices, which leads to conceptual confusion. There is a need to work on a precise and agreed definition that determines which practices can be considered regenerative and which cannot. There are useful previous experiences, such as the official definition of organic farming in European regulations.

In the case of carbon farming, it is equally necessary to clarify its scope, specifying whether the term refers only to carbon sequestration or whether it also covers emission reduction projects within the agri-food sector.

This nuance is particularly relevant, given that part of the sector associates carbon farming with broader mitigation actions linked to reducing the carbon footprint.

Moving towards a shared and operational conceptualization of both concepts is key to their coherent integration into public policies, carbon markets, and non-financial reporting programs of agri-food companies.

Objective

The main objective is to establish a precise and agreed conceptualization of key terms such as regenerative agriculture and carbon farming to ensure legal consistency, avoid ambiguities, and facilitate their integration into public policies, voluntary carbon markets, and non-financial sustainability reports.

Specific measures

a. Develop an official and operational definition of regenerative agriculture and livestock farming, based on scientific and agroecological criteria.

b. Clarify the concept of carbon farming, differentiating between carbon sequestration and emission reduction projects in the agri-food sector.

c. Promote the harmonization of terminology and criteria between national and European regulations as well as public and private MRV frameworks.

Proposed actions

a. Creation of a technical group (administration, research, agricultural organizations, and other agents) to agree on definitions and methodologies.

b. Review of previous experiences, such as the definition of organic farming, to establish regulatory parallels, as well as monitoring of the Credible project.

c. Dissemination within the sector to ensure consistent application.

Agents involved

a. **Ministry for Ecological Transition and Demographic Challenge (MITECO):** Leadership in interministerial coordination and definition of the regulatory framework that integrates carbon farming practices into national climate change mitigation and adaptation strategies.

b. **Ministry of Agriculture, Fisheries, and Food (MAPA):** Development of the agricultural regulatory framework and alignment with the CAP, ensuring consistency between agricultural and climate policy instruments.

c. **Regional and local administrations:** Territorial implementation of measures, adaptation to regional agroecological contexts, and monitoring of pilot projects in coordination with the relevant ministries.

d. **Agricultural organizations, cooperatives, and sectoral associations:** Practical application and validation of methodologies in the field; communication of the needs and experiences of the productive sector, contributing to consensus on operational definitions.

e. **Research centers and universities:** Technical definition and scientific validation of methodologies for calculating, monitoring, reporting, and verifying (MRV) carbon in soil and biomass; generation of evidence to support decision-making.

f. **Financial sector and investment funds:**
Incorporation of the criteria defined in their financial instruments, support for the financing of regenerative agriculture and livestock projects, and guarantee of climate integrity in carbon-related investments.

g. **European agencies and European Union bodies (DG AGRI, DG CLIMA, JRC):**
The EU should lead the process of conceptual and regulatory harmonization of the terms "regenerative agriculture" and "carbon farming" within the EU framework so that member states work on a common basis. Specifically, it could:

- Develop European guidelines and reference frameworks that define minimum criteria for considering a practice to be regenerative or carbon farming, based on scientific evidence and consistent with the future EU Carbon Removal Certification Framework (EU CRCF).
- Integrate these definitions into the Common Agricultural Policy (CAP) and European funding mechanisms (such as Horizon Europe or the Innovation Fund), ensuring their consistency across all policies related to agriculture, climate, and corporate sustainability.
- Promote a unified European taxonomy that links these practices to the sustainable finance criteria of the EU Taxonomy Regulation, facilitating their recognition in sustainability reports and green investment.
- Promote technical coordination through the JRC (Joint Research Centre) to compile, validate, and update the scientific standards that serve as a basis for Member States in the implementation and verification of projects.

h. **Civil society and environmental organizations (NGOs, think tanks, citizen platforms):**
Ensure that the conceptualization is legitimate, transparent, and socially accepted, helping to ensure that the terms regenerative agriculture and carbon farming are not captured by particular interests, but rather respond to the public interest, as well as preventing misuse or greenwashing.

Potential barriers

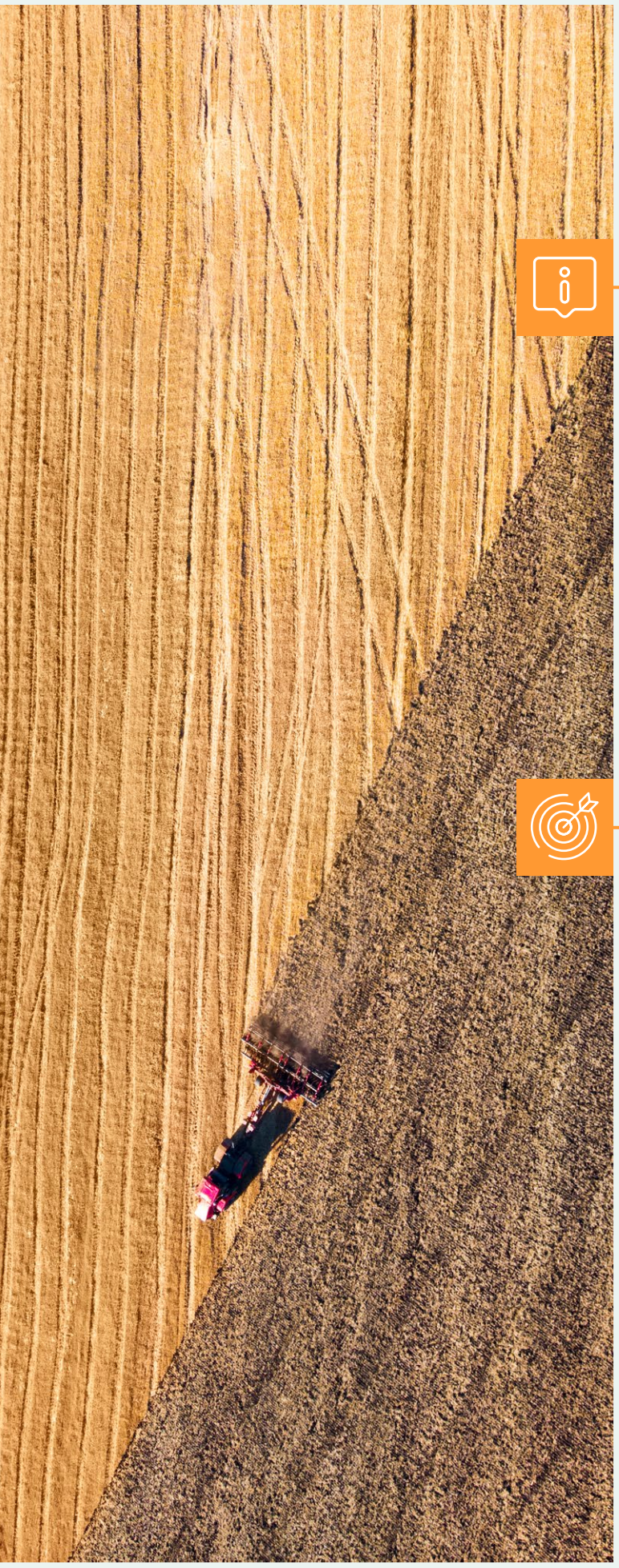
a. Lack of consensus among stakeholders (companies, administrations, agricultural organizations) on the limits and scope of the concepts.

b. Overlap or contradiction between existing regulatory frameworks (ecological, sustainable, regenerative, low-carbon).

c. Absence of harmonized scientific methodologies to measure and validate the impacts of regenerative practices.

d. Risk of appropriation of the term by marketing or "greenwashing" without a solid technical basis.

e. Difficulty in updating regulations in the face of rapidly evolving research and field practices.



5.1.2. PROVIDE ACCESSIBLE MEASUREMENT AND CERTIFICATION TOOLS. MRV MECHANISMS

What it consists of

The European Union's efforts to establish common and verifiable criteria are an important step towards improving the confidence and competitiveness of European carbon farming projects in carbon markets.

Similarly, both public and cooperative support are key to the inclusion of small and medium-sized farms. It is also essential to develop cost-effective methodologies that can be adopted by the sector as a whole. Public support and cooperative assistance will be crucial to ensuring their technical and economic viability.

Objective

Ensure the measurement, reporting, and verification (MRV) of carbon emissions and sequestration in the agri-food sector through accessible, low-cost tools that comply with current standards. These tools must be transparent and strengthen the trustworthiness and competitiveness of carbon farming projects.

Specific measures

a. Develop and adapt standardized MRV methodologies for the sector, based on European criteria.

b. Promote simplified measurement tools at an affordable cost for small and medium-sized farms.

c. Integrate technological innovation (sensors, AI, big data) into verification processes.

d. Encourage the creation of collective certification systems that allow for the sharing of costs.

Proposed actions

a. Promote programs focused on the development of measurement and certification tools adapted to the Spanish context.

b. Establish public support lines for the adoption of MRV systems in small farms.

c. Promote collective certification pilot projects managed by cooperatives or groups.

d. Technical training on MRV requirements and practical application.

Agents involved

a. **Ministry for Ecological Transition and Demographic Challenge (MITECO):** Implement the national regulatory framework for measurement, reporting, and verification (MRV) systems in the agri-food sector, ensuring consistency with European standards and future EU carbon sequestration certification. It should also coordinate the financing of technological innovation projects in MRV and establish monitoring and control mechanisms to ensure the transparency and environmental integrity of data.

b. **Ministry of Agriculture, Fisheries, and Food (MAPA):** Integrate MRV tools and methodologies into CAP programs and agricultural sustainability support instruments, promoting their adoption especially among small and medium-sized farms.

c. **Regional and local administrations:** Implement territorial support programs for the adoption of MRV tools, adapted to the agroecological and productive characteristics of each region. Likewise, facilitate connections between producers, technology centers, and cooperatives to promote collective certification and data exchange.

d. **Agricultural organizations, cooperatives, and sector associations:** Continue developing pilot projects for collective measurement and certification that reduce costs and increase the accessibility of MRV systems. Their role should focus on supporting farms in data collection, methodology application, and results validation.

e. **Research centers, universities, and technology centers:** Develop, adapt, and validate science- and technology-based MRV methodologies, ensuring their applicability to the Spanish context. They should collaborate with government agencies and the private sector in the design of digital tools (sensors, AI, remote sensing, big data) that facilitate the automation of measurement and reduce verification costs.

f. **Financial sector and investment funds:** Integrate verified MRV systems into their climate impact assessment models, linking green financing and financial incentives to projects that use recognized tools. They should also collaborate in the creation of certification mechanisms that facilitate access to reliable carbon markets.

g. **European agencies and European Union bodies (DG AGRI, DG CLIMA, JRC):** Establish common methodological frameworks and minimum quality criteria for MRV systems across the EU, ensuring their interoperability between countries and their recognition in voluntary carbon markets. In addition, they should finance R&D projects aimed at improving technological measurement and certification tools.

h. **Civil society and environmental organizations:** Monitor the transparency and traceability of MRV systems, ensuring the environmental integrity of certified projects. They can also play a key role in disseminating information and raising awareness about the importance of verification mechanisms in ensuring real climate impact.

Potential barriers

a. High costs of developing, validating, and implementing technological tools, especially in the context of small farms.

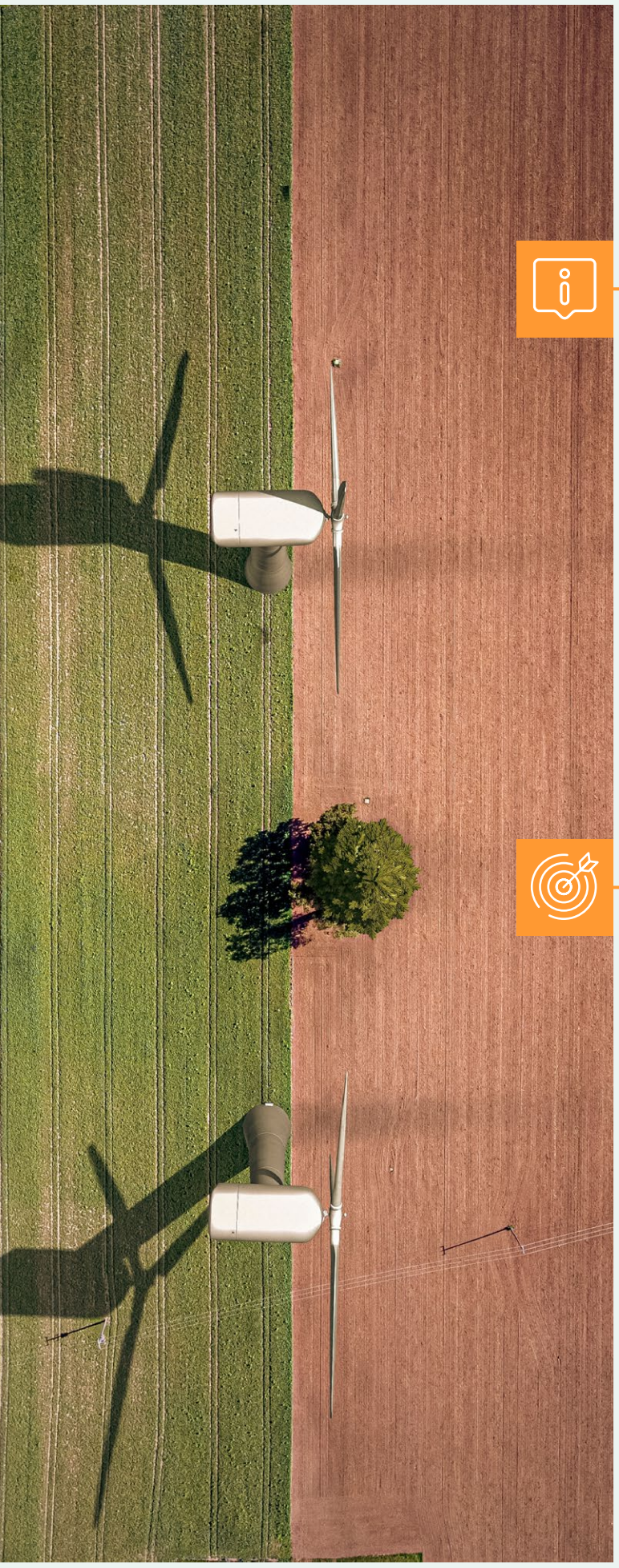
b. Technical complexity and lack of international standardization, which can lead to incompatibilities between methodologies and make it difficult to compare results.

c. Difficulty accessing the technical and digital capabilities needed on farms, which limits the adoption of advanced MRV systems.

d. Lack of sustained financial support for maintenance, updating, and continuous verification of systems.

e. Risk of technological dependence on large suppliers, hindering data sovereignty and equitable access to tools.

f. Mistrust or lack of knowledge on the part of the productive sector regarding the practical usefulness or economic return of MRV certification.



5.1.3. REFORZAR MECANISMOS DE APOYO FINANCIERO ESPECÍFICO

What it consists of

The working group agreed on the need to strengthen specific financial support mechanisms for the agri-food sector. Currently, the adoption of sustainable and low-carbon practices is limited by economic barriers, stemming from high initial investment costs, lack of short-term returns, and administrative complexity in accessing existing financing programs. This situation particularly affects small and medium-sized farms, which often lack the technical and financial capacity to implement mitigation or adaptation projects.
It is therefore proposed to diversify financial instruments, simplify procedures, and encourage public-private partnerships that activate voluntary carbon markets and contribute to the decarbonization targets for 2030 and 2050.

Objective

The objective is to facilitate access to climate finance tailored to the specific characteristics of the agri-food sector, strengthening public and private financial mechanisms to ensure that all farms (especially small and medium-sized ones) can participate in mitigation programs and carbon markets.

Specific measures

a. Diversify existing financial instruments.

b. Simplify administrative processes for accessing aid and financing.

c. Promote public-private partnerships to activate projects and voluntary carbon markets in the agri-food sector.

d. Establish tax incentives and specific lines of support for emission capture and reduction projects without compromising the additionality criterion.

e. Prioritize financing mechanisms that favor the inclusion of smaller farms and collective projects.

Proposed actions

a. Promote financing programs between financial institutions and cooperatives to scale up pilot projects.

b. Implement temporary tax incentives for agri-food companies that invest in technologies and reduce emissions.

c. Establish a microcredit system that allows small farms to access initial investments.

d. Develop specific green credit lines for farms and livestock operations that adopt low-carbon practices.

Agents involved

a. **Ministry for Ecological Transition and Demographic Challenge (MITECO):** Design specific climate finance mechanisms for the agri-food sector, integrating mitigation and adaptation criteria into national decarbonization funds. This should be coordinated with the Ministry of Agriculture and the financial sector to channel resources towards low-carbon agriculture projects and promote green finance schemes that prioritize the inclusion of small and medium-sized farms.

b. **Ministry of Agriculture, Fisheries, and Food (MAPA):** Simplify procedures for accessing public aid and coordinate CAP financial instruments with national and European climate finance mechanisms. In addition, it should identify specific lines of support for sustainable practices, promote tax incentives, and facilitate the creation of collective mitigation projects through cooperatives and producer groups.

c. **Regional and local administrations:**
Adapt regional rural development and sustainability programs to incorporate financing instruments aimed at the climate transition of the agri-food sector. They should also facilitate the connection between regional financial institutions, cooperatives, and final beneficiaries, ensuring that funds reach small-scale projects.

d. **Agricultural organizations, cooperatives, and sector associations:**
Promote the creation of cooperative funds or collective financing schemes that allow for the sharing of risks and investment costs. Their role should focus on identifying the financial needs of the sector, providing technical support to farms in the preparation of projects, and facilitating their access to green credit lines or microfinance.

e. **Research centers, universities, and technology centers:**
Assess the effectiveness of existing financial instruments and generate evidence on their impact on the adoption of sustainable practices. They should also design methodologies for evaluating the environmental and social return on investments in the agri-food sector, helping to better target public and private funds.

f. **Financial sector and investment funds:**
Develop specific financial products for the agri-food sector, such as green credit lines, carbon bonds, or public-private co-financing mechanisms. They should simplify their access requirements, incorporate verifiable climate impact metrics, and collaborate with cooperatives to scale up pilot mitigation and adaptation projects.

g. **European agencies and European Union bodies (DG AGRI, DG CLIMA, European Investment Bank):**
The role of European institutions should focus on strengthening existing financial mechanisms and designing new instruments tailored to the characteristics of the agri-food sector, where investments are typically smaller in scale, with slower returns and specific climate and market risks.

The **European Investment Bank (EIB)** could play a key role by acting as a financial intermediary and risk guarantor, facilitating green credit lines channeled through national banks and cooperative entities, with preferential conditions for projects that demonstrate verifiable emissions reductions or improvements in climate resilience. The EIB could also support the creation of a European guarantee fund for the agri-food transition, which would partially cover the risks of default by small and medium-sized farms, thereby encouraging the participation of the private financial sector.

The **European Bank for Reconstruction and Development (EBRD)**, with its experience in emerging agrarian economies, can contribute to the development of blended finance models that combine public funds, private investment, and international cooperation, especially in rural regions with less access to credit. These models could serve as pilots to be replicated at

the national level, linking financing to measurable mitigation and adaptation results.

From a regulatory and programmatic perspective, **DG AGRI and DG CLIMA** should coordinate to establish common eligibility criteria and a green taxonomy applicable to agri-food investments. This would involve defining which types of projects can be considered climate-sustainable (e.g., regenerative agriculture practices, energy efficiency, organic waste management, or carbon sequestration in agricultural soils) and ensuring their alignment with the European Sustainable Finance Taxonomy.

The Joint Research Centre (JRC) could, for its part, support the creation of standardized methodologies for assessing climate impact and environmental return for investments in the sector, providing a scientific basis for the criteria for access to European funds.

Finally, both the EIB and the EBRD could collaborate in the design of combined (public-private) financial vehicles to finance collective or cooperative decarbonization projects in the agri-food sector, encouraging the aggregation of small farms to achieve investment scales that are attractive to institutional investors.

h. **Civil society and environmental organizations:**
Monitor the transparency and integrity of financial mechanisms, ensuring that resources are effectively allocated to projects with a real climate impact. They can also promote citizen oversight and the dissemination of good practices in the use of green finance, fostering public confidence in instruments supporting the agri-food sector.

Potential barriers

a. Low short-term profitability of investments in sustainable practices, which discourages participation without public support.

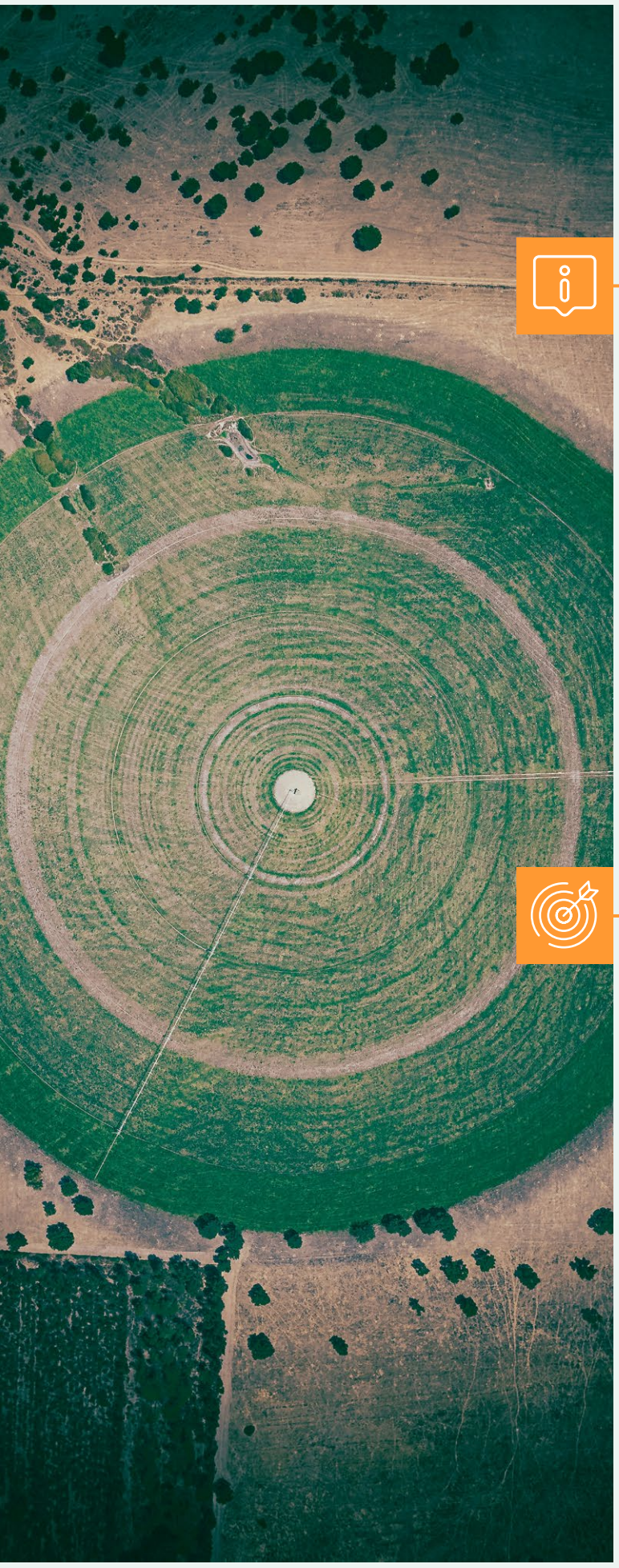
b. Lack of adaptation of existing financial instruments to the needs and scale of the agri-food sector (especially in SMEs).

c. Bureaucratic complexity and slowness in the application, evaluation, and grant award processes.

d. Limited knowledge or technical and financial support in the sector to access European or national funds.

e. Risk of concentration of resources in large farms or companies, leaving out smaller actors or groups.

f. Lack of coordination between financial programs and climate objectives, leading to overlaps or inconsistencies between lines of support.



5.1.4. DIFERENCIAR ENTRE MODELOS PRODUCTIVOS Y ADAPTAR LOS MODELOS A LOS MISMOS

What it consists of

During the discussions, the importance of differentiating between production systems and recognizing that certain practices, such as regeneratively managed extensive livestock farming, can be great allies in climate action was also highlighted. These systems promote soil improvement, biodiversity, and carbon sequestration, while maintaining economic and social activity in rural areas.

In conclusion, the need to look beyond carbon is emphasized, integrating a more holistic and ecosystemic vision into climate policies and markets that recognizes the ecological and agronomic value of sustainable practices as a whole.

Objective

Recognize the diversity of production systems and adapt climate policies, incentives, and measurement methodologies, considering ecological, social, and economic aspects. The goal is to ensure that **each model has the appropriate tools** to build climate action.

Specific measures

a. Develop differentiated evaluation criteria according to the production system.

b. Recognize the social and environmental value of certain production models, such as extensive livestock farming and organic farming, for their contributions to soil fertility, biodiversity, and/or territorial cohesion.

c. Promote mixed models that integrate production and ecosystem services.

Proposed actions

a. Develop a technical reference framework that identifies sequestration and reduction potential, as well as other sustainability indicators by production type or practice, based on scientific evidence.

b. Create demonstration pilot projects to validate practices adapted to different production systems.

Agents involved

a. **Ministry for Ecological Transition and Demographic Challenge (MITECO):** It should lead the definition of climate and environmental criteria differentiated by type of production system—intensive, extensive, organic, or mixed—ensuring their consistency with climate action and biodiversity frameworks. In coordination with MAPA, it would have to integrate these criteria into national mitigation and adaptation strategies, as well as into agricultural emissions registries. In addition, it could promote the incorporation of ecosystem services and agricultural multifunctionality into national environmental accounting systems, ensuring their recognition within market and climate compensation mechanisms.

b. **Ministry of Agriculture, Fisheries, and Food (MAPA):** Responsible for adapting agricultural policies to the diversity of production systems, it should review CAP instruments to incorporate differentiated incentives according to the model (e.g., specific payments for extensive livestock farming and regenerative agriculture). It should also coordinate the integration of specific measurement methodologies for each type of farm within national strategic plans so that the agronomic, ecological, and social value of each model is recognized. It should also promote cooperation between farms through operational groups and innovation networks that validate practices adapted to different agroecological contexts.

c. **Ministry of Economy, Trade, and Business (MINECO):**
Through the ICO and green investment instruments, it should design differentiated financing lines for sustainable production models, providing soft credit or microfinance for extensive, organic, or small-scale farms that generate ecosystem and social benefits. In addition, it can provide tax incentives to agri-food companies that integrate regenerative practices into their supply chain.

d. **Regional and local administrations:**
They should play a key role in the territorial implementation of measures, adapting rural development programs and CAP eco-schemes to the productive realities of each region. They can also create regional agricultural sustainability observatories that collect data on carbon, biodiversity, and soil based on the production system. At the local level, rural municipalities can act as facilitators of pilot projects that integrate agricultural production and ecological restoration.

e. **Agricultural organizations, cooperatives, and sector associations:**
They have the capacity to identify, document, and disseminate the most effective practices for each production model, contributing to the creation of evidence-based technical frameworks. They should actively participate in the design of sustainability indicators and the validation of adapted certification systems. They can also act as intermediaries to scale up pilot projects and build confidence in new methodologies.

f. **Research centers, universities, and technology centers:**
Their role will be essential in developing differentiated measurement methodologies (e.g., for carbon, biodiversity, or animal welfare), as well as in quantifying the ecosystem benefits associated with each production system. They should contribute to the design of mixed models that integrate productivity and sustainability and generate scientific evidence to support regulatory decisions. In addition, in coordination with the EU, they can participate in innovation programs (Horizon Europe, EIT Food) aimed at validating regenerative practices in different environments.

g. **Financial sector and investment funds:**
They should incorporate the variable “production model” into their risk assessment and climate eligibility criteria, differentiating financing conditions for projects with high environmental or social value. They can promote specific funds for extensive, ecological, or mixed systems with verified environmental impact metrics. They could also develop bonds or credit lines linked to ecosystem performance, rewarding practices with demonstrable climate and social benefits.

h. **European agencies and European Union bodies (DG AGRI, DG CLIMA, JRC, EIB, EBRD):**
They should establish European reference frameworks that explicitly recognize the diversity of production models in the CAP and in future National and Regional Collaboration Plans (NCPs). In particular, DG AGRI could include productive differentiation criteria in the upcoming CAP reform for 2028–2034, ensuring that extensive livestock farming, organic farming, and agroforestry practices are given adequate weighting in climate spending. For their part, the EIB and the EBRD could develop differentiated agroecological transition funds, combining loans, guarantees, and grants to support projects for productive transformation and the conversion of intensive systems to more sustainable models.

i. **Civil society and environmental organizations:**
They should participate in dialogue and consultation processes to ensure that the definition of sustainable production models incorporates social, animal welfare, and territorial justice criteria. In addition, they can promote monitoring and transparency mechanisms for the application of differentiated incentives, as well as awareness campaigns that increase social demand for products from sustainable and regenerative systems.

Potential barriers

a. Lack of comparable and robust data on the climate and environmental performance of different production systems.

b. Difficulty in establishing common evaluation criteria without losing the specificity of each model and territory.

c. Institutional or business resistance to modifying established incentive frameworks (CAP, sectoral aid, certifications).

d. Lack of technical and human resources to adapt MRV methodologies and policies to the diversity of systems.

e. Risk of overgeneralization or inequity in the distribution of incentives if local differences are not adequately considered.

f. Limited visibility of ecosystem services from models such as extensive livestock farming or mixed agriculture compared to more intensive systems.

5.2. Climate action in business strategies

5.2.1. PROMOTE PARTNERSHIPS BETWEEN PRODUCERS AND DISTRIBUTORS TO FACILITATE ACCESS TO CERTIFICATIONS

What it consists of

The agri-food sector continues to show limited coordination between the different links in the chain, which hinders the implementation of comprehensive actions and joint participation in environmental or climate certification systems.

To overcome barriers to access to different certification schemes such as carbon footprint, sustainable production, or carbon capture, the promotion of alliances, consortia, and mutual support mechanisms is considered key.

These alliances would allow for the sharing of costs, knowledge, and technical structures, strengthening the traceability and consistency of business strategies in the sector. In addition, the importance of using existing spaces for dialogue, such as the Food Chain Observatory, to advance common agreements and facilitate coordination between agents is highlighted.

Objective

To promote cooperation and coordination between the different links in the agri-food chain (production, processing, and distribution) to facilitate joint access to different certification systems, reducing costs, simplifying processes, and improving the traceability and consistency of business strategies.

Specific measures

a. Promote the creation of strategic alliances and consortia that share resources to obtain joint certifications (carbon footprint, sustainable production, carbon capture, etc.).

b. Develop cooperative structures that offer technical assistance and advice on certification.

c. Integrate common sustainability criteria into contracts between production and distribution.

d. Incentives for distribution chains to financially support their suppliers in adopting certifications.

Proposed actions

a. Create pilot programs for collective certification, promoted by cooperatives and producer associations with technical support from distributors.

b. Implement digital traceability systems.

c. Promote contracts that include commitments to reduce emissions.

d. Organize spaces for dialogue between stakeholders involved in certification, standards, and environmental footprint issues.

e. Use existing platforms, such as the Food Chain Observatory, to facilitate sectoral agreements and promote technical exchange.

Agents involved

a. **Ministry of Agriculture, Fisheries, and Food (MAPA):**
Should lead the creation of a regulatory and technical framework that facilitates cooperation between producers, processors, and distributors in environmental and climate certification. In coordination with MITECO and the Ministry of Economy, Trade, and Business, it could develop national guidelines for best practices for joint certifications (carbon footprint, sustainable production, and carbon capture), as well as integrate these schemes into the CAP Strategic Plans and rural development programs. MAPA should also support the establishment of agri-food consortia and cooperatives that share advisory, auditing, and environmental data management services, promoting specific calls for technical and financial support.

b. **Ministry for Ecological Transition and Demographic Challenge (MITECO):**
It has the capacity to harmonize certification systems with national and European climate reporting frameworks, ensuring consistency with the future European Carbon Removal Certification (EU CRCF) and with sustainable finance taxonomy. It should define digital traceability standards and uniform verification methodologies that can be applied throughout the agri-food value chain. It could also create a national register of climate certifications to accredit and compare the results achieved by different production models.

c. **Ministry of Economy, Trade, and Business (MINECO):**
Through the ICO and green financing instruments, it should design lines of support for collective certification, providing microcredits or guarantees for agri-food SMEs and cooperatives that invest in traceability systems, auditing, or digital reporting platforms. In addition, it could incentivize large distribution companies through tax breaks for financially supporting the certification of their suppliers, thus reinforcing shared responsibility throughout the chain.

d. **Regional and local administrations:**
They play a key role in the territorial implementation of collective certification programs. They can finance cooperative structures and technical support offices in the areas of sustainability and verification, as well as facilitate connections between producers and regional distribution chains. Regional governments, through their agricultural and development agencies, can incorporate these actions into Rural Development Programs and co-finance joint certification pilot projects.

e. **Agricultural organizations, cooperatives, and sector associations:**
They should promote the creation of cooperation platforms that allow for the sharing of audit and verification costs and act as intermediaries between producers and distributors. Their role is key in identifying needs, coordinating technical training, and ensuring that certifications are adapted to the reality of small and medium-sized farms. In addition, they can promote chain agreements that include common sustainability criteria and mutual commitments to reduce emissions.

f. **Food Chain Observatory:**
A space for dialogue, coordination, and transparency.

g. **Research centers, universities, and technology centers:**
They can develop methodologies and digital tools that facilitate the measurement of environmental footprints and collective verification. Their role is to generate scientific evidence to support certifications and validate interoperable digital traceability systems between producers, processors, and distributors. They can also act as technical observatories, assessing the real impact of certification programs on emissions, efficiency, and competitiveness in the sector.

h. **Financial sector and investment funds:**
They should link green financing lines to certified projects or those in the process of certification, prioritizing partnerships between producers and distributors that generate verifiable climate benefits. The European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) could launch co-financing mechanisms and risk-sharing guarantees for collective certification initiatives, integrating traceability and climate compliance criteria into their eligibility assessments.

i. **Distributors, large agri-food companies, and retail chains:**
They have a responsibility to facilitate the inclusion of environmental criteria in contracts with suppliers and to co-finance collective certification processes, assuming part of the audit or training costs. They should also establish technical support mechanisms for their suppliers, promoting digitization and transparency in the value chain. In addition, they can incorporate the results of certifications into their sustainability communication and non-financial reports, improving corporate reputation and climate traceability.

j. **European agencies and European Union bodies (DG AGRI, DG CLIMA, JRC, EIB, EBRD):**
DG AGRI should officially recognize joint certification within the CAP framework and allow its inclusion as a fundable activity in future National and Regional Collaboration Plans (NRCPs). DG CLIMA and the JRC could define common certification and traceability methodologies that are interoperable across the EU, ensuring that certified projects can participate in European voluntary carbon markets. The EIB and EBRD should create European funds to support collective certification that integrates digitization, measurement, and climate verification in the agri-food sector.

k. **Civil society and environmental organizations:**
They should ensure the transparency and credibility of certification systems by participating in the validation of standards and independent monitoring of results. They can also promote awareness campaigns to inform consumers about the added value of certified products and encourage public recognition of chains that adopt verified sustainability and climate action practices.

Potential barriers

a. Lack of trust and effective coordination between the different links in the chain, resulting from economic interests or power asymmetries.

b. High initial costs and lack of shared financing to implement joint certifications.

c. Inequality in technical and administrative capacities between large companies and small producers.

d. Poor harmonization between existing standards and labels, which can lead to confusion or duplication in certifications.

e. Lack of common digital platforms to facilitate traceability, communication, and joint data management.

f. Cultural or institutional resistance to modifying traditional contracts and commercial relationships in favor of collaborative models.

5.2.2. NEED FOR GREATER COOPERATION BETWEEN LINKS IN THE CHAIN

What it consists of

The proposal is to establish multisectoral collaboration frameworks that integrate companies, cooperatives, public administrations, and research centers to strengthen cooperation between the different links in the agri-food chain. The aim is to promote crop diversification programs at the regional level, encourage investment in local logistics infrastructure, and develop medium- and long-term supply agreements between companies and producers, ensuring stable availability of domestic products and a more resilient and sustainable supply chain.

Objective

To strengthen coordination and collaboration between the different links in the agri-food chain (producers, processors, distributors, administrations, and knowledge centers) to promote joint strategies for sustainability, climate resilience, and stable local supply, generating shared economic, social, and environmental benefits.

Specific measures

a. Establish frameworks for multisectoral and multi-stakeholder collaboration.

b. Promote medium- and long-term supply agreements to ensure stable prices, sustainability, and food security.

c. Encourage crop diversification programs, as well as practices that promote circular economy schemes (linking livestock and agriculture).

Proposed actions

a. Promote supply contracts with sustainability criteria that include emission reduction clauses.

b. Develop collaborative innovation initiatives that promote joint projects in digitization, the circular economy, etc.

c. Establish green public procurement programs that prioritize local and low-carbon products.

d. Use established spaces such as the Food Chain Observatory to strengthen coordination and facilitate cross-sector agreements.

Agents involved

a. **Ministry of Agriculture, Fisheries, and Food (MAPA):**
It should lead the creation of stable cooperation frameworks between producers, processors, and distributors, promoting national or regional platforms for dialogue and agri-food collaboration. In coordination with MITECO and the autonomous communities, it can promote medium- and long-term supply agreements that integrate sustainability and price stability criteria, as well as encourage crop diversification and the connection between agriculture and livestock in rural development programs. The MAPA can also organize specific calls for proposals within the CAP and the Strategic Plan (PEPAC) to finance collective projects that strengthen the integration of the value chain and territorial resilience.

b. **Ministry for Ecological Transition and Demographic Challenge (MITECO):**
It must ensure that cooperation and supply frameworks include climate and circular economy criteria so that partnerships between actors in the sector contribute effectively to national decarbonization and adaptation objectives. In coordination with MAPA, it can define incentives for low-emission agro-industrial projects, as well as environmental certification mechanisms that value sustainable business alliances. It can also participate in the promotion of green public procurement, integrating sustainability and carbon footprint reduction clauses into public food contracts.

c. **Ministry of Economy, Trade, and Business (MINECO):**
Through the ICO and business support instruments, it should develop financing and guarantee lines for companies and cooperatives that establish sustainable supply agreements or invest in local logistics infrastructure and proximity storage. It could also provide tax incentives for collaborative investments between different links in the chain (e.g., agreements between agricultural cooperatives and processing or distribution companies). In addition, it can promote the sustainable internationalization of agri-food alliances through programs that support the external competitiveness of low-carbon products.

d. **Regional and local administrations:**
They should implement and adapt multisectoral collaboration frameworks to the regional context, promoting productive diversification and balanced territorial development. Autonomous communities can integrate these objectives into their rural development programs, agri-food clusters, and bioeconomy strategies, while city councils and provincial councils can promote local markets, local logistics centers, and green public procurement programs that prioritize local and sustainable products.

e. **Agricultural organizations, cooperatives, and sector associations:**
They play a key role in coordinating cooperation between producers and the rest of the chain. They should promote collective supply contracts with environmental clauses, facilitate the joint organization of supply, and coordinate shared logistics to reduce costs and emissions. They can also act as mediators in the creation of consortia or operational groups that integrate innovation, digitalization, and sustainability.

f. **Research centers, universities, and technology centers:**
They should provide technical support for the design and evaluation of multi-stakeholder cooperation frameworks, as well as the development of pilot projects for the circular economy and digitalization in agri-food value chains. In addition, they can generate environmental and socioeconomic performance indicators to measure the impact of partnerships (e.g., in avoided emissions, energy efficiency, waste reduction, or territorial resilience). Their role is key in the transfer of knowledge and the systematization of good practices.

g. **Financial sector and investment funds:**
It should facilitate financing tailored to collaborative projects and the implementation of low-carbon practices.

h. **Distributors, the agri-food industry, and large companies:**
These are essential actors in generating long-term supply contracts that guarantee stability and promote the transition to low-carbon models. They should include clauses in their sustainability strategies to support local and smaller suppliers, as well as participate in joint innovation projects with producers (e.g., digitization of traceability or energy efficiency in transport and storage).

i. **European agencies and European Union bodies (DG AGRI, DG CLIMA, EIB, EAFRD):**
DG AGRI should strengthen cooperation mechanisms within the CAP and facilitate their integration into future National and Regional Collaboration Plans (NCPs), ensuring consistency with resilience and food security objectives. The EAFRD can co-finance sustainable vertical integration projects, while the EIB can offer financial instruments for the development of low-emission logistics infrastructure and the circular economy.
DG CLIMA can contribute to the alignment of these projects with European decarbonization and climate neutrality strategies.

j. **Civil society and environmental organizations:**
Their involvement can strengthen the transparency, traceability, and social legitimacy of partnerships between links in the chain, ensuring that cooperation agreements truly contribute to environmental and social sustainability. They can also promote spaces for participatory dialogue and launch campaigns that highlight the value of sustainable local chains and the connection between responsible consumption and territorial resilience.

Potential barriers

a. Lack of a culture of cooperation between the different actors in the agri-food system, stemming from competition or historical mistrust between links in the chain.

b. Misalignment of economic interests and sustainability objectives between producers, industry, and distribution.

c. Inequality of bargaining power within the chain, which can limit the equitable participation of small producers.

d. Absence of governance or coordination structures to facilitate joint decision-making and monitoring of agreements.

e. Limitations in local logistics and transport infrastructure, which hinder the creation of short circuits and more sustainable regional chains.

f. Regulatory fragmentation and lack of specific incentives that recognize or reward cross-sector cooperation.

5.2.3. IMPROVING ACCESS TO INFORMATION

What it consists of

Administrative obstacles are identified as one of the main barriers to climate transition in the agri-food sector. It is proposed to ensure greater regulatory stability that encourages long-term investment, as well as to simplify and harmonize environmental and climate legislation applicable to the sector. In addition, it is proposed to improve institutional communication on aid, speed up the granting process, and adapt eligibility criteria to the reality of the countryside.

It is also considered key to strengthen agricultural training and extension systems, increase public investment in technical training, and promote independent advice. Finally, it is suggested that public and private programs be designed to support the scalability of successful projects, facilitating the transfer of knowledge and the replicability of positive experiences.

Objective

To ensure clear, agile, and transparent access to information and resources available to the agri-food sector in terms of sustainability, climate finance, and regulations, reducing administrative barriers and strengthening the sector's technical capacity for long-term planning and investment.

Specific measures

a. Simplify and harmonize environmental and climate legislation to provide legal certainty and regulatory consistency.

b. Improve institutional communication on aid, calls for proposals, and requirements, centralizing information in single, accessible channels.

c. Streamline administrative processes for applying for, evaluating, and awarding grants and subsidies.

d. Strengthen training, advisory, and agricultural extension systems, promoting continuous and independent technical support.

e. Facilitate the exchange of information and best practices among stakeholders.

Proposed actions

a. Design public and private programs to support the scalability of successful projects, facilitating technology transfer and the exchange of results.

b. Establish free or subsidized regional technical advisory services on sustainability, emissions management, and climate adaptation.

c. Strengthen the network of agricultural extension, technology transfer, and vocational training, including content on ecological transition, circular economy, and carbon markets.

d. Promote awareness campaigns and information days that bring technical and administrative information closer to producers and small businesses in rural areas.

Agents involved

a. **Ministry of Agriculture, Fisheries, and Food (MAPA):**
It should lead the way in simplifying administration and improving institutional communication with the agri-food sector, especially with regard to CAP aid, calls for proposals, and requirements. To this end, it could set up a single portal for climate and agricultural information, bringing together data on financing, regulations, and training. It should also strengthen the agricultural advisory and extension network and knowledge transfer, ensuring the territorial presence of free public technical services, and strengthen agricultural vocational training through content on sustainability, digitization, emissions management, and adaptation to climate change. It can also coordinate with MITECO to create systems for the exchange of good practices and experiences that can be replicated at the regional level.

b. **Ministry for Ecological Transition and Demographic Challenge (MITECO):** Responsible for regulatory coherence in environmental and climate matters, it should promote the harmonization and simplification of regulations applicable to the agri-food sector, avoiding overlaps between regulatory frameworks. It should also coordinate with MAPA to integrate climate information (e.g., emissions inventories, mitigation and adaptation indicators, and DNSH principle requirements) into agricultural information systems. In addition, it can support the creation of digital transparency platforms that facilitate access to information on aid, incentives, and technical requirements, as well as promote the training of public technical staff in environmental assessment and sustainable project management.

c. **Ministry of Economy, Trade, and Business (MINECO):** Through the ICO and its green investment promotion programs, it can contribute to improving financial information and accessibility to climate finance instruments, especially for small farms and agri-food SMEs. It plays an important role in disseminating green credit lines and guarantees (ICO Verde, MRR, and InvestEU) and coordinating with MAPA to publish practical financing guides tailored to rural areas.

d. **Regional and local administrations:** They must implement measures at the territorial level, establishing one-stop shops for agri-environmental and regional technical advisory services integrated into the structure of their agricultural and environmental departments. These administrations can simplify administrative procedures, coordinate communication between different calls for proposals, and bring technical information closer to farms, especially in rural areas with low connectivity. They must also reactivate or expand agricultural training networks and rural training schools, incorporating content on innovation, circularity, and sustainability.

e. **Agricultural organizations, cooperatives, and sector associations:** They play an essential role in the transmission of information and practical training in the sector. They should create or strengthen internal technical services that advise producers on compliance with environmental requirements and on applying for aid. They can also collaborate with the administration in communication campaigns and information days, ensuring that the content is adapted to the language and real needs of the countryside.

f. **Research centers, universities, and technology centers:** They should contribute to the design of training, agricultural extension, and technology transfer programs, incorporating the latest scientific and technological advances in mitigation, adaptation, and resource efficiency. In addition, they can participate in knowledge transfer programs that facilitate the scalability of successful projects and the dissemination of R&D results to the productive sector. They can also support the development of sustainability observatories that collect and systematize information on climate impact, innovation, and productivity in the sector.

g. **Financial sector and business support entities:**
They have a responsibility to improve the transparency and understanding of green financing instruments available to the agri-food sector. They can offer specialized financial advisory services on sustainable investment and publish accessible guides on how to access loans or guarantees linked to green projects. Their collaboration with cooperatives and sectoral organizations can facilitate financial support for small farms.

h. **European agencies and European Union bodies (DG AGRI, DG CLIMA, JRC):**
DG AGRI can enhance the transparency and simplification of CAP-related procedures by improving communication with Member States and supporting the development of common digital tools. DG CLIMA and the JRC can support the harmonization of information systems on emissions and adaptation in agriculture, ensuring that national data is compatible with European standards. In addition, they can finance training and technical advisory projects through Horizon Europe, LIFE, or the EAFRD, aimed at training technical staff and digitizing the sector.

i. **Civil society and environmental organizations:**
They can contribute to the dissemination and accessibility of climate and environmental information through training materials, workshops, and campaigns in rural areas. Their participation can strengthen transparency and trust between producers, the administration, and citizens, ensuring that information is disseminated in a clear, understandable, and unbiased manner.

Potential barriers

a. Institutional fragmentation and lack of coordination between the relevant administrations (state, regional, and local).

b. Excessive bureaucracy and complex application processes, which discourage the participation of small farms.

c. Lack of uniform digitization in public management systems and in the one-stop shop for aid.

d. Limited technical and human resources capacity in the administration and in the sector itself to manage the available information.

e. Lack of ongoing training in sustainability, aid management, and climate adaptation.

f. Lack of knowledge or trust in official information channels and technical support within the sector.

5.3. Financing mechanisms

5.3.1. MOVING FROM REACTIVE MEASURES TO PREVENTIVE RISK MANAGEMENT STRATEGIES

What it consists of

The proposal is to promote a change of approach to climate risk management within the agri-food sector, moving from responding to damage once it has occurred (reactive measures) to anticipating it through preventive and adaptive strategies. This involves promoting investment in resilient infrastructure, soil restoration, and water management, as well as linking agricultural insurance to climate adaptation and rewarding farms that reduce their vulnerability to climate threats. In addition, it proposes promoting the use of prediction technologies, early warning systems, and digital tools that enable more efficient risk management and more informed planning.

Objective

To promote a change in climate risk management within the agri-food sector, moving from a reactive approach (response to damage) to a preventive and adaptive one, based on planning, investment, and implementation of measures that reduce the sector's vulnerability to extreme weather events.

Specific measures

a. Create a system of incentives for preventive investments in infrastructure, water management, soil restoration, drainage improvement, etc.

b. Link agricultural insurance to climate adaptation, rewarding farms that implement measures to reduce their exposure and vulnerability to different climate hazards.

c. Promote early warning systems to improve climate risk management.

d. Integrate climate risk assessment into the planning of agri-food companies.

e. Promote training and technical assistance on climate risk adaptation and management in the agricultural sector.

Proposed actions

a. Design incentive programs for preventive investments linked to risk management.

b. Introduce discounts on agricultural insurance premiums for farms that adopt adaptation practices.

c. Develop and make available to the sector digital tools that integrate monitoring data to anticipate risks (meteorological, agronomic, hydrological, etc.).

Agents involved

a. **Ministry of Agriculture, Fisheries, and Food (MAPA):**
Should lead the transition towards preventive climate risk management within the agri-food sector. Through the State Agricultural Insurance Entity (ENESA) and the State Agricultural Guarantee Company (SAECA), it can introduce discounts on agricultural insurance premiums for farms that adopt adaptation measures (such as efficient water management, crop diversification, or soil restoration). In addition, it should integrate climate risk assessment into rural development programs and CAP interventions, linking aid to preventive and resilient practices.

The MAPA can also promote territorial and sectoral planning based on climate scenarios by updating agricultural information systems and strengthening the early warning network for extreme events, in coordination with MITECO and the autonomous communities.

b. **Ministry for Ecological Transition and Demographic Challenge (MITECO):**
Responsible for national climate change adaptation policy and coordination of the National Adaptation Plan (PNACC), MITECO should ensure the integration of climate risk into water, soil, and biodiversity policies. It can promote preventive investments in ecosystem restoration, watershed management, and natural drainage, as well as develop common indicators to assess the vulnerability of the sector.

In collaboration with MAPA and AEMET, it should strengthen monitoring and early warning systems, ensuring their connection with regional agricultural services and the dissemination of real-time information to producers.

c. **Ministry of Economy, Trade, and Business (MINECO):**
It should coordinate with the ICO and public and private financial institutions to develop green credit lines and guarantees to finance preventive investments (water infrastructure, drainage systems, forest management, and soil regeneration). It could also encourage the creation of climate hedging financial products linked to adaptation performance, in collaboration with the insurance sector.

MINECO can also support the creation of a national agri-food resilience fund, in line with European climate finance mechanisms, to facilitate the transition of vulnerable farms to safer and more sustainable models.

d. **Regional and local administrations:**
They should take on the territorial implementation of preventive strategies, financing green infrastructure projects, soil restoration, drainage improvement, and water management. The autonomous communities, in their role as competent authorities in agriculture and the environment, can co-finance insurance subsidies and establish regional climate risk management plans. Local governments, for their part, can promote adaptive urban and rural planning, integrating risk management into land use planning and supporting producers in climate emergencies.

e. **Agricultural organizations, cooperatives, and sector associations:**
Their role is key in promoting the adoption of preventive measures among producers. They should disseminate information on the benefits of adaptation, assist farms in assessing vulnerabilities, and facilitate the purchase of appropriate insurance. In addition, they can manage collective preventive investment programs (e.g., shared irrigation systems or joint drainage projects) and serve as a liaison with insurers and public administrations.

f. **Research centers, universities, and technology centers:**
They must provide the scientific and technical basis for designing effective prevention strategies. Their work includes developing predictive climate risk models, assessing the impact of adaptation measures, and generating digital monitoring and warning tools. In addition, they should contribute to training and technical advice, training agricultural personnel in risk management, climate-smart agriculture, and the use of observation and prediction technologies.

g. **Insurance and financial sector:**
The combined agricultural insurance system, led by ENESA and Agroseguro, must evolve to integrate adaptation criteria, offering bonuses and differentiated premiums to those who reduce their climate vulnerability. Insurers can incorporate risk analysis tools based on meteorological and satellite data, adjusting coverage models to the new climate reality.

For its part, the financial sector (ICO, credit cooperatives, rural banks) should prioritize projects that demonstrate physical risk reduction and greater resilience, channeling green financing towards preventive infrastructure and technologies.

h. **European agencies and European Union bodies (DG AGRI, DG CLIMA, EIB, EUSPA):**
DG AGRI can include preventive climate risk management as a cross-cutting priority in the post-2027 CAP, linking part of the expenditure to adaptation and resilience indicators. DG CLIMA could strengthen the link between the CAP and the EU Civil Protection Mechanism to promote synergies in emergency management and prevention.

The European Investment Bank (EIB) can offer specific financial instruments for preventive investments in rural areas, while the European Space Program Agency (EUSPA) can facilitate the use of Copernicus data to improve early warning systems and real-time agricultural monitoring.

i. **Civil society and environmental organizations:**
They should raise awareness of the costs and benefits of climate risk prevention. They can collaborate in dissemination and training campaigns, promote projects to restore productive ecosystems, and monitor and ensure transparency regarding the effectiveness of public investments in adaptation. Their involvement is essential to consolidate a culture of prevention and climate co-responsibility in the sector.

Potential barriers

a. Lack of a culture of prevention and predominance of a reactive approach to agricultural risk management.

b. High initial costs of preventive investments, without an immediate economic return.

c. Absence of specific incentives or clear links between agricultural insurance and adaptation practices.

d. Limitations in the availability and accessibility of climate and agronomic data to develop reliable prediction tools.

e. Lack of coordination between administrations and insurance companies, which hinders integrated risk management.

f. Technological gap and lack of digital training in rural areas, which hinders the use of early warning systems and advanced risk management tools.

5.3.2. REDUCING COST BARRIERS FOR LOW-CARBON TECHNOLIGIES

What it consists of

Low-carbon technologies are an essential pillar of the agri-food sector's climate transition, as they enable emissions to be reduced, efficiency to be improved, and progress to be made towards more sustainable production systems. However, implementation costs remain high, especially for small and medium-sized farms, which limits their adoption. The proposal is to design co-financing and public-private support programs to offset initial costs, analyze barriers to access existing financial instruments, and develop tailored alternatives, such as green microloans, revolving funds, or tax incentives, to facilitate investment in climate innovation.

Objective

To facilitate the adoption of low-carbon technologies by reducing the economic and administrative barriers currently faced by the sector, to accelerate the decarbonization of the production system and climate adaptation, and to encourage the participation of small and medium-sized entities.

Specific measures

a. Design co-financing and public-private support programs to partially cover the costs associated with the implementation of low-carbon measures.

b. Review existing financial instruments (PERTE, green ICO lines, etc.) to identify the reasons for their low use by the sector.

c. Develop financing alternatives tailored to small farms and businesses: microcredits, revolving funds, or results-based payments.

d. Promote sectoral or cooperative agreements for the collective purchase of technologies to reduce costs.

e. Promote practical training and transfer to ensure the use and profitability of innovative low-carbon projects.

Proposed actions

a. Promote practical training and transfer to ensure the use and profitability of innovative low-carbon projects.

b. Create a co-financing program for low-carbon technologies (renewable energies, efficient irrigation systems, biogas digesters, use of inhibitors in agriculture, etc.).

c. Establish subsidies or deductions for investments in emission reduction technologies in the agri-food sector.

d. Conduct a sector-level diagnosis of barriers to access green financing.

e. Promote joint venture platforms managed by cooperatives or professional associations.

f. Promote training and demonstration projects that show the economic returns and environmental benefits of low-carbon technologies.

Agents involved

a. **Ministry of Agriculture, Fisheries, and Food (MAPA):**
Should lead the identification of the technological and financial needs of the agri-food sector and coordinate specific support programs for the adoption of low-carbon technologies (efficient irrigation, renewable energies, and electric or precision machinery). In collaboration with MINECO and the autonomous communities, it can promote calls for co-financing under the CAP and EAFRD funds, as well as establish collective or cooperative purchasing mechanisms to reduce unit costs.

MAPA should also strengthen training and technical support services to ensure that investments in climate innovation are profitable and sustainable in the long term.

b. **Ministry of Economy, Trade, and Business (MINECO):**
Through the Official Credit Institute (ICO) and other financial instruments, it should review green financing lines (such as the ICO MRR Verde line) to adapt requirements to the reality of the agri-food sector and facilitate access for small and medium-sized farms. It should also promote the creation of green microcredits, revolving funds, or pay-for-performance schemes aimed at agricultural decarbonization projects.

MINECO can also offer temporary tax incentives for agri-food companies that invest in low-emission technologies and support the channeling of European funds (InvestEU, Innovation Fund) to the primary sector in coordination with MAPA and the EIB.

c. **Ministry for Ecological Transition and Demographic Challenge (MITECO):**
It should ensure the consistency of measures with national decarbonization objectives, promoting the integration of low-carbon technologies into the Integrated National Energy and Climate Plan (PNIEC) and the National Climate Change Adaptation Plan (PNACC). In coordination with MAPA, it can finance pilot energy transition projects on farms and cooperatives and support the creation of public-private platforms for rural climate innovation.

MITECO can also provide technical assistance and sectoral guidelines on the technologies with the greatest potential for reducing emissions in agriculture, livestock, and agribusiness.

d. **Regional and local administrations:**
They should implement territorialized support programs, co-financing projects with EAFRD, LIFE, or cohesion funds. Autonomous communities can offer regional subsidies for low-carbon investments, as well as coordinate producer groups and cooperatives for joint purchases or shared facilities (e.g., energy self-consumption).

At the local level, municipalities can set up green transition technical offices to advise small farms on available aid, permit management, and technology installation.

e. **Agricultural organizations, cooperatives, and sector associations:**
They should promote the collective adoption of technologies, encouraging cooperative models of investment and shared management. They can act as intermediaries between producers and financial institutions, pooling demand to access preferential purchasing or credit terms.

They also have a key role in knowledge transfer, organizing workshops and training on profitability, maintenance, and optimization of the technologies implemented.

f. **Research centers, universities, and technology centers:**
They should contribute to the analysis of costs, returns, and climate effectiveness of the technologies applied in the agri-food sector, providing scientific evidence to guide public policies and incentives. They can also develop demonstration projects and platforms for technology transfer and dissemination, in collaboration with companies and cooperatives, to facilitate the replication of good practices and the validation of innovations adapted to different production scales.

g. **Financial sector and investment funds:**
Financial institutions—including ICO, SAECA, cooperative banks, and rural savings banks—should design financial products tailored to the characteristics of the sector, with long terms, low interest rates, and flexible guarantees. They can also offer green bonds and sustainable loans linked to decarbonization results, prioritizing projects that contribute to verifiable emissions reductions.

The European Investment Bank (EIB) can channel specific lines of credit to small farms, cooperatives, or agri-food SMEs that adopt low-carbon technological solutions.

h. **European agencies and European Union bodies (DG AGRI, DG CLIMA, EIB, Innovation Fund):**
DG AGRI can strengthen support for low-carbon modernization through the CAP and the EAFRD, simplifying procedures for technological investment projects. DG CLIMA and the Innovation Fund can finance the development and deployment of innovative mitigation technologies in the agro-industrial sector.

The EIB can play a catalytic role through guaranteed instruments and public-private blending, reducing the risk of initial investments. In addition, the European Commission could facilitate interoperability between European funding mechanisms (LIFE, Horizon Europe, and InvestEU) to maximize the sector's access to climate funds.

i. **Civil society and environmental organizations:**
They can play a supporting and monitoring role, ensuring that public aid is effectively directed towards technologies with real climate benefits and avoiding greenwashing effects. They can also promote awareness campaigns and disseminate success stories, contributing to the social acceptance and visibility of low-carbon technologies.

Potential barriers

a. High initial investment costs and long payback periods, which make it difficult to adopt technologies without financial support.

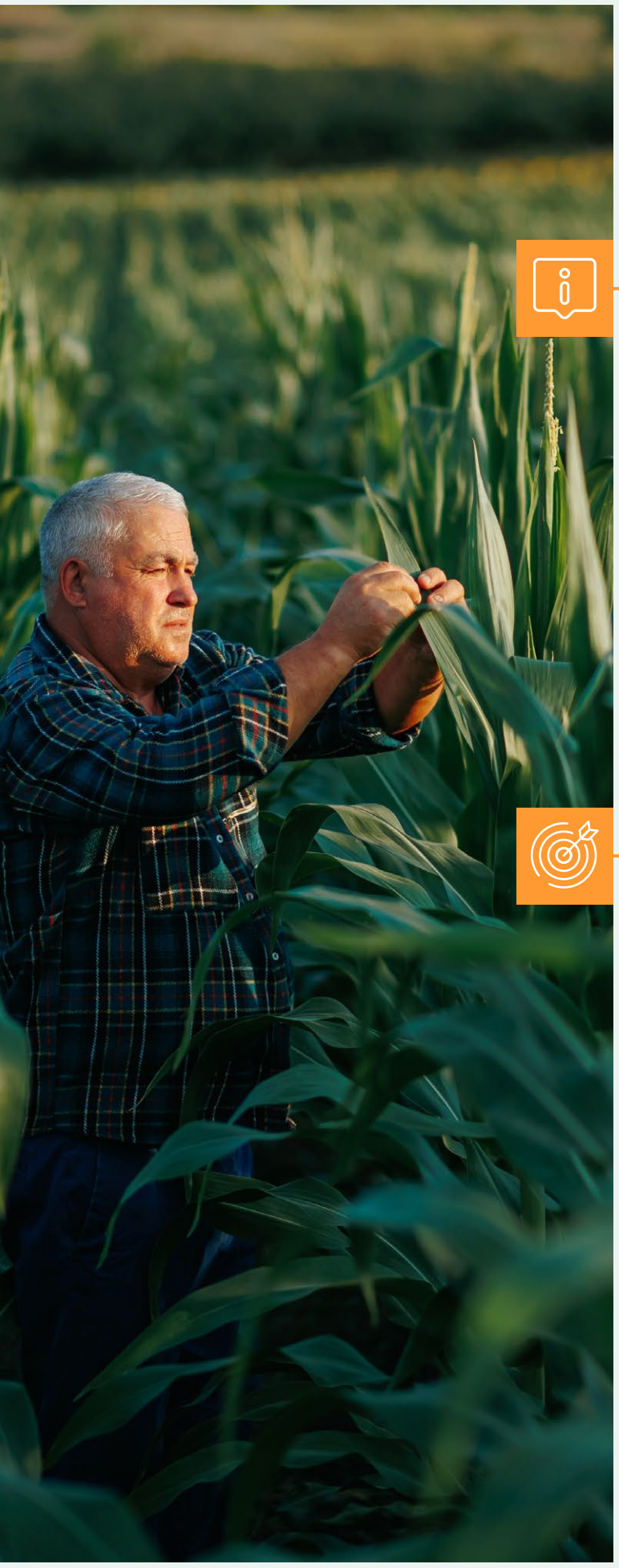
b. Difficulty in accessing green financing for small farms due to bureaucratic requirements or lack of guarantees.

c. Lack of technical knowledge or specialized support to select, implement, and maintain low-carbon technologies.

d. Fragmentation of aid and overlapping programs, which creates confusion and inefficiency in their use.

e. Risk of dependence on international technology suppliers, with potential maintenance or technical support issues.

f. Lack of evidence on short-term economic returns, which reduces the perception of viability among producers.



5.3.3. ENSURING THE LONG-TERM ECONOMIC VIABILITY OF SUCCESSFUL PROJECTS

What it consists of

Once the pilot phase is over, many low-carbon or climate action agri-food projects face difficulties in sustaining themselves over time due to the lack of ongoing financing mechanisms, the absence of stable contracts, or limited integration into established value chains. The proposal is to design staggered financing schemes that accompany the development of projects beyond their initial phase, promoting their consolidation, replicability, and structural integration into business and territorial strategies. It also proposes establishing public-private partnerships and collaboration mechanisms between producers, industry, and distribution to ensure the economic, technical, and social viability of the most successful initiatives.

Objective

To ensure the continuity and consolidation of low-carbon projects that have demonstrated positive results through financing mechanisms and integration throughout the agri-food chain, preventing pilot initiatives from becoming isolated or being lost due to lack of financial support.

Specific measures

a. Design staggered financing schemes that accompany the development of projects beyond their initial phase, facilitating their consolidation and replicability.

b. Integrate successful projects throughout the value chain, promoting agreements between producers, industry, and distribution.

c. Create continuity funds to ensure the maintenance and expansion of successful initiatives and projects.

d. Promote public-private partnerships that enable joint investment and long-term stability for successful experiences.

Proposed actions

a. Design a phased financial mechanism, with support phases linked to verified results.

b. Incorporate economic viability criteria into the selection of projects financed by public programs.

c. Create an observatory or registry of successful projects to facilitate their visibility and connection with potential investors and partners.

d. Promote mixed financing instruments to consolidate low-carbon projects in the sector.

Agents involved

a. **Ministry of Agriculture, Fisheries, and Food (MAPA):**
It should lead the identification, monitoring, and consolidation of successful agri-food projects in the field of climate mitigation and adaptation. Through the instruments of the CAP and the EAFRD, it can design staggered financing mechanisms to accompany initiatives beyond their pilot phase, linking disbursements to the achievement of measurable results in emissions reduction, productivity, and sustainability.

Likewise, MAPA can promote the creation of a national observatory of successful projects that records, evaluates, and disseminates good practices, facilitating their replicability and connection with potential partners or investors. In coordination with the autonomous communities, it should encourage agreements between producers, industry, and distribution to integrate these projects into consolidated value chains and give them commercial stability.

b. **Ministry of Economy, Trade, and Business (MINECO):**
It plays a central role in designing financial instruments adapted to the maturity of projects, allowing for their scalability. Through the ICO, ENISA, and the Recovery, Transformation, and Resilience Plan (PRTR) programs, it could develop continuity or climate transition funds that offer financing in advanced stages to projects with proven results.

It should also encourage the creation of mixed public-private investment vehicles (e.g., co-investment funds or risk-sharing guarantees) that ensure the permanence of climate initiatives with real impact. In addition, it could establish tax incentives or interest rate reductions for companies that integrate consolidated low-carbon agri-food projects into their business model.

c. **Ministry for Ecological Transition and Demographic Challenge (MITECO):**
In its role as coordinator of decarbonization and adaptation policies, it should integrate successful projects into national planning instruments—such as the PNIEC, the PNACC, and the Circular Economy Strategy—to ensure their consistency and long-term sustainability.

It can also support the development of mechanisms for certification and official recognition of climate results (e.g., carbon sequestration or resilience improvements) that allow projects to generate additional income in voluntary markets or offset schemes. Likewise, MITECO can promote the creation of digital monitoring and reporting platforms to verify climate impacts and facilitate access to national and international climate finance for consolidated projects.

d. **Regional and local administrations:**
They should co-finance and support the expansion of successful projects within their territories, integrating them into regional strategies for rural development, innovation, and climate action. Autonomous communities can allocate resources from their EAFRD programs or their own funds to regional continuity funds, ensuring the permanence of initiatives with demonstrable benefits.

Local governments, for their part, can promote the installation of infrastructure, processing centers, or logistics spaces that consolidate the territorial and economic integration of projects.

e. **Agricultural organizations, cooperatives, and sector associations:**
They should take an active role in the economic and operational consolidation of successful projects. This involves promoting long-term supply agreements, facilitating the participation of farms in collective investment schemes, and disseminating viable business models. They can also act as intermediaries between administrations and the private sector to identify projects with high scalability potential and seek industrial or commercial partners to ensure their sustainability.

f. **Research centers, universities, and technology centers:**
Their role is to guarantee the technical and scientific validity of project results, contributing to their evaluation and monitoring. They can generate methodologies for verifying climatic and economic results, as well as tools for estimating the return on investments in sustainability. In addition, they can develop platforms for technology transfer and knowledge, connecting successful projects with new opportunities for financing or business collaboration.

g. **Financial sector and investment funds:**
They should design financial mechanisms adapted to the project consolidation phase (e.g., second-stage loans, impact bonds, or blended finance instruments). Cooperative banks, rural credit unions, and agricultural credit institutions can offer low-interest financing to expand or replicate demonstration projects.

The European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) could establish credit lines or continuity guarantees for agri-food projects with verified results in mitigation or adaptation, prioritizing those that integrate technological innovation or ecological restoration.

h. **European agencies and European Union bodies (DG AGRI, DG CLIMA, InvestEU, Innovation Fund, EAFRD):**
DG AGRI can promote the continuity of projects through the EAFRD and the future CAP (2028–2034), allowing additional funding for the scaling-up and replicability phase. InvestEU and the Innovation Fund can support agro-industrial projects that demonstrate climate impact and economic profitability with guarantee or co-investment instruments.

DG CLIMA can recognize these projects within European climate action programs and highlight them as reference models, while the Commission could support the creation of a European database of successful projects that promotes transnational cooperation and private investment.

i. **Civil society and environmental organizations:**
They can play a role in monitoring, disseminating, and socially legitimizing successful projects, ensuring the transparency and consistency of their climate results. In addition, they can collaborate in identifying projects with high environmental and social value, support their connection to international networks, and contribute to the assessment of their impacts on biodiversity, rural employment, and territorial equity.

Potential barriers

a. Lack of long-term financial mechanisms, with public support focused solely on pilot phases or initial innovation.

b. Absence of clear indicators of success and climate or economic return, which hinders the continuity of funding.

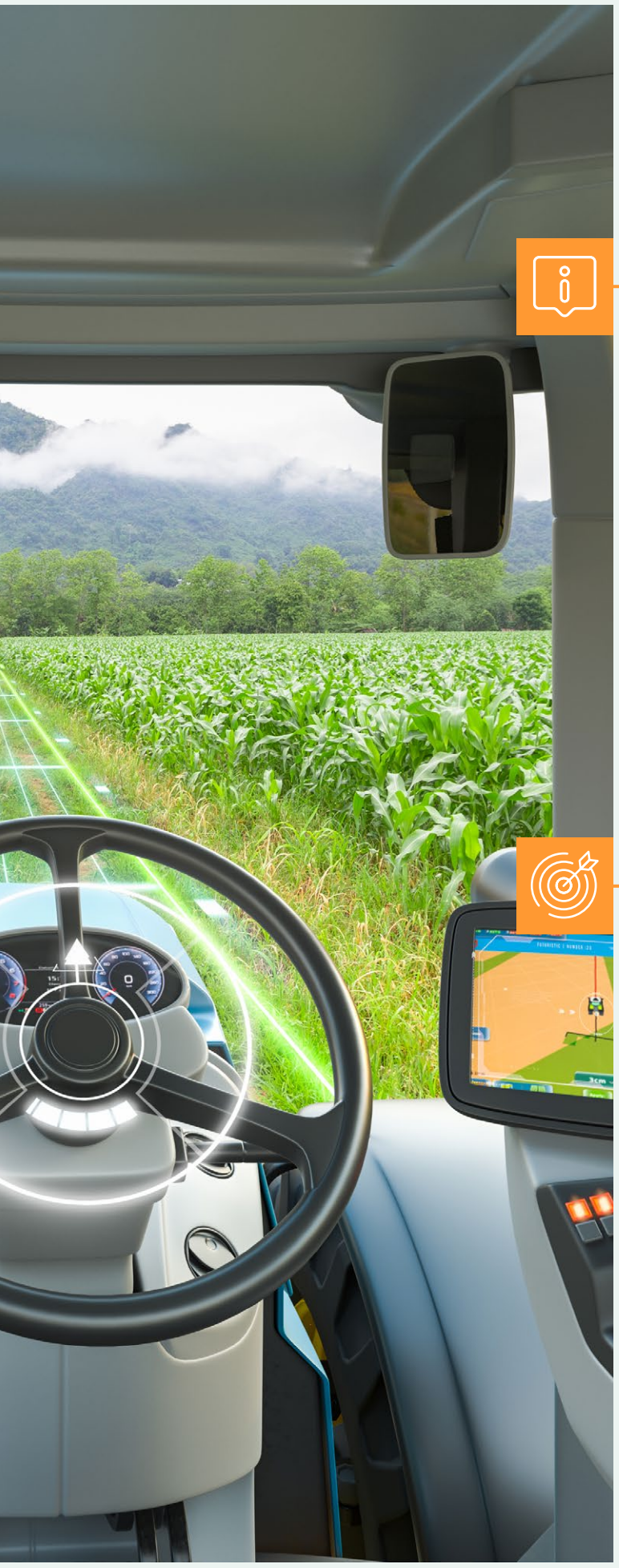
c. Limited coordination between funders, administrations, and sector actors, leading to discontinuity of support.

d. Difficulty in integrating successful projects into large-scale business strategies or global value chains.

e. Risk of dependence on public subsidies, without consolidating self-sustaining business models.

f. Lack of post-project monitoring and evaluation structures, which prevents the measurement of results and the justification of new investments.

g. Unequal access to scalability opportunities, especially for small farms or initiatives in areas with less technical capacity.



5.3.4. SPECIALIZED TECHNICAL SUPPORT FOR THE PRODUCTION SECTOR

What it consists of

The climate transition of the agri-food sector requires not only funding and incentives but also specialized and continuous technical support to ensure the correct application of sustainable measures and technologies. Currently, many farms, especially small and medium-sized ones, lack adequate technical support to plan, implement, and monitor mitigation and adaptation practices.

The proposal is to create a national network for technical assistance in agricultural climate action, coordinated through cooperatives, professional organizations, technology centers, and universities, to provide independent advice, training, and field support.

Objective

To strengthen the technical capacities of the sector by creating a network of specialized assistance and support for climate transition, providing ongoing advice tailored to the territory and aligned with public policies and the climate objectives of the agri-food sector.

Specific measures

a. Create a nationwide network of technical assistance in agricultural climate action, coordinated by cooperatives, professional associations, academia, and technology centers.

b. Finance technical profiles specialized in climate action and sustainability within cooperatives, interprofessional organizations, and agricultural organizations.

c. Ensure continuous training and education in sustainability, mitigation, and adaptation.

Proposed actions

a. Design a public support and financing program for the hiring of technical profiles specialized in climate action within cooperatives and associations.

b. Create regional advisory offices that offer subsidized or free services for project diagnosis, planning, and monitoring.

c. Promote training in digital skills and sustainability for technicians.

d. Develop a digital knowledge-sharing platform that compiles tools, guides, and case studies.

Stakeholders involved

a. **Ministry of Agriculture, Fisheries, and Food (MAPA):**
It should take the lead in creating, coordinating, and financing a national network of technical assistance in agricultural climate action, integrating cooperatives, professional organizations, technology centers, and universities.

It should:

- Design a national program to support the hiring of technicians specialized in sustainability and climate action within cooperatives and agricultural organizations.
- Co-finance with EAFRD funds the creation of regional agricultural advisory offices, especially in rural areas with less technical capacity.
- Establish minimum training and certification standards for technical advisors, ensuring their alignment with CAP objectives, emissions mitigation, and climate change adaptation.
- Integrate this system into the National Rural Network to coordinate the transfer of knowledge and experiences of agricultural innovation.

b. **Ministry for Ecological Transition and Demographic Challenge (MITECO):**
It must ensure the consistency of the technical assistance network with national mitigation and adaptation strategies (PNACC, PNIEC, Circular Economy Strategy).

It should:

- Provide technical and methodological assistance so that regional offices use tools and methodologies compatible with national emissions monitoring and climate vulnerability systems.
- Finance the training of public technicians in decarbonization, water management, soil restoration, and renewable energies applied to the agricultural sector.
- Facilitate technicians' access to climate data platforms, indicators, and risk assessment tools, in coordination with AEMET and the National Greenhouse Gas Inventory.

c. **Ministry of Science, Innovation, and Universities (MICIU):**
It should promote the ongoing education and training of field technicians, strengthening the connection between research and agricultural practice.

It should:

- Finance advanced training programs and specialized postgraduate courses in agri-food sustainability and climate action.
- Promote R&D&I projects that include components of transfer and technical advice in the field.
- Facilitate the development of a digital knowledge-sharing platform, in collaboration with technology centers and universities.

d. **Regional and local administrations:**
They are responsible for implementing actions on the ground and adapting technical assistance to the agroecological characteristics of each territory.

They should:

- Create and manage regional and district offices for agro-environmental advice, financed with European or regional funds.
- Incorporate climate advice into agricultural extension services, ensuring coverage throughout the territory.
- Collaborate with MAPA and MITECO in disseminating technical information and implementing training programs for technicians and farmers.

e. **Agricultural organizations, cooperatives, and interprofessional associations:**
They play a key operational role in providing direct technical support to producers.

They should:

- Hire and train technicians specialized in sustainability, climate mitigation, and adaptation, with support from public funding programs.

– Offer climate diagnosis and planning services to their members (carbon footprint, water management, energy efficiency, regenerative practices).
– Act as a liaison between producers, administrations, and research centers, ensuring that information flows and is applied in the field.

f. **Technology centers, universities, and research centers:**

They should:

– Develop tools, guides, and technical protocols that facilitate the practical application of low-carbon technologies and adaptation strategies.
– Participate in the continuous training of agricultural technicians through accredited programs and up-to-date teaching materials.
– Coordinate the digital knowledge-sharing platform, which brings together databases, monitoring tools, and case studies.

g. **Financial sector (ICO, cooperative banking, SAECA):**
Their role should focus on facilitating the contracting and sustainability of technical services within cooperatives and organizations.

It should:

– Create soft credit lines or specific guarantees for the hiring of technical personnel and for the digitization of advisory services.
– Collaborate in the financing of infrastructure and technical equipment, such as sensors, monitoring software, or data management systems.

h. **European agencies and bodies (DG AGRI, EAFRD, Horizon Europe, EIT Food):**
Horizon Europe and EIT Food can fund training, applied innovation, and knowledge transfer projects between technology centers and cooperatives. The European Commission could also promote interconnection between national advisory networks (AKIS—Agricultural Knowledge and Innovation Systems) to share methodologies, results, and tools.

i. **Civil society and environmental organizations:**
They can contribute to disseminating and raising awareness of the benefits of technical assistance in sustainability and climate transition. They should collaborate in the training of producers and technicians through environmental education programs, disseminate accessible materials, and participate in monitoring the network to ensure transparency, territorial equity, and service quality.

Potential barriers

a. Lack of stable financial resources to sustain a permanent technical network in the long term.

b. Shortage of specialized profiles in agricultural climate mitigation, adaptation, and management.

c. Territorial inequality in access to technical services, especially in rural areas with low population density.

d. Risk of dependence on temporary projects or European funds, without structural continuity.

e. Digital divide and low technological training, which hinders the use of digital platforms and technical information systems.

5.3.5. STRENGTHENING THE LINK BETWEEN SUSTAINABILITY AND THE END CONSUMER

What it consists of

One of the main weaknesses of the current agri-food system is the disconnect between sustainable practices in the field and the perception of the end consumer. The environmental and social value of sustainability does not always translate into purchasing decisions or economic recognition for those who produce responsibly. The proposal is to strengthen communication and traceability throughout the agri-food chain, highlighting the environmental and social benefits of sustainable practices, thereby generating greater awareness and demand for low-carbon products. The aim is to recognize the efforts of producers, encourage responsible consumption, and consolidate sustainable and transparent markets that reward good practices.

Objective

To bring the real value of agri-food sustainability closer to the end consumer, clearly and tangibly showing the positive impacts of responsible agricultural and livestock practices, to promote more conscious purchasing decisions, strengthen traceability, and recognize the environmental efforts of producers.

Specific measures

a. Develop communication campaigns that highlight the social and environmental benefits of sustainable practices.

b. Promote transparency and traceability throughout the agri-food chain.

c. Promote the internalization of sustainability impacts within the chain, considering the reduction of emissions or carbon sinks in the added value of the product.

d. Raise public awareness of the role of responsible consumption in climate action.

Proposed actions

a. Launch awareness campaigns on the environmental and social value of sustainable products from the Spanish countryside.

b. Create digital platforms that allow consumers to learn about the origin and practices of products.

c. Incorporate sustainability criteria into public procurement to give visibility to sustainable products.

Agents involved

a. **Ministry of Agriculture, Fisheries, and Food (MAPA):**
It must lead the promotion and recognition of the environmental and social value of agri-food sustainability, promoting national awareness campaigns that highlight sustainable practices and the efforts of the production sector, as well as the development of a seal or system of public recognition that integrates environmental criteria into existing quality labels and strategies for promoting Spanish products abroad.

b. **Ministry for Ecological Transition and Demographic Challenge (MITECO):**
It must ensure the environmental consistency of actions, supervise the accuracy of ecological claims on labeling and advertising, and collaborate with MAPA in defining verifiable criteria for sustainability and low emissions, ensuring that communication to consumers is backed by objective data.

c. **Ministry of Economy, Trade, and Business (MINECO):**
It must integrate sustainability into trade and consumption policies, encouraging distributors and small businesses to prioritize suppliers with recognized certifications and including environmental criteria in public procurement. In addition, it can encourage the incorporation of sustainable products in institutional purchases and promote the modernization of retail trade towards more responsible and circular models.

d. **Ministry of Social Rights, Consumption, and Agenda 2030:**
It should strengthen citizen education and awareness of responsible consumption, incorporating food sustainability into consumer campaigns and promoting understandable and unified labels that allow citizens to easily identify sustainable and low-carbon products.

e. **Regional and local administrations:**
They should complement state actions with regional communication and environmental awareness campaigns, integrating sustainability criteria into public food procurement and supporting local markets and fairs. They can also promote educational programs in schools and rural communities to strengthen the link between sustainability, territory, and consumption.

f. **Agricultural organizations, cooperatives, and sectoral associations:**
They should act as intermediaries between the countryside and consumers, clearly communicating the social and environmental benefits of sustainable practices, ensuring traceability, and promoting partnerships with distributors to improve the visibility and marketing of sustainable products.

g. **Distributors and the agri-food industry:**
They must incorporate sustainability as a central element of their commercial strategy, developing joint campaigns with producers, offering transparent information on the origin of products and their production practices, and adopting digital tools that facilitate complete traceability from the field to the end consumer.

h. **Technology centers, universities, and research centers**
They must provide scientific evidence on the positive impacts of sustainable practices, design methodologies for measuring environmental footprints, and develop digital tools that allow this data to be communicated in an understandable and verifiable way. In addition, they must train professionals capable of translating technical knowledge into messages that are accessible to the public.

i. **European agencies and bodies, such as DG AGRI and DG CLIMA,**
can support pilot projects on climate labeling and sustainable traceability, while EIT Food and Horizon Europe can co-finance education, innovation, and consumer communication programs that bring sustainability closer to European citizens.

j. **Civil society and environmental organizations**
should accompany and reinforce these efforts through environmental awareness and education campaigns, promoting transparency, verifying the consistency of messages and certifications, and strengthening public confidence in sustainable products and the agri-food sector's climate commitment.

Potential barriers

a. Low consumer awareness of the environmental impact of the agri-food system and the benefits of sustainable production.

b. Price is the primary determining factor in consumer purchasing decisions.

c. Proliferation of poorly harmonized environmental labels and seals, which generate confusion or mistrust among consumers.

d. Difficulty for small and medium-sized enterprises to invest in communication or certification, compared to large brands with more resources.

e. Risk of "greenwashing" if communication actions are not based on verifiable metrics and transparency.

Final considerations 06

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The climate transition of the agri-food sector in Spain is underway, but it faces structural barriers that prevent existing initiatives from scaling up and generating large-scale transformation.

There are pilot projects, scientific knowledge, business willingness, and collaborative experiences, but there is still a lack of frameworks to turn these initiatives into stable and scalable cases, rather than isolated ones.

Based on the issues and measures identified in the working sessions, three aspects stand out for moving forward:

* **Harmonize concepts, regulations, and certification frameworks** to build trust and reduce the administrative burden.
* **Design financing instruments** that ensure continuity beyond the pilot phase, accompanied by technical assistance throughout the implementation process.
* **Promote collaboration** between links in the chain through collective strategies.

The climate transformation of the Spanish agri-food system does not depend solely on new technologies or financial instruments but on a shared vision in which each agent in the system takes an active role in the transition.

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This report, prepared by alinnea through a multi-stakeholder dialogue process, identifies the main bottlenecks hindering the climate transition of Spain's agri-food sector and puts forward concrete recommendations to overcome them, highlighting that Spain is facing a strategic opportunity.

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