Interreg Europe

Co-funded by the European Union

FISSH

Joint Report TFA 2:
Sustainable Food Production and Product Value Chain

Contents

Consolidated State of the Art Report - TFA 2

1. Introduction

1.1 Objectives of the State-of-the-Art Report for Thematic Focus Area 2 (TFA2)

Objective of FISSH is to improve the implementation of the regional policies in the partner territories aiming at increasing business support to enhance the sustainability transition (ecological, economic and social) of food industry SMEs with the help of the recognised tools and practises.

To guarantee comprehensive learning, supporting sustainability in food SMEs is analysed in 3 Thematic Focus Areas (TFA). Thematic Focus Area 2 (TFA2) specifically addresses the sustainability of food production processes and product value chains. The objective is to deepen the understanding of regional challenges and opportunities, identify best practices and inform policy development to support SMEs in their sustainability transition.

The following cross-topics are evaluated under TFA2:

I. RDI and business support for sustainability in production process and value chain
II. Measuring and assessing sustainability in production process and value chain
III. Policies and funding instruments to support sustainability in production process and value chain

with Specific focus in measuring and assessment tools that support the evaluation of sustainability in processes and value chains.

Goals:

- Support SMEs in the food sector for more sustainable production
- Highlight tools, support mechanisms and actions to improve processes
- Enhance sustainability across the food supply chain

Key Point:

- Use of practical tools for measuring and assessing sustainability

Outcome:

- Ability to assess the level of sustainability in production and product value chains
- Opportunity to improve overall sustainability

1.2 Executive Summaries

Each region - Central Macedonia (Greece), South Ostrobothnia (Finland), Kujawsko-Pomorskie Voivodeship (Poland), East Flanders (Belgium) and the Coimbra Region (Portugal) - developed a State-of-the-Art Report (SAR) that provides a comprehensive self-assessment of the current situation regarding sustainable food production and the product value chain. The aim was to identify existing sustainability practices and tools, key challenges and gaps, regional strengths and development needs, support mechanisms and inform regional policy with evidence-based recommendations related to sustainable food production and product value chains among food industry SMEs in each partner region.

The consolidated analysis of sustainable food production and product value chains across the five European regions highlights both common challenges and unique opportunities for advancing sustainability and resilience in the agri-food sector.

Across all regions, the agri-food sector constitutes a cornerstone of the regional economy, with small and medium-sized enterprises (SMEs) forming the backbone of production, processing and distribution systems. These enterprises are often deeply embedded in local food traditions and rural economies, but they face structural limitations in digitalization, infrastructure, financing and knowledge transfer. While sustainability awareness is increasing, the implementation of structured tools such as life cycle assessments, eco-certifications, traceability systems and circular economy practices remains limited and unevenly distributed.

A shared strength across the regions is the presence of policy frameworks, EU and national financial instruments and research and innovation (RDI) institutions committed to fostering the green transition. Central Macedonia leverages its export-oriented agri-food base; South Ostrobothnia benefits from strong cooperation networks and RDI actors; Kujawsko-Pomorskie builds on short food supply chains and innovative local distribution models; East Flanders shows broad willingness for sustainability but faces gaps in SME awareness of support instruments; and Coimbra demonstrates experimentation in sustainable food systems, anchored by academic and regional strategies.

Despite these advantages, persistent barriers are evident. These include fragmented value chains, underdeveloped infrastructure for waste management and bio-resources, limited SME access to tailored training and guidance, complex regulatory requirements and low environmental or digital literacy among operators. Specific challenges include climate change impacts in Coimbra, vague communication of policy tools in East Flanders and limited uptake of funding in South Ostrobothnia and Central Macedonia.

Opportunities for transformation lie in strengthening SME capacities through targeted support services, tailored funding mechanisms and structured sustainability training. Expanding

digitalization, traceability and precision agriculture technologies will enable greater resource efficiency and competitiveness. Enhancing cold storage, logistics and bio-resource valorisation infrastructure can reinforce short supply chains, reduce waste and promote circular practices. Furthermore, improved communication strategies, cluster development and stronger cross-sector cooperation will be essential to overcome fragmentation and build resilience.

Taken together, these five regions demonstrate both the diversity and convergence of sustainability pathways in Europe's agri-food sector. By aligning SME-focused policies, leveraging regional RDI strengths and fostering innovation in value chain organisation, they can accelerate the transition toward resilient, low-carbon and competitive food systems that respond to both local needs and global sustainability imperatives.

A. Region of Central Macedonia (Greece)

The Region of Central Macedonia plays a central role in Greece's agri-food economy, with a strong presence in primary production, processing and exports. Its diversified agricultural base and strategic infrastructure support national leadership in products such as rice, milk, aquaculture and fruits.

Small and medium-sized enterprises (SMEs) are the backbone of the regional agri-food sector, especially in rural areas. While there is growing awareness of sustainability, most SMEs operate within conventional systems. The uptake of environmental technologies and circular practices is limited and structured sustainability tools, such as traceability systems, eco-certifications or life cycle assessments, are not yet widely used.

The region benefits from a supportive policy environment and access to national and EU financial instruments that promote the green transition and innovation. However, uptake by SMEs is limited by technical, financial and coordination barriers, as well as limited access to tailored guidance.

Key challenges include fragmented value chains, underdeveloped waste and bio-resources infrastructure and low environmental literacy among SME operators. At the same time, the region's export orientation, innovation capacity and growing demand for sustainable food provide a solid basis for transformation.

To realise this potential, greater investment is needed in SME support services, infrastructure for circular economy practices and sustainability monitoring tools. A more coordinated and SME-focused approach will be essential to achieve a resilient, low-carbon and competitive agri-food system.

B. Region of South Ostrobothnia (Finland)

This report provides an overview of the state of sustainable food production and product value chains in the region. The main findings highlight that while there are promising sustainability practices and tools being implemented—such as life cycle assessment tools, education and RDI cooperation—significant challenges and needs can be found. Key issues include limited resources and need for increased training among SMEs, and the necessity to further develop funding mechanisms and policy support.

Priority areas for development are identified as enhancing SMEs' capacities for sustainability development and increasing access to relevant funding and training. The region's existing strengths—such as established cooperation networks, strong RDI actors, and region's solid foundation in agri-food industries—can be leveraged to address these gaps.

The report recommends targeted actions to support sustainable growth, such as providing targeted support, education and funding, especially for digitalization and new technologies education for SMEs, increasing collaboration between industry and research institutions, and improving access to green technologies. These measures will help the region advance towards more sustainable and resilient food production and value chains. Sharing best practices from regional and European initiatives is seen as important and improving the operational environment through supportive policies and tailored mechanisms is essential to enable the growth and sustainability of SMEs in the food value chain.

C. Kujawsko-Pomorskie Voivodeship (Poland)

The agri-food sector in the Kujawsko-Pomorskie Voivodeship constitutes one of the key pillars of the regional economy. Its foundations rest on a strong resource base, encompassing cereals, vegetables, and milk, as well as the dominance of small and medium-sized enterprises, which account for over 95% of all entities. Increasingly significant roles are being played by short food supply chains, organic farming, and local brands, reflecting the growing expectations of consumers regarding product quality and sustainable production. These development directions are supported by regional policies (Acceleration Strategy 2030+, Regional Innovation Strategy, and European Funds for Kujawy and Pomorze 2021–2027) alongside dedicated financial instruments such as RFS II, the Export Fund, and the Kujawsko-Pomorskie Development Fund.

In practice, the region is witnessing the emergence of numerous initiatives based on innovative sales and distribution models. Key examples include Direct Agricultural Sales and Community-Supported Agriculture, digital platforms for the marketing of local products, as well as micro-

logistical solutions such as vegetable vending machines and 24/7 self-service shops. Equally important is the growing role of craft-based entrepreneurship - small dairies, butcheries, and breweries that provide distinctive products and contribute to strengthening the regional brand.

At the same time, the sector faces a series of challenges that constrain its further development. The most pressing of these include the low level of digitalization and automation among SMEs, complex sanitary and certification requirements, deficiencies in infrastructure (cold storage facilities, warehouses, laboratories), as well as insufficient cooperation and knowledge transfer between farmers, processors, and research institutions.

The analysis identifies four priority areas for the sector's advancement. First, the implementation of digital technologies and resource-efficiency solutions, including precision agriculture, product traceability systems, and life cycle assessment methods. Second, the expansion of cold storage and logistics infrastructure in support of short supply chains. Third, the professionalization of marketing and sales activities in small and medium-sized enterprises, with particular emphasis on digital channels. Fourth, the strengthening of cooperation through clusters, cooperatives, and simplified regulatory mechanisms designed to facilitate the market presence of micro-producers.

The implementation of these measures will enable the full realization of the agri-food sector's potential in the Kujawsko-Pomorskie Voivodeship, positioning it not only as a stable foundation of the regional economy but also as a driver of innovative and sustainable development.

D. Economic Council of East Flanders (Belgium)

The agri-food sector in East Flanders is well developed. There are a lot of different players and a lot of different subsectors. All in all, we see a high level of sustainability initiatives, or at least a lot of willingness to become more sustainable. Circularity is often more difficult and challenging than sustainability, since in many cases it requires a different business approach.

The government offers a lot of supporting systems, subsidies and coachings, but the majority of the SMEs do not even know about it. That makes it harder for them to make the right decisions when it comes to sustainability. That means it should now be the main priority of the government to better inform the entrepreneurs of these opportunities.

The most challenging problems within the entire sustainability picture are for SMEs themselves the short chain principle, staff, sustainable transport, finding the resources to make sustainable investments, waste management and sustainable suppliers. But even here we see that a lot of these could already be solved by being better informed about what already exists and what the government has to offer. What is often the problem in Belgium, is also proven here:

communication is often vague, not transparent and not structured. SMEs do not have a simple and clear overview of the existing initiatives, so they stay far away from them.

E. Coimbra Region Intermunicipal Community (Portugal)

The Coimbra Region (CIM-RC), comprising 19 municipalities and about 437,000 inhabitants[1], presents a diverse agri-food system characterised by strong traditions in dairy, wine, olive oil, bakery, meat, and horticulture, but faces critical sustainability challenges. The sector is dominated by micro and small enterprises, which struggle with scaling, financing, and innovation. Climate change adds further stress, with droughts and extreme events threatening production[2]. Yet, the region has become a hub of experimentation in sustainable food systems, through initiatives such as the Coimbra Region Food Strategy 2022–2030[3], the "European Region of Gastronomy"[4] designation, and research capacities at higher education institutions and research centres, as the Agrarian School of Coimbra (ESAC) and its applied research centre CERNAS, as well as the Pedro Nunes Institute Fitolab. These initiatives emphasise short food supply chains, reduction of food waste, valorisation of by-products, ecological footprint calculators for producers, and integration of Mediterranean diet principles[5].

A questionnaire was carried out and disseminated through our stakeholders, including business associations, higher education institutions, and local action groups. Respondents identified bureaucracy, lack of resources, and fragmented organisation as key barriers, while pointing to cooperation, innovation, and investment in sustainability as urgent needs.

[1] Instituto Nacional de Estatística (INE). (2021). *Estatísticas regionais – Região de Coimbra*. Lisboa: INE. Available at https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_main

[2] CIM Região de Coimbra. (2017). *Plano Intermunicipal de Adaptação às Alterações Climáticas (PIAAC)*. Coimbra: CIM-RC. Available at https://climagir.cim-regiaodecoimbra.pt/application/views/assets/documentos/piaac-cim-rc.pdf

[3] CIM Região de Coimbra. (2022). Coimbra Region Food Strategy 2022–2030. Coimbra: CIM-RC. Available at https://urbact.eu/sites/default/files/2023-01/FOOD%20CORRIDORS%20CIM%20COIMBRA%20IAP%20Final.pdf

[4] URBACT. (2021). Região de Coimbra – Um milhão de estórias gastronómicas. Brussels: URBACT. Available at https://urbact.eu/articles/regiao-de-coimbra-um-milhao-de-estorias-gastronomicas.

[5] Prato Certo. (2021). Mediterranean Diet and Food Waste Manual. Coimbra: ACSA. Available at https://www.pratocerto.pt/uploads/modulos_ficheiros/manual-da-dieta-mediterranica-e-do-desperdacio-alimentar-na-regiao-de-coimbra.pdf.

2. Regional Context

The five regions under review share a strong dependence on the agri-food sector as a driver of economic activity, employment and cultural identity. Despite differences in scale and specialization, all regions demonstrate the sector's strategic importance, anchored by SMEs that dominate the food value chain.

Economic and sectoral significance

Agri-food is a cornerstone of regional economies, contributing substantially to Gross Value Added (GVA) and exports. Central Macedonia is Greece's leading producer of rice, milk and mussels, with robust processing infrastructure and strong export orientation. South Ostrobothnia is Finland's "Food Province," with the highest regional employment impact of the agri-food sector nationwide. Kujawsko-Pomorskie integrates a strong agricultural base with meat, dairy and fruit processing, supported by export markets in Northern Europe. East Flanders forms part of one of Europe's most dynamic agri-food complexes, with €2.1 billion added value and growing demand for alternative proteins. The Coimbra Region combines dairy, wine, olive oil, bakery and horticulture with gastronomic heritage, but lags in productivity and innovation uptake.

Role of SMEs

Across all regions, SMEs represent more than 90% of businesses in the sector, often family-owned and deeply rooted in rural economies. Their contributions include job creation, cultural continuity and innovation in short supply chains, organic farming and niche products. Yet SMEs face common barriers: limited access to finance, low levels of digitalisation and automation, fragmented cooperation structures and difficulties navigating complex regulatory and funding landscapes. In East Flanders, poor awareness of existing subsidies limits uptake; in Coimbra, bureaucratic obstacles constrain access to EU and national funds.

Sustainability and innovation dynamics

While sustainability awareness is rising, the implementation of structured approaches such as traceability, eco-certification, life cycle assessments and circular economy practices remains at an early stage. Central Macedonia and Kujawsko-Pomorskie show promising developments in export-driven sustainability and short supply chain models, respectively. South Ostrobothnia and Coimbra have established research and higher education capacities that support RDI-led sustainability transitions. East Flanders exhibits a growing alternative protein sector and increasing consumer demand for healthier, local and transparent food, though SME engagement with sustainability strategies is inconsistent.

Policies, strategies, and funding

All regions benefit from multi-layered support frameworks, combining EU, national and regional policies. These include Smart Specialisation Strategies (RIS3), regional food strategies, climate adaptation plans and participation in European initiatives such as Horizon Europe, Interreg and CAP 2023-2027. Significant funding is available through instruments like ERDF, EAFRD, Recovery and Resilience Plans and regional operational programmes. However, effectiveness is undermined by limited SME awareness, bureaucratic complexity and insufficient technical assistance.

Common challenges and opportunities

The regions face converging challenges: climate change impacts (notably in Coimbra), fragmented value chains, weak logistics and storage infrastructure, low adoption of digital and green technologies, and limited SME capacity to absorb sustainability requirements. Opportunities lie in strengthening SME support systems, scaling cooperation through clusters and cooperatives, investing in digitalisation and circular economy infrastructure and fostering RDI-industry collaboration. Consumer trends toward healthier, local and environmentally responsible food add further momentum for transformation.

A. Region of Central Macedonia (Greece)

The agri-food sector is a cornerstone of the economy in Central Macedonia, contributing significantly to the national agricultural production and turnover of the food industry in Greece. Central Macedonia represents 13.4% of the country's agricultural holdings and 16.4% of the national utilized agricultural area, covering 2.84 million hectares [1].

The region is Greece’s leading producer of rice and is among the leading regions for milk production (cow, goat, and buffalo), with strong infrastructure in both dairy farming and processing, cotton, fruits (peaches, cherries), vegetables and cereals. Additionally, Central Macedonia is the largest aquaculture region for mussel farming, accounting for 67% of national production [1].

Over 53% of cultivated land in Central Macedonia is irrigated - one of the highest irrigation rates in the country. This has implications for water resource efficiency, especially for rice and vegetable crops [1]. Irrigation prevalence signals opportunity for water-efficient systems (e.g., drip irrigation, scheduling via IoT).

Central Macedonia accounted for 14% of the national Gross Value Added (GVA) from the Agriculture - Forestry - Fisheries sector, underlining its economic significance [1].

As part of the 2021-2027 Smart Specialisation Strategy (RIS3) review, the One Stop Liaison Office of the Innovation and Entrepreneurship Support Mechanism of Central Macedonia conducted an assessment of the region's agri-food sector [2], yielding the following key findings:

1. Economic and industrial significance

    - The food and beverage industry represents 21% of national employment in the sector (NACE codes 10 and 11), with a €3.06 billion turnover and 2,719 legal entities, placing Central Macedonia second nationwide (2019 data).
    - International food exports grew by 8.5% from 2016 to 2020, positioning the region as Greece's leader in food exports, with a 35.8% share of total national export turnover, reaching €1.87 billion (rising above €2 billion if beverages and tobacco are included).

2. Innovation and research dynamics

    - Central Macedonia SMEs submitted:

        - 435 proposals to the national research programme "RESEARCH–CREATE–INNOVATE", worth €178.3 million
        - 82 proposals to Horizon 2020, totalling €22.97 million

    - The food sector demonstrates high engagement in R&D and innovation funding.

3. Entrepreneurship trends

The region recorded a steady average of 80 new food industry (NACE 10) enterprises established annually between 2014-2021 (GEMI data).

4. Top agri-food products and regional strengths

Central Macedonia holds national leadership across ten strategic agri-food product areas:

- Shellfish (Mussels):

  67% of national aquaculture production; exclusive farming of Mytilus galloprovincialis; places Greece 6th in EU 27 in production volume and 8th in value.

- Rice:
  Generates 87% of national primary income from rice farming; hosts 89% of relevant agricultural holdings.

- Milk:
  Ranks 1st in cow and goat milk production and exclusive producer of buffalo milk; achieves highest national average price, indicating superior quality. Includes 886 milk-processing enterprises (14% of national total), producing €587 million turnover (24%) and employing 25% of sectoral workforce.

- Eggs:
  2nd in national production distribution (22.8%) and 1st in poultry layer farms (34%).

- Honey:
  2nd region nationally in beehive distribution, with 107,490 beehives (14% of total).

- Other agricultural strengths:

  - Cereals: 32% of national farming income, dominated by wheat/barley.
  - Industrial crops: 32% share (e.g., cotton).
  - Fresh fruits: 55% share of national income from fruit cultivation and sales.
  - Cattle breeding: 25% of income share.
  - Poultry: 2nd place nationally in income from poultry farming (21%).

A recent OECD analysis confirms that food and beverages comprised 24.5 % of the region's total exports in 2021 - the dominant export category, above textiles (20.5 %) and chemicals (11.3 %) [3].

There is also a growing consumer demand for sustainable and organic products**,** supported by export trends and participation in EU-certified quality schemes such as PDO (Protected Designation of Origin) and PGI (Protected Geographical Indication).

According to the European Innovation Scoreboard 2025, Central Macedonia is classified as a "Moderate Innovator" with a Regional Innovation Index (RII) of 84.8. This marks a decrease of 5 points compared to the previous year, 2024, and an increase of 11.1 points compared to the year 2018 [4].

However, sustainable practices are still in early stages. While many SMEs recognize the importance of transitioning to environmentally sound methods, most operate traditionally and lack integrated sustainability strategies. There is limited adoption of circular economy practices, such as food waste valorization or closed-loop resource use. Supply chains are predominantly linear, with weak integration among producers, processors and retailers.

Key Actors

The Region of Central Macedonia has a dense network of key actors that participate in networks and projects and have their own contribution in the regional development. Though many actors are active, collaboration within the value chain and with research institutions and in general collaboration between actors' categories are sporadic and lacks structured coordination.

SMEs

The region hosts small and medium-sized enterprises (SMEs) which operate across the entire agri-food value chain, with a strong concentration in primary production and food processing. These enterprises, many of which are family-owned, represent the majority of operators within the regional food industry and play a critical role in both domestic supply and export activities. The regional agri-food sector is constituted of more than 2,300 registered food processing units [5]. These include bakeries, dairies, fruit packers, wineries, and juice producers.

Cooperatives

According to the Register of Agricultural Cooperatives of the Hellenic Ministry of Rural Development and Food (as of January 2025) [6], Central Macedonia hosted 200 agricultural cooperatives, many of them operating at a municipal or community level. Cooperatives and producer organisations are present but remain relatively fragmented in structure and governance. Their modernisation is a target under the new CAP and regional policy frameworks.

It worth mentioning the following:

- ASEPOP Naoussa - Agricultural Cooperative of Naoussa for the Elaboration and Sale of Fruit Products (https://www.asepopn.gr) that is active in producing, handling and exporting fruits.
- Agricultural Cooperative of Pella - ACP (https://www.acpella.gr) that manages orchards, cotton, cereals - especially peach production. It owns a large-scale canning industry facility and exports widely.
- AgroMacedonia - Agronutritional Cooperation of the Region of Central Macedonia (https://agromacedonia.gr/). It is a Public-private platform established by the Region of Central Macedonia along with academic/business partners. Its role is to promotes cooperation in local value chain development, branding of regional products and sustainable agricultural practices. It offers access to training, market channels and public-private partnerships aimed at improving SME competitiveness and sustainability.

Clusters

Clusters play a vital role in the region's innovation ecosystem, such as:

- The AgriFood Cluster of Central Macedonia (https://www.ag-cluster.gr/) fosters collaboration between SMEs, research institutions and government bodies. It was supported by ERDF funds via ROP Central Macedonia 2014–2020.
- The AgroTech Export Cluster (https://atecluster.gr) promotes sustainable technologies and export readiness for SMEs.
- The Greek Exporters Association - SEVE (https://www.seve.gr/) is a non-profit organization and is currently the largest association of exporting companies in Greece. It serves as a national body representing Greek exporters, with a particular focus on Northern Greece and Central Macedonia.
- The DigiAgriFood EDIH (https://digiagrifood.gr/) is a digital Innovation Hub supporting digital and green transformation of agri food SMEs in Northern and Central Greece.
- The AgroDesign Cluster is a bottom-up initiative emerging from Thessaloniki's local creative community, coordinated via the non-profit Creativity Platform. It aims to bridge the agri-food sector with local creative professionals to support market-ready packaging, branding and product identity development.

Research Institutions

The region hosts multiple academic and research institutions which support applied research in agri-food innovation, precision agriculture, circular economy and biotechnology. In some cases they collaborate with SMEs via EU-funded pilots to test and transfer innovation, such as precision agriculture and IoT technologies, agri-waste valorisation systems, clean energy systems for SMEs, and low-carbon technologies.

- Aristotle University of Thessaloniki (AUTH) is the largest university in Greece and Southeastern Europe
- International Hellenic University - public university with multiple campuses in Northern Greece
- Centre for Research and Technology Hellas (CERTH) along with Institute of Bio-Economy and Agri-Technology (iBO). CERTH also helped spin off Farm B, which works directly with local producers on digital farming platforms.
- American Farm School along with Perrotis College of Agriculture, Environment and Life Sciences
- South-East European Research Centre (SEERC) based in Thessaloniki
- ELGO DEMETER supports innovation in the agri-food sector through applied research, technology transfer and training. In Central Macedonia, it contributes to sustainable

agriculture and food systems through specialised institutes focused on crop science, livestock and environmental monitoring.

Uncategorised actors

- The "One Stop Liaison Office" (OSLO) under RIS3 Central Macedonia serves as a coordination and facilitation body, helping local SMEs, research institutions and startups navigate funding opportunities and develop innovation projects.

- Regional Authority of Central Macedonia (RCM) among the projects that is involved in, such as BIOTECH4FOOD (Accelerating agro-food SME transition via biotechnology & circular bioeconomy) and ROBIN (Deploying circular BIOecoNomies at Regional level with a territorial approach), it is a full Member of ERIAFF (European Network of Regions Driving Agro-Food Innovation) that supports policy alignment, digitization, innovation projects and networking initiatives across member regions. It actively participates in S3 Agrifood partnerships including High-Tech Farming, Traceability & Big Data, Personalized Nutrition, fostering innovation ecosystems across the region.

- Regional Development Fund (RDFCM) actively coordinating circular economy Interreg & Horizon Europe projects, such as:

    - SinCE-AFC (Enhancing Entrepreneurship of SMEs in Circular Economy of the Agri Food Chain)
    - RUMORE Project (Enhancing Rural Urban Innovation for Agri Food SMEs)
    - CESME (Circular Economy Support for SMEs)
    - BIOREGIO (Enabling Circular Bioeconomy in Central Macedonia)

  affecting the Regional Policy Instrument and engaging the enterprises in their activities.

  On behalf of the Region of Central Macedonia is a CCRI (Circular Economy in Cities and Regions) Fellow, a category of regions receiving capacity-building, peer learning, and policy support to advance circular economy efforts.

- Alexander Innovation Zone (AIZ) strengthens the bridges of knowledge and cooperation between the institutions of Northern Greece and promotes the innovation ecosystem in international markets.

Role and Contribution of SMEs in the Regional Economy

Agri-food SMEs are central to the economy of Central Macedonia, accounting for over 90% of food business operators. They are especially vital in rural areas, where agriculture remains a primary source of income and employment. These enterprises contribute significantly to value creation, often operating as vertically integrated producers and processors.

Active in sectors such as dairy, wine, organic farming and horticulture, SMEs are increasingly engaging with eco-certifications, traceability systems and smart farming technologies. However, adoption of structured sustainability tools like Life Cycle Assessment (LCA) and ESG frameworks remains limited, largely due to technical and financial constraints.

Despite being export-oriented and innovation-aware, agri-food SMEs often face barriers in accessing funding and specialised support. Strengthening these areas is essential for enabling their transition to greener, more resilient business models and reinforcing their role in the region's sustainable development.

Sustainability-Related Policies and Strategies

Region of Central Macedonia benefits from a multi-layered policy environment that supports sustainable development:

- The Regional Innovation Strategy of Central Macedonia for Smart Specialisation (RIS3 CM) 2021-2027 prioritises agri-food, digital transformation and circular economy, promoting sustainable production and product innovation. For Central Macedonia, it prioritizes sustainable agri-food as strategic sector.
- The Regional Operational Programme (ROP) 2021-2027 supports investment in bioeconomy and digital tools for SMEs.
- The Regional Spatial Framework of Central Macedonia 2025-2040 integrates food system transformation with climate neutrality and bioeconomy development.
- The NSRF 2021-2027 (Greece's Strategic Investment Framework) is Greece's core development strategy, co-financed by the European Union through the European Structural and Investment Funds (ESIF) and supports targeted investments aligned with EU priorities, including the Green Deal, digital transformation, regional resilience and social cohesion.
- The National Strategic Plan for the Common Agricultural Policy (CAP) 2023-2027 promotes green and digital transitions, climate-smart agriculture and support for young farmers and agri-food cooperatives.
- The National Bioeconomy Strategy (2023) aligns with circular principles and sustainable agriculture
- EU frameworks such as the European Green Deal**,** Farm to Fork Strategy and Circular Economy Action Plan frame regional efforts on sustainability.

- The forthcoming EU Sustainable Food Systems Law is expected to introduce mandatory sustainability requirements across the food value chain, including for SMEs. This regulation will likely promote circularity, transparency and resilience in food systems, creating both challenges and opportunities for agri-food enterprises.

While these frameworks are supportive, their practical uptake by SMEs remains low due to limited awareness, complexity of procedures and insufficient localised guidance.

Existing Funding Programmes and Initiatives

A variety of regional, national and EU funding mechanisms support sustainable food production in Central Macedonia.

- EU Programmes:

    - Horizon Europe, in which SMEs are eligible to be partners mainly as pilots, supports the transformation of agri-food SMEs toward sustainability, digitalization and competitiveness

- National Programmes:

    - NSRF 2021-2027 supports digital transformation and sustainability for SMEs
    - The Development Law 4887/2022 establishes a comprehensive investment incentive framework for Greece’s economic modernization, including 13 thematic schemes of support addressing digital transformation, green transition, agri-food, large investments, tourism and more.

      The "Agro Food - Primary Production & Processing, Fisheries & Aquaculture" incentive scheme was the recent first call and eleven SME-level projects in agri-food and aquaculture were approved for Central Macedonia in this first cycle.

    - Rural Development Programme (RDP) 2021-2027, Greece, is the second pillar of the Common Agricultural Policy (CAP) and support agri-food SMEs for investments in processing, marketing and coordination within short supply chains and producer groups.

      The RDP includes the LEADER initiative that provides direct benefit to agri-food SMEs, particularly in rural areas.

- Operational Programme “Competitiveness” 2021-2027 offers grants for energy efficiency, process optimisation and digitalisation of SMEs in the food sector.

- Regional Tools - Regional Operational Programme (ROP) of Central Macedonia (2021-2027):

  Agri-food SMEs can apply for investment subsidies, equipment upgrades or R&D collaboration through targeted calls.

  - The recent call “Transition to Innovation, Extroversion and Smart Specialisation” funds innovative and internationally oriented SME-led investments that align with Central Macedonia’s RIS3 priority domains. Agri-food SMEs are central beneficiaries, demonstrating high interest in sustainable and export-oriented business development.
  - The recent call “Starting Point for Innovation and Extroversion” specifically include agro-food SMEs among eligible categories.
  - The recent call “Key to Progress: Innovation, Extroversion and Sustainable Development” is relevant to SMEs with agri-food sustainability models.

  Under the ROP Central Macedonia 2014-2020 there were calls such as “Innovation Vouchers for SMEs” (5 vouchers awarded to SMEs, including agri-food related, for circular bioeconomy initiatives) and “Innovation Investment Plans” (4 SME investment plans approved with a focus on circular bioeconomy).

B. Region of South Ostrobothnia (Finland)

The Food Province of Finland is the name under which the South Ostrobothnian food-related actors work and co-operate. Food Province is an ecosystem that covers the entire food chain. Its actors include entrepreneurs throughout the food chain, developers, researchers and public authorities working on the themes, as well as consumers who buy and enjoy food.

Seinäjoki University of Applied Sciences offers bachelor’s and master’s degree programmes in Agriculture, Food Processing, Biotechnology, and Hospitality, as well as English-taught degrees in Sustainable Food Processing and Hospitality Management. Open UAS courses support lifelong learning e.g. for the needs of the companies. It also hosts the region’s largest food sector development team with numerous RDI projects focused on sustainability. Additionally, different universities of Finland (including University of Helsinki Ruralia institute, University of Vaasa and University of Turku Nutrition and Food Research Center) have based their researchers to the Food Province to conduct food-related research in the area. The city of Seinäjoki has allocated a significant part of its development company’s actions to food-related issues.

(Ruokaprovinssistrategia, Ruokaprovinssi.fi) There are also active SMEs cooperating in RDI activities and Food Province network.

The agri-food industry is a significant contributor to the regional economy of South Ostrobothnia. Employment impact and regions value-added impact of the agri-food sector is the highest of all regions in Finland. There are around 111 Food SMEs in the region of which over 95 % are micro, small or medium sized SMEs.

Key policy document describing the existing sustainability-related policies of the region is the Smart specialisation strategy of South Ostrobothnia, which states the sustainable food ecosystem and new bio-economy solutions as the major development targets of the region. S3-strategy is part of the Regional Strategy of South Ostrobothnia (summary in English). The region of South Ostrobothnia strongly aims to be a responsible food region. This includes high quality and sustainable food system, sustainable food production and energy solutions, knowhow and research in the food technology sector. South Ostrobothnia has received the label of Regional Innovation Valley on Increasing Global Food Security from the European Commission.

Region's emphasis on sustainable land use and food systems underlines its commitment to environmental management and resilience. Through investments on agri-tech innovation and circular economy principles, region seeks to enhance productivity while minimizing ecological footprint and promoting biodiversity conservation. S3 strategy has a goal of harnessing the innovation potential of the ecological transition (low carbon, biodiversity) in the food sector and bioeconomy.

Other regional level strategies and plans include Regional climate adaptation plan, Regional food system climate adaptation strategy and Food Province Strategy (summary in English). The objectives of the Food Province Strategy emphasize sustainability for SMEs in the food industry through environmental aspects of food production, proactive and responsive operations, carbon-neutral logistical solutions, impactful and networked responsibility work, utilization of by-products, and consciously responsible actions. The climate roadmap for the food sector in South Ostrobothnia highlights the importance of comprehensive sustainability across the entire food chain, while also emphasizing the necessity of ensuring economic viability of businesses.

During programming period 2021-2027, around 20 % of the ERDF funds, that are allocated from the Regional Council of South Ostrobothnia, have been dedicated directly to the theme of sustainable food ecosystem and new bio-economy solutions. ERDF funds distributed from the Regional Council are granted to different intermediary organisations (ie. Business support, universities and other education providers), not directly to the companies. The European Agricultural Fund for Rural Development (EAFRD) funds actions that are related to developing the Food Province. So far around 34 % (EUR 4.3 million) of the funds have been dedicated to this section, including development projects and business support. The ELY Centre of Central Finland

has so far granted ERDF and JTF funds around EUR 16.9 million for business projects in South Ostrobothnia. Around 7% of the funding has been allocated to companies in South Ostrobothnia for the development of the food sector. The form of support is the Enterprise Development Grant, which is an administrative support scheme of the Ministry of Employment and the Economy for SMEs. The funding granted for food development can vary greatly depending on the size of the projects (investment or development measures) being undertaken by SMEs in the region at any given time.

C. Kujawsko-Pomorskie Voivodeship (Poland)

The economic landscape of Kujawsko-Pomorskie is strongly shaped by the food sector, which serves as a cornerstone of regional development. Owing to its agricultural profile and well-developed processing infrastructure, the region plays an important role in the national food supply chain. According to data from Statistics Poland (GUS) and analyses contained in strategic documents, the food industry generates a significant share of the value of sold industrial production—estimated at between 15% and 20%, depending on the county.

The region is home to several hundred food processing companies, the majority of which are SMEs. The strongest subsectors include the processing of milk, meat, fruit, and vegetables, as well as the production of bread and confectionery products. Kujawsko-Pomorskie also stands out in terms of food exports, particularly to Germany, the Netherlands, and Scandinavian countries.

The region actively responds to the growing consumer interest in sustainable products. Climate change, rising environmental awareness, and lifestyle changes are driving consumers to increasingly choose local, organic products with a low carbon footprint and without artificial additives.

The number of organic farms and producers with quality certifications (e.g. EKO, Fair Trade, Product of Poland) is steadily increasing in the region. The regional authorities support this trend through local product promotion programs, such as “Made in Kujawsko-Pomorskie,” as well as through educational and informational activities.

The food sector in Kujawsko-Pomorskie is based primarily on the activity of small and medium-sized enterprises, which account for more than 95% of all businesses in the industry. SMEs are flexible, innovative, and often deeply rooted in local communities, which fosters cooperation with farmers and other suppliers.

Agricultural and food cooperatives also have a long-standing tradition in the region, integrating local producers and enabling joint purchasing, processing, and sales. Examples include the Dairy Cooperative in Wąbrzeźno and the Agricultural Production Cooperative in Inowrocław County.

Role and contribution of SMEs in the regional economy

SMEs in the food sector are among the main drivers of economic growth in the Kujawsko-Pomorskie region. They create jobs, support local communities, and in many counties represent the largest employers in the private sector, fostering both employment and innovation. By the end of 2024, more than 228,000 business entities were registered in the region, nearly 19,000 of which operated in the manufacturing sector, including the food industry.

Their role is particularly important in the context of sustainable development—SMEs, more frequently than large corporations, implement pro-environmental solutions, rely on local raw materials, and engage in social initiatives, often preserving the region's culinary traditions. They are supported by regional business support institutions such as the Toruń Regional Development Agency and the Kujawsko-Pomorskie Loan Fund.

Existing sustainability-related policies and strategies (regional, national and EU)

The Kujawsko-Pomorskie Voivodeship is implementing a range of strategic documents that support the sustainable development of the food sector:

- **Acceleration Strategy 2030+** – focuses on the development of a circular economy, the promotion of eco-innovations, and the marketing of local products.
- **Economic Development Program of the Kujawsko-Pomorskie Voivodeship** – concentrates on supporting SMEs, developing clusters, and implementing green technologies.
- **Regional Innovation Strategy (RIS3)** – promotes smart specializations, identifying the agri-food sector as one of the priorities.

In addition, the region actively participates in international projects (e.g. Interreg) that foster the development of sustainable business models in the food industry. Initiatives such as the **FISSH project** (Support and Assistance for SMEs in the Food Sector in the Area of Sustainable Development) aim to help enterprises adapt to sustainability requirements, while promoting innovation and environmental responsibility.

Existing funding programmes and initiatives relevant to sustainable food production

European Funds for Kujawy and Pomorze 2021–2027 provide broad support for enterprises, covering a wide range of initiatives, including:

- **Regional Training Fund II**, implemented by the Toruń Regional Development Agency, which supports companies and their employees through training, mentoring, and postgraduate studies. The project places particular emphasis on the development of

competencies related to digitalization and the green transition. It covers 350 companies and 1,462 employees, with co-financing of 70% of service costs.

- **Export Fund**, which facilitates the international expansion of SMEs by providing grants for internationalization strategies, participation in international fairs and trade missions, and product certification. Additional export-related training helps companies access new foreign markets.
- **Regional Financial Institution – Kujawsko-Pomorski Development Fund**, offering loans for investments in renewable energy sources (RES), the circular economy, and energy efficiency, enabling enterprises to adapt to emerging market and environmental challenges.

Other forms of financial support offered by the Kujawsko-Pomorskie Loan Fund include development loans for the purchase of modern technologies, infrastructure modernization, and improvements in production efficiency. The **Research and Implementation Fund 3.0**, also implemented by the Kujawsko-Pomorskie Loan Fund, provides grants for R&D initiatives, the testing of new solutions, and the introduction of innovative products to the market, thereby strengthening the technological capacity of regional enterprises.

Additional projects implemented by the Kujawsko-Pomorskie regional authorities in support of the economy include:

- **Promotion of the Regional Economy**, aimed at increasing the visibility of local brands and strengthening the export capacities of enterprises through trade missions, study visits, and conferences.
- **Accreditation of Business Support Services**, which ensures access to high-quality advisory services for SMEs in the region. Enterprises can benefit from consultancy vouchers within the accreditation system, supporting their growth and innovation.

Through these consistent measures, the region is becoming a leader in the areas of innovation, green technologies, and digitalization. Support for enterprises in research and development, energy transformation, and international expansion contributes directly to enhanced competitiveness. By integrating tradition with modernity, Kujawsko-Pomorskie is building a solid foundation for the sustainable development of its economy in the years to come.

D. Economic Council of East Flanders (Belgium)

The agri-food sector is one of the most important economic sectors in Flanders. According to the latest available figures (2016), the Flemish agrobusiness complex (ABC) comprised 34,325 companies. Nearly 152,000 people were employed in the various branches of the ABC (including self-employed individuals in agriculture and horticulture). This represents approximately 5.5% of the total working population in the Flemish Region. At that time, ABC companies invested €2.04 billion. The turnover of the ABC has increased significantly in recent years, reaching €61.7 billion.

This growth is primarily due to the food industry, which generated a turnover of €39.7 billion. The added value of the ABC amounted to €8.3 billion.[6]

The food industry in East Flanders (agriculture, horticulture, fishery, food and beverage producers) provides an added value of 2.1 billion euro and employment for 25.600 people.[7] Exact numbers on how many food producing companies the province hosts, are not available; yet we do know that in 2023, there were 5.606 food producing farms (which is half of the amount there were in 2000).[8] Add the large number of food producers (not farms) and the conclusion is that the food industry is very important for the East Flemish economy.

Climate change and global population growth put additional pressure on ecosystems, land use, and emissions, and influences both food production and consumption habits. European and Flemish policies (the European Green Deal, Farm to Fork strategy, the Flemish long-term vision - Vision 2025, Go4Food - Flemish food strategy, and the Flemish Protein Strategy (2021-2030)) set the course for a further transition to a sustainable and therefore a more local and shorter food chain. These changes are also noticeable at the provincial level. The required Sustainability Reporting Standards (ESRS), for example, will effectively impact companies. This transition is putting increasing pressure on the food sector and producers to make environmentally, economically, and socially responsible choices throughout the entire production chain. Professional development of food businesses is crucial to guide them through this transition without compromising the authenticity of their local products.

Eating habits are shifting clearly. While obesity rates continue to rise, public awareness of healthy and balanced eating is also growing. The annual TrustTracker[9] study by the European Institute of Innovation and Technology (EIT), which surveyed consumers from 18 countries, shows that 51% of respondents want to eat healthier. The focus is primarily on less fat (57%), less sugar (61%), and less highly processed foods (59%). Furthermore, 18% of respondents do not eat animal products, and 25% are considering reducing their consumption.

Public attention to alcohol use and abuse is increasing. This trend has led to the emergence of non-alcoholic alternatives and more conscious consumption of alcoholic products.

At the same time, vegetarian and vegan diets are steadily gaining popularity, partly driven by climate awareness and ethical considerations. After a sharp rise in demand in the early 2020s and a slight decline after the hype, demand is expected to plateau in the coming years and become a

[6] Departement Landbouw & Visserij en Fevia Vlaanderen. Startcharter - werkagenda voedselketen. https://vlaanderen-circulair.be/src/Frontend/Files/userfiles/files/Werkagenda's/WA_voedselketen_startcharter.pdf - date of access: August 4, 2025

[7] https://innovationplayground.be/cluster/agro-voeding/ - date of access: July 30, 2025

[8] Statbel | provincies.incijfers.be ; date of access: July 7, 2025

[9] European Institute of Innovation and Technology. Trust Report 2024.

structural component of the diet (cf. Gartner Hype Cycle - Productivity Plateau). However, this requires a caveat: entrepreneurs, the retail industry, studies etc. indicate that the purchasing behavior of the average consumer is currently still determined by dietary habits, familiar products, and price. In any case, the alternative protein sector is slowly becoming stronger and stronger. According to a recent study, this emerging sector, which focuses on alternatives to animal proteins, could be at least 6 to even 15 times larger by 2035 than it was in 2020. Of the 155 Flemish companies producing alternatives to dairy or meat, 30 are from East Flanders. Twelve of these companies produce exclusively plant-based and alternative protein products, such as spreads, cultured meat, and drinks based on ingredients like oats, rice, or soy. Eighteen 'hybrid' companies produce animal proteins in addition to alternative proteins.[10] [11]

A recent survey commissioned by Fevia among 1,000 Belgians shows that Belgian consumers are increasingly choosing locally sourced food and drinks. A whopping 72% say they consciously buy Belgian products to support the local economy. This is good news, because buying Belgian products contributes to a sustainable food system – something 84% of Belgians support.

Consumers increasingly want to know where their food comes from, who produces it and how. Besides the focus on the present and the future, there's also a renewed appreciation for the past. Interest in intangible heritage, such as crafts, craftsmanship, and traditions, is growing. According to the Food Inspiration Trend Report 2025[12], consumers no longer just buy a product, but also the story, branding, and expertise behind it. This trend is also being seen in tourism and offers opportunities for producers and entrepreneurs who want to place their heritage, craftsmanship, and the experience at the heart of their offerings and operations.

The EU not only wants to ensure sufficient, affordable, and nutritious food, but also facilitate the shift to healthy and environmentally friendly diets by reducing overconsumption, preventing food loss, and shifting to a more plant-based diet through the protein transition. Building on this European ambition and on efforts already made internationally, nationally, and locally, the Flemish government developed a food strategy. Because food affects everyone and the many challenges related to food are interconnected, a system approach is required. This means putting food in its broader context and examining it from different perspectives to understand how elements in the food system are interrelated and how they influence each other. To achieve this, broad collaboration is essential. Therefore, a broad food coalition has been established to develop and

[10] Wullaert, A., Byttebier, K. & Smets, V. (2024). Economische impact van de alternatieve eiwitsector in Vlaanderen en Brussel, Green Deal Eiwitshift op ons bord, Departement Omgeving, Vlaamse overheid.

[11] Dedobbeleer, K., Moerman, N. Baeke P., Gillis, K. Innovation Playground 'In Cijfers'. 2025.

[12] Food Inspiration. Trends & Transitie Rapport. 2024

further implement the Flemish food strategy, comprising representatives from the agri-food chain, society, research, and policy.[13]

All parts of the societal pentagon are represented:

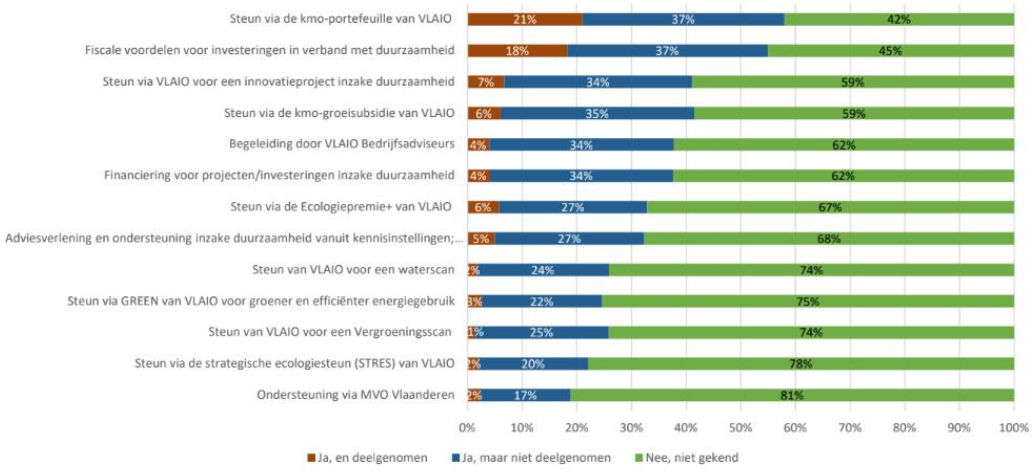
- Industry and entrepreneurs: Algemeen Boerensyndicaat, Boerenbond, Belgian Feed Association, Comeos, Flanders' FOOD, Bioforum, Reo-veiling, Verbond van Belgische Tuinbouwcoöperaties, Herw!n
- Finance: VLAIO (supporting investments, research and innovation)
- Local and midfield: Bond Beter Leefmilieu, VELT, ProVeg, FoodWIN
- Policy: Departement Economie, Fevia, Wetenschap en Innovatie, Departement Omgeving, OVAM, VLM, VLACO
- Knowledge: EIT FOOD, Flanders' FOOD, Innovatiesteunpunt, ILVO, Inagro, Proef!, universities

Every year, the Flemish government publishes a sustainability report with data covering the entire SME landscape in Flanders (so not only the food sector). The report for 2024 states that SMEs in Flanders have a poor knowledge of sustainability-related policies and subsidies. About 1 out of 5 SMEs knows these initiatives and has used them in the past.[14]

This is a small overview of a couple of sustainability subsidies in Flanders offered by VLAIO (Flemish Agency for Innovation and Entrepreneurship)[15] - and there are even more than shown here:

[13] Agentschap Landbouw en Zeevisserij (2024) Landbouwrapport 2024 (LARA). Vlaamse landbouw in cijfers, Brussel.
[14] Cathy Lecocq, Thomas Standaert and Petra Andries (ECOOM-Ondernemerschap Gent). Duurzaamheidsbarometer. Duurzaam ondernemerschap bij Vlaamse KMO's - situatie 2024. April 2025. https://www.vlaanderen.be/publicaties/duurzaamheidsbarometer-duurzaam-ondernemerschap-bij-vlaamse-kmos
[15] https://www.vlaio.be/nl/subsidies-financiering - date of access August 4, 2025

- SME-wallet for circular and sustainable entrepreneurship (funding for coaching and training)
- SME growth subsidy for circular and sustainable entrepreneurship
- Strategic ecology support (STRES)
- Waterscan
- GREEN support for greener and more efficient energy use
- Financial support (loans and capital through PMV or LRM) for sustainability projects
- Coaching by VLAIO business advisors
- MVO Flanders (Sustatool, MVO-scan…)



Statistics show that SMEs often do not know about these, or they haven't participated. In the figure above, the red part shows the percentage of SMEs that have been subsidised, the blue part shows the percentage of SMEs that have knowledge about subsidies but have not participated, and the green part shows the percentage of SMEs that have no knowledge of any support.

A lack of knowledge means a lack of strategic and efficient innovations in sustainable practices. This means that for Flanders it is more important to focus on a policy that stimulates SMEs to think strategically about sustainability and that gives them access to the right information.[16] Obligating SMEs to report on their sustainability investments is not (yet) useful, since the majority of the investments they do now are mostly not based on strategic choices.

[16] Cathy Lecocq, Thomas Standaert and Petra Andries (ECOOM-Ondernemerschap Gent). Duurzaamheidsbarometer. Duurzaam ondernemerschap bij Vlaamse KMO's - situatie 2024. April 2025. https://www.vlaanderen.be/publicaties/duurzaamheidsbarometer-duurzaam-ondernemerschap-bij-vlaamse-kmos

But - as said before - these figures represent the entire SME ecosystem in Flanders. Fevia (the Belgian federation of the food industry) has created a sustainability roadmap that explains four ambitions of the sector[17]:

1. We keep making the most delicious food, which is also safe and a part of a healthy lifestyle; with respect to both humans and animals, to keep earning the trust of the consumer.

2. We embrace and increase the sustainable transition, by being more efficient with water, energy and packaging, by thinking circularly and by battling food loss and food waste.

3. We focus on safe and motivating workplaces where people love to work and where they have the possibility to grow.

4. We invest in local food production chains and support our Belgians food producers to remain competitive both nationally and internationally.

If we look more closely at the food industry in Belgium, we see that this is the sector representing 20% of all (sustainable) industrial innovations in our country. All in all, this means that the food industry in Belgium - and thus in East Flanders - might be one of the more successful sustainably innovating sectors of our SME ecosystem.

E. Coimbra Region Intermunicipal Community (Portugal)

CIM-RC covers 4,336 km² with heterogeneous landscapes from coastal zones to inland rural areas. The food sector is embedded in cultural identity, with gastronomic heritage leveraged by the title of European Region of Gastronomy. According to Pordata[18], the region hosts about 13,000 companies in the primary and agri-food sector, employing over 40,000 workers. Datacentro indicates that the agri-food sector contributes ~7% of the regional Gross Value Added (GVA)[19].

Dairy (notably cheeses), wine, olive oil, and bakery are strategic subsectors, alongside horticulture and fisheries/aquaculture. Despite this relevance, productivity levels remain below the EU average, with limited innovation uptake.

[17] Fevia. Duurzaamheidsroadmap. 2025. https://www.fevia.be/sites/default/files/files/2025-03/FEV%20manifest%20affiche%20410x550%20LOWRES%20NL.pdf

[18] Pordata. (2021). Base de dados Portugal contemporâneo. Lisboa: Fundação Francisco Manuel dos Santos. Available at https://www.pordata.pt.

[19] Datacentro. (2021). Indicadores socioeconómicos da Região Centro. Coimbra: CCDRC. Available at https://www.ccdrc.pt/datacentro.

SMEs represent more than 95% of companies in the agri-food sector (INE, 2021). Their small scale constrains investment in green technologies and internationalisation. Cooperation through clusters such as InovCluster and through intermunicipal initiatives has emerged as a way to pool resources. Stakeholders confirmed in the project's questionnaire that SMEs see networking and cooperation as essential tools for accessing knowledge, markets, and sustainability innovations.

At the national level, the Portugal 2030 framework, the National Strategy for Organic Farming (Proposed Action Plan 2023-27)[20], the National Programme for a Healthy and Sustainable Diet[21], and the National Energy and Climate Plan 2030 (PNEC 2030)[22] reinforce these priorities. Together, they promote sustainable primary production, ecological transition of agri-food SMEs, circular bioeconomy initiatives, and healthier diets aligned with sustainability goals.

The CIM-RC Integrated Territorial Development Strategy (EIDT) 2021–2027[23] sets a regional roadmap with emphasis on climate transition, circular economy, and innovation. The Intermunicipal Climate Change Adaptation Plan identifies food systems as vulnerable to climate impacts, recommending adaptation measures including water efficiency and diversification. The Regional Risk Management Plan stresses resilience in supply chains. The CIM-RC Food Strategy 2022–2030 is a central innovation, aiming to reduce food waste, strengthen short supply chains, support sustainable logistics, and implement ecological footprint calculators for local producers. Parallel to this, the higher education institutions offers studies on this thematic, per exemple the Coimbra Higher Agricultural School offers a doctoral programme in Sustainable Agri-Food and Environmental Systems, strengthening the human capital for sustainability transitions.

Access to financing is available through Centro 2030 and Compete 2030, which provide instruments for innovation, digitalisation, decarbonisation and internationalisation. The Recovery and Resilience Plan (PRR) supports industrial decarbonisation, renewable energy adoption and energy efficiency measures. The Common Agricultural Policy 2023–2027 introduces eco-schemes and agro-environmental interventions that reward sustainable practices in farming. Interreg Europe enables cross-border knowledge transfer and cooperation projects. Despite these opportunities, stakeholders underlined in the questionnaire that bureaucracy and slow administrative procedures often limit access to funds. They stressed the need for simplification, better guidance, and tailored technical assistance to ensure that SMEs in the Coimbra Region can fully benefit from these financial mechanisms.

[20] Governo de Portugal. (2017). Estratégia Nacional para a Agricultura Biológica 2017–2027 (ENAB). Lisboa: Ministério da Agricultura. Available at https://www.producaobiologica.pt/images/20230213_ConsultaPublica_ENAB.pdf.

[21] Direção-Geral da Saúde (DGS). (2020). *Programa Nacional para a Promoção da Alimentação Saudável (PNPAS)*. Lisboa: Ministério da Saúde. Retrieved from https://alimentacaosaudavel.dgs.pt.

[22] Governo de Portugal. (2020). *Resolução do Conselho de Ministros n.º 53/2020: Plano Nacional Energia e Clima 2030 (PNEC 2030)*. Diário da República, 1.ª série, n.º 129 (6 de julho de 2020). Retrieved from https://diariodarepublica.pt/dr/detalhe/resolucao-conselho-ministros/53-2020-137618093

[23] CIM Região de Coimbra. (2021). Estratégia Integrada de Desenvolvimento Territorial 2021–2027. Coimbra: CIM-RC. Available at https://www.ccdrc.pt/wp-content/uploads/2024/02/CIM_Regiao_Coimbra_EIDT2021-2027_VFinal_abril2021.pdf.

3. Sustainable Production and Value Chain Assessment

Across the five regions, sustainable production and value-chain practices are advancing but remain uneven, especially among micro-SMEs. Progress concentrates on three areas:

- **Resource and energy efficiency:** Precision irrigation, renewable energy (solar, biomass, biogas), energy-efficient equipment and sustainable livestock/feed practices are increasingly adopted.
- **Circularity and short food supply chains:** Valorisation of by-products into energy, feed, or compost, alongside growth of farm shops, vending machines, CSA models and cooperative platforms, strengthen local economies and reduce environmental impacts.
- **Traceability, packaging and logistics:** Pilots in blockchain traceability (e.g., rice, wine), eco-packaging initiatives, cooperative logistics hubs and redistribution of surplus food show growing momentum but limited scale.

Measurement and assessment remain fragmented. While tools such as carbon calculators, checklists and regional ecological-footprint pilots exist, systematic use of LCA, carbon footprinting or ESG reporting is rare among SMEs. Larger firms and RDI institutions are better positioned, but widespread SME adoption requires accessible, affordable frameworks.

Overall, the regions show strong innovation potential, with exemplary pilots in each territory. The key challenge is scaling these practices, particularly by supporting SMEs with finance, capacity building and simplified monitoring tools, while embedding systemic circularity and strengthening short supply chain infrastructures.

A. Region of Central Macedonia (Greece)

The region of Central Macedonia is characterized by a diversified agri-food sector, including small and medium-sized enterprises (SMEs) involved in crop cultivation, livestock farming, dairy production and food processing. In recent years, growing environmental concerns, regulatory pressures and EU-driven policy mechanisms have led many large companies and fewer SMEs to introduce sustainable production practices.

Sustainable Production Practices Identified in Central Macedonia

Adoption of Environmental and Resource-Efficient Technologies

Agri-food SMEs in Central Macedonia are adopting selective environmental technologies to improve production efficiency and reduce resource use. Practices in the region include:

- Organic farming and integrated pest management:

  Central Macedonia hosts a growing number of organic farms, particularly in the sectors of olive oil, vegetables, herbs, and wine. Organic land has expanded in recent years due to CAP subsidies and rising domestic demand, though market access remains a barrier for many small producers.

- Agroforestry and precision irrigation systems:

  Several fruit producers in Imathia and Pella implement precision irrigation, pest monitoring systems, and low-input fertiliser protocols to maintain yields while reducing environmental pressures.

- Sustainable Livestock Practices:

  In the dairy sector, some SMEs are adopting sustainable feed management, manure composting and closed-loop water systems.

- Use of solar energy and biogas in food processing facilities
- Gradual adoption of ISO 14001:

  A small but growing number of SMEs are obtaining ISO 14001 or eco-label certifications as a market differentiation strategy or as part of compliance with retail procurement standards.

Use of Circular Economy Principles and Clean Energy

Central Macedonia applies circular economy principles by:

- Biowaste valorisation and use for energy or fertilizer
- Agri-food waste composting and anaerobic digestion projects
- Valorisation of agro-industrial by-products

Regional and Local Examples of Successful Sustainable Practices

Examples:

- Agricultural Cooperative of Pella (ACP) has adopted GIS and Earth Observation tools since the early 2000s for crop monitoring and control systems, as the end-user pilot in EU-financed initiatives, MYAGROAPP and AgriBIT.

- Alexander S.A., a fruit processing SME in Veria (Central Macedonia) has installed solar panels, alongside with a biomass boiler and the use of sunflower husk pellets, achieving significant energy savings and emissions reductions.
- The 250 kW combined heat and power (CHP) WELTEC BIOPOWER biogas plant was built in Serres, Central Macedonia, powered by a mix of cattle slurry and energy crops, with upgrades planned to reach 750 kW. While this is a larger-scale installation, regional livestock producers and SMEs supplying feedstock are directly engaged in its operation and benefit via digestate and local energy use.
- Gropalis Cottage Industry follows a zero-waste approach, as they integrate fruit waste (peach, apple, cherry residues) as biofuel in heating systems for their facilities and reuse vegetable scraps as animal feed.
- ASEPOP Naoussa operates modern facilities with certified quality systems (e.g. AGROCERT) and applies integrated management practices in fruit sorting, packing and cold storage.
- Domaine Agrovision (wine producer) reuses wine lees as inputs for compost and bioenergy recovery and collaborates with local restaurants and pizzerias to incorporate wine lees into bread and pizza dough.
- Tsakiris Family Egg Farms, one of Greece's leading egg producers, operates a biogas facility that processes hen manure into on-site electricity and fertilizer, highlighting a real example of circular bioenergy practices by a regional agri-food company in Central Macedonia.

Sustainability in the Product Value Chain Identified in the Region

Practices Related to Logistics, Traceability, Eco-Packaging, Waste Management

Efforts to embed sustainability across the value chain are visible, though still limited in overall market penetration. Key practices include:

- Traceability platforms using QR codes and blockchain for food origin and safety
- Eco-friendly packaging materials (bioplastics, compostables):

  Some SMEs have moved toward biodegradable or recyclable packaging materials, prompted by EU regulations on single-use plastics and growing consumer awareness.

- Logistics optimisation via AI to reduce food waste and fuel use
- Logistics and local supply chains:

  There is growing momentum behind short supply chains, including farmers' markets and agri-tourism-based distribution models, especially in Pieria and Chalkidiki. This reduces carbon footprint while strengthening local identity.

- Food loss prevention via redistribution networks with NGOs
- Emerging waste valorisation projects

Regional and Local Examples of Sustainable Value Chain Practices

While widespread adoption of structured sustainability practices across the agri-food value chain remains limited, several documented initiatives in Central Macedonia illustrate promising developments:

- Blockchain traceability in the rice sector: As part of the RUMORE Interreg project, the Region of Central Macedonia, in collaboration with CERTH and other stakeholders, piloted a blockchain-based traceability system for the rice value chain. This system allows data capture from farm operations to processing and distribution, enhancing transparency and supporting quality assurance efforts.
- Digital traceability in the wine sector: The ORION-CM platform, developed by CERTH–ITI, introduces a blockchain infrastructure for wine traceability. It records key parameters from vineyard management, production and bottling, providing anti-counterfeiting protection and supporting export competitiveness. While still at the pilot stage, it demonstrates the potential for wider digitalisation in value chains.
- Food waste redistribution initiatives: In Thessaloniki and surrounding areas, collaborative schemes involving local food businesses and civil society organisations are redirecting surplus food from the supply chain toward social solidarity networks. These efforts contribute to the region's early-stage circular food economy.

These examples underscore the region's innovation potential while highlighting the need for scaled implementation and deeper SME integration. Moving from pilot to practice will require enhanced infrastructure, digital capacity-building and incentive alignment.

Measurement and Assessment Tools

Existing Tools Used by SMEs in the Region to Monitor Sustainability

Despite increasing awareness of environmental and social responsibilities, the adoption of structured sustainability assessment tools among agri-food SMEs in Central Macedonia remains limited. The region has made isolated progress, particularly among medium-sized or export-oriented businesses, but the systematic integration of sustainability monitoring tools is not yet widespread. The OECD report [3] emphasizes the need for regional data platforms and standardized sustainability indicators.

Current practices and tools in use:

- Life Cycle Assessment (LCA): While recognized as a valuable tool for evaluating environmental impacts across the product lifecycle, LCA has only been piloted in selected agri-food SMEs with research support. However, there are currently no publicly documented cases where agri-food SMEs have conducted a full LCA of their production or value chain processes.
- Carbon footprinting: The use of carbon footprinting tools remains limited and primarily motivated by export market compliance. No SMEs have yet published structured carbon footprint accounts or greenhouse gas (GHG) inventories.
- Environmental management standards: The implementation of ISO 14001 environmental management systems has been observed sporadically, mainly among SMEs seeking access to international markets. The broader application of these systems remains infrequent, especially among micro-enterprises.
- ESG and Sustainability Reporting: There are currently no publicly documented cases of agri-food SMEs in Central Macedonia producing Environmental, Social and Governance (ESG) reports or formal sustainability disclosures. These practices remain confined to large enterprises, highlighting a transparency gap in the SME segment.
- Carbon emissions reporting under Article 19 of the National Climate Law: Medium and large agri-food facilities subject to A1/A2 environmental permits, particularly in the livestock and aquaculture sectors, are mandated under Article 19 of the National Climate Law to implement carbon emissions reduction planning and verified reporting. These requirements create a precedent for structured monitoring, but do not currently apply to most SMEs. This obligation applies from 2026.
- As part of the Horizon Europe ROBIN project (2022-2025), Central Macedonia is co-developing a regional digital toolbox/platform to support governance in the circular bioeconomy. The Toolbox includes tools for data collection, monitoring and evaluation, structured around Key Performance Indicators (KPIs) on water use, greenhouse gas emissions, circularity and other metrics. As of early 2025, the platform has completed alpha and beta testing with regional stakeholders and is positioned to enable SME-level participation in structured sustainability tracking and reporting in the future.

B. Region of South Ostrobothnia (Finland)

Sustainable production is one of the key focuses of the regional RDI and is emphasized in development projects for both farming sector and food processing SMEs. Value chain assessment has been developed in both national and regional scale. Below some current examples of development projects and cooperation within each theme.

a) Sustainable production practices identified in the region

- Adoption of environmental and resource-efficient technologies

    - Sustainable Digital Double Transition (ERDF InnoCities) (in Finnish): supporting food sector enterprises with digital and technological new solutions. SME cases, mappings.
    - Future Frami Food Lab (ERDF): Strengthening cooperation and the use of the testing platform for food technologies and processes, development of new sustainable food technologies.
    - Smart Farm of Tomorrow – HÄMY (EAFRD) (in Finnish): education for farmers on new technologies

- Use of circular economy principles and clean energy
    - RIIHI Circular Economy Platform (ERDF) (in Finnish). Tools, guidelines, SME cases, network.
    - Honkajoki Oy (company): Circular economy products from animal by-products: responsibly produced high-quality renewable raw materials for animal nutrition, biofuels and fertilizers

- Regional and local examples of successful sustainable practices
    - Climate-smart agricultural production of the future in South Ostrobothnia – TIME (Ministry of Agriculture and Forestry of Finland) (in Finnish): Developing and sharing carbon farming methods with pilot farms.
    - The Future Climate-Smart Food System in South Ostrobothnia -TIRE (EAFRD) (in Finnish): Strengthening climate actions and sustainability among farms and food industry enterprises in South Ostrobothnia.
    - Kaura 2.0. cooperation of farmers and a food processing company on sustainable farming
    - Several projects on peat-free production and sustainable use of peatlands (ERDF JTF)

b) Sustainability in the product value chain identified in the region

- Practices related to logistics, traceability, eco-packaging, waste management, etc.
    - Pirjon Pakari Oy (SME case) (in Finnish): A business model based on freshness guarantee reduces biowaste. RDI cooperation.

- Regional and local examples of sustainable value chain practices
    - Coopreation of Anora and Atria A-Rehu (page 12) (Business case): Side streams of Anora ethanol plant (Koskenkorva) are used for barley protein feed for pigs and cattle. The factories are side-by-side with no

external logistics needed. Barley protein feed has replaced imported soybean meal.

- Regional Climate Roadmap for the Food Sector in Southern Ostrobothnia (National AKKE funding (Supporting sustainable growth and vitality in the regions): Developing a common roadmap for the food value chain for climate sustainability
- Sustainable and Responsible Food Province (ERDF): Strengthening and substantiating the sustainability efforts in the food system in South Ostrobothnia. Offering and developing various tools for businesses and piloting them, promoting climate change adaptation and risk prevention in the region's food system.

c) Measurement and assessment tools

- Existing tools used by SMEs in the region to monitor sustainability (e.g., LCA, carbon foot printing, environmental performance indicators)
  - VHH (ERDF): (in Finnish): Responsible and low-carbon food production - a checklist for self-assessment of sustainability

2.2 Processing and Manufacturing

	Yes / Partly	No	I don't know	Not applicable to my company	Comments
Are the by-products generated from production utilized as efficiently as possible?	☐	☐	☐	☐	☐
Has the carbon footprint of the entire life cycle of the product been calculated?	☐	☐	☐	☐	☐
Are efforts made to find ways to reduce the product's carbon footprint?	☐	☐	☐	☐	☐

Picture: example of VHH checklist (translated)

  - IKE & IKET (ERDF) (in Finnish): Climate sustainable food chain. Developing carbon footprint tool for SMEs, helping measurement and assessment. Guidance video of IKE calculator: https://youtu.be/gw1VxyPo8q8

Picture: screenshot of the IKE calculator

C. Kujawsko-Pomorskie Voivodeship (Poland)

Short Food Supply Chains and Direct Agricultural Sales (DAS) are today among the most important tools for building a sustainable food sector in Kujawsko-Pomorskie. At a time when food products travel thousands of kilometers and their origins are increasingly opaque to consumers, these sales models restore authenticity to the food we eat. They allow food to reach the table almost directly from the field—fresh, flavorful, and nutritious—without unnecessary intermediaries or complex logistical processes. This not only benefits the environment, through fewer transport emissions, reduced packaging, and a smaller carbon footprint, but also provides tangible support to the local economy.

Small processors and farmers who engage in direct sales gain financial independence and a larger share of the final product price, while consumers pay fairly and know exactly what they are buying and from whom. Direct Agricultural Sales (DAS) offers many small farms an opportunity for legal, flexible operation—allowing them to sell their own processed products without running a formal business and under simplified sanitary requirements. It also serves as the first step toward professionalization, including investments in infrastructure, improved marketing, and ultimately the creation of a recognizable local brand within the region and beyond.

Behind these producers and their initiatives lies not only economic motivation but also a social dimension of change. Direct sales, markets, farm boxes, and online local marketplaces strengthen the connection between producers and consumers. They create a community in which food is not an anonymous commodity but a story of work, tradition, and passion. This builds trust—the foundation of sustainable marketing for local products. Authenticity, transparency, and locality become not just marketing slogans, but tangible values experienced with every interaction with the producer.

DAS and short supply chains align with global trends in sustainable development while remaining deeply rooted in the local context. They exemplify how small farms can adapt to the challenges of the modern market by leveraging proximity, tradition, and innovative communication tools. They strengthen local communities, stimulate the growth of small enterprises, and promote regions, making them recognized destinations on the culinary map. Their strength represents the future of the food sector—fairer, more responsible, and genuinely authentic.

Online Platform naszelokalne.pl (formerly lokalna-zywnosc.pl)

The platform **naszelokalne.pl**, previously operating as *Lokalna Żywność z Kujaw i Pomorza*, is an innovative initiative that effectively promotes the concept of short food supply chains in the region. It functions as a modern online marketplace, connecting local producers with consumers seeking fresh, authentic food directly from farmers. Customers can order high-quality cold cuts, cheeses, bread, preserves, honey, vegetables, and fruits online and collect them at designated points across the region, including in Toruń and Przysiek. By eliminating intermediaries, the platform ensures that products reach consumers as quickly as possible, preserving freshness and flavor, while simultaneously supporting local farms by providing a fair margin.

A key element in the further development of the project is the logistics and exhibition center being established in Przysiek, which will combine storage, sales, promotional, and educational functions. This facility will serve as the heart of product distribution across the Kujawsko-Pomorskie region, streamlining the fulfillment of online orders and providing a space for producers to engage with customers, business partners, and the media. An integral part of the center will be a bistro serving dishes prepared exclusively from local ingredients available on the platform, offering a tangible example of how traditional products can inspire modern cuisine.

By integrating logistics, promotion, and gastronomy, naszelokalne.pl strengthens its position as a comprehensive project supporting the development of local food—not only through sales but also through consumer education, culinary awareness, and the promotion of gastronomic tourism. This model has the potential to serve as an example for other regions, demonstrating how digitalization, infrastructure, and marketing can together create a strong, sustainable food distribution system based on local resources.

Source: **https://www.facebook.com/lokalnazywnoscpl?locale=pl_PL**

CSA Dobrzyń nad Wisłą – A Local Food Revolution

Dobrzyńskie Warzywa, operating as a modern **Community-Supported Agriculture (CSA)** farm since 2016, represents a local food revolution. Managed by Adrianna Augustyniak and Bartłomiej Kembłowski, the farm spans 4–5 hectares and currently supplies approximately 260 families in Warsaw, Toruń, and Bydgoszcz. The model is based not on a traditional producer–consumer relationship, but on a partnership between farmers and consumers—they plan together, share risks, and enjoy the benefits collectively. The CSA delivers fresh, seasonal products directly from the field to subscribers' homes, bypassing wholesalers and stores, providing a tangible example of a **short food supply chain (SFSC)**. This approach ensures that consumers pay for healthy food while farmers receive stable financial support even before the season begins.

Innovations in planning and production include:

- **Seasonal subscription:** registration opens well in advance, enabling farmers to plan production accurately.
- **Climate adaptation:** for instance, carrots are sown as early as February using moister soil, allowing cultivation even during drought.
- **Good agricultural practices:** crop rotation (5-year rotation with cover crops such as phacelia or lupine), field composting, and crop diversity (several species per hectare), which help prevent erosion and disease.
- **Soil protection:** hedgerows and scattered trees act as natural windbreaks, reducing soil erosion and dust dispersal.

Subscription members not only receive produce boxes but also actively participate in farm life—they help plan, visit the farm, receive reports, and agree to share production risks. This fosters strong bonds between farmers and consumers, enhancing transparency throughout the entire process.

Although the farm does not have a dedicated application, digitalization is implemented through:

- online subscription forms,
- newsletters and social media (Facebook, recipient groups),
- support from institutions such as KSOW, which promote CSA initiatives and SFSC technologies.

CSA Dobrzyń aligns with broader European and national initiatives, such as the Japanese *Teikei* model and local projects funded under the Rural Development Program (PROW), which promote and support short food supply chains. It demonstrates how an innovative approach to community-supported agriculture can transform the traditional farmer–consumer relationship by introducing:

- subscription-based models supporting production planning and financial security,
- adaptive production methods responsive to climate challenges,
- transparency and active communication,
- local, sustainable shortening of the supply chain,
- development of a trust-based and engaged community.

CSA Dobrzyń serves as evidence that a small farm can not only operate effectively but also thrive, providing inspiration and a model for other initiatives across Poland.

Video: https://www.facebook.com/rwsdobrzyn/videos/352250897312543

Find more information: https://www.facebook.com/rwsdobrzyn

”U Doroty – Flavors as in the Old Days”: A Local Field-to-Table Supply Chain

Dorota Słomkowska runs a home-based butchery and shop, **“U Doroty – Flavors as in the Old Days”**, in Murczyn (Żnin County). For years, she has been reviving traditional recipes, smoking sausages and meats according to family traditions passed down by her 92-year-old grandmother. The products are handcrafted without preservatives, prepared on-site, and sold directly to customers—through the shop, SMS notifications, Facebook, and local markets—bypassing wholesalers and retail chains. Consumers gain fresh food “with smoke and flavor as in the old days,” while Dorota has established a stable, direct sales channel.

The real innovation lies in the logistical infrastructure: adaptation of farm buildings into a small-scale butchery, equipped with support from the Rural Development Program (PROW) for small butcheries. Communication goes beyond tradition: SMS messages reach a database of approximately 1,500 customers, and Facebook is used for promotional posts, including seasonal products such as barbecue sausages.

Dorota does not work alone—she collaborates with local producers of pastries, bread, dairy, honey, wine, organic flours, and vegetables. She is actively involved in local projects such as **“From Field to Table”**, implemented by the Marshal’s Office in Toruń, and regularly participates in

regional markets. Support from the PROW grant (03/2019–12/2021) expanded production capacity—from one pig per week to more than four, and poultry from 200 to 600 per month. The business now generates a stable income, employs two additional staff members, and serves a customer base of over 1,500.

Source: https://www.facebook.com/profile.php?id=100081977414774

Siemońskie Smakołyki – Regional Flavors Straight from the Farm

Siemońskie Smakołyki, run by farmers from the Siemionka area, showcase the potential of small-scale, local food production. Their Facebook page has over 2,180 followers, who actively engage with updates - demonstrating growing interest in locally produced, homemade food.

Direct farm sales: a self-service farm stand allows customers to come, choose fresh products such as eggs, dill, and garlic, and pay "into the money box." This approach ensures full transparency, eliminates intermediaries, and delivers seasonal products directly to consumers. It also builds trust and a "farm-to-table" connection while reducing distribution costs.

At the stand, customers can find high-quality eggs, which command a fair price for freshness. Seasonal kits for pickling, including dill, garlic, and horseradish, encourage consumers to prepare their own fermented foods at home.

Digital communication and marketing: short videos (reels) on Facebook showcase products and production processes—for example, in May, April, and December—creating a visual relationship with customers and providing educational content. Regular updates and photos of fresh products (eggs, baked goods, vegetables) maintain engagement and attract the local community.

Authenticity and engagement: newsletters with accessible pricing and practical pickling kits encourage culinary experimentation and conscious eating. Production transparency is emphasized through photos and reels, enabling followers not only to see the final product but also to feel connected to the source of their food.

Community benefits and future prospects:

- Local consumers gain reliable access to fresh, regional products at friendly prices.
- The owners can sell directly, retaining higher margins, independently expanding their product range, and reducing losses.
- The educational model (e.g., pickling kits) supports home cooking and preserves local culinary traditions.

Source: https://www.facebook.com/profile.php?id=61555835722277

Jasiurkowscy Dairy – Artisanal Cheesemaking with a Short Farm-to-Table Path

The family-run farm from Pałuki, located in Bożejewiczki near Żnin and managed by Jakub with his wife and parents, exemplifies a modern approach to traditional dairy production. The farm specializes in cheeses—from quark and fresh rennet cheeses to ripened and mold-ripened varieties—as well as butter, yogurt, and a wide range of other dairy products. Their high-quality, naturally made products have been recognized with numerous awards, including first place and the Grand Prix at the *Wielkie SERwowanie* in Wrocław.

The farm operates within a **short food supply chain**, producing all items on-site and delivering them directly to customers. Sales occur both at the farm and through online stores, without intermediaries. A key part of their strategy is participation in the **naszelokalne.pl** platform, which allows customers to place orders online and pick up products at points in Toruń. This solution ensures freshness and emphasizes the local character of deliveries, shortening the route from "farm to table."

Modernity is also evident in their investments. The installation of a **24-hour milk vending machine** allows customers to fill their own containers with fresh milk—offering a convenient, hygienic, and environmentally friendly sales method. This approach reduces plastic usage, strengthens direct customer relationships, and promotes sustainable consumption. Simultaneously, the farm is expanding into a modern cheesemaking facility, which will allow complete on-site milk processing. Investment in specialized equipment such as a milk vat, pump, and transport system ensures production independence, greater efficiency, and process safety.

The farm's product offering combines tradition with innovation. Quark, Gzik Pałucki, 83% butter, lightly pasteurized milk, and flavored cheese sets with paprika, nigella, and wild garlic are made exclusively from their own milk, without chemical additives. Direct sales and the naszelokalne.pl platform enhance the farm's regional brand recognition and facilitate consumer access to artisanal products.

Jasiurkowscy also prioritizes education and the promotion of local traditions. They organize workshops and educational tours where participants can learn about cheesemaking, tasting products, and discover more about their origins. Participation in local markets and fairs—in Żnin, Inowrocław, Minikowo, and Barcin—strengthens community ties and promotes regional culinary heritage.

Jasiurkowscy Dairy demonstrates how a traditional farm can successfully combine craftsmanship with innovation, creating an effective short supply chain model. Through modern solutions, conscious marketing, and strong local cultural roots, they show that contemporary, sustainable agriculture holds not only economic potential but also a social mission.

Video: https://fb.watch/AZSg16m3of/

More information: https://www.facebook.com/SerowarniaJasiurkowscy

Kozieławy – From Goats to the Table in a Short Food Supply Chain

Emilia and Krzysztof Witkowscy run **Kozieławy**, a small certified artisanal goat cheese farm in Ławy, Kujawsko-Pomorskie. Their products include fresh, aged, and mold-ripened cheeses, and their high quality is reflected in numerous awards as well as growing popularity—over 1,700 likes and followers on Facebook.

The farm operates on the principle of a **short food supply chain** and diversified sales channels. Products are delivered directly to customers through an on-farm shop, the online store **naszelokalne.pl**—available 24/7—and local delicatessens in Toruń, Bydgoszcz, and Warsaw. Participation in fairs, including those in Włocławek and Podlasie, helps reach new customers while promoting freshness, locality, and authenticity. By eliminating intermediaries, the farm shortens the path "from the aging room and dairy to the table" while ensuring higher margins and financial stability for producers.

The farm emphasizes continuous development and education. Receiving the **Bronze Medal for "Ser Gospodarza"** at the Podlasie Cheese Festival confirms product quality. Emilia's active participation in cheesemaking workshops and her sharing of knowledge with other artisans enhances the skills of the entire local community. Such initiatives not only strengthen the Kozieławy brand but also promote artisanal cheesemaking and increase consumer awareness.

A key element of the farm's success is thoughtful logistics and infrastructure. The **naszelokalne.pl** platform allows customers to order online around the clock and pick up products at convenient times, while a broad presence across multiple sales channels minimizes the distance between product and consumer. Production independence and organic certification ensure full control over product quality, flexibility to introduce new items, and resilience against disruptions in external supply chains.

Kozieławy exemplifies how a small farm can successfully combine tradition with innovation, building a brand based on a short supply chain, high production standards, and conscious marketing. This model strengthens the local economy, promotes sustainable production, and brings consumers closer to the authentic taste of artisanal products.

Video: https://www.youtube.com/watch?v=lmGQd_vQCR4

Source: https://www.facebook.com/kozielawy

Swędrowki Farm – Modern Technologies and Short Food Supply Chains

The **Swędrowki family farm** in Jaroszewo, Kujawsko-Pomorskie, exemplifies a modern and innovative approach to milk production and the distribution of local dairy products. At the core of the operation is a **cow milking robot**—a technologically advanced solution that not only automates the milking process but also ensures animal welfare and consistently high-quality milk.

Automated milking allows the schedule to be adjusted to the individual needs of each cow, promoting herd health and stability in raw milk production.

A key element of the farm's strategy is its **24/7 self-service on-farm shop**, where customers can purchase fresh milk, cheeses, butter, and other products at any time, using a simple trust-based system. This approach significantly shortens the supply chain, eliminates intermediaries, and strengthens the direct relationship between producer and consumer.

The Swędrowki actively embrace the **short food supply chain model**, building their brand through direct customer engagement. Although traditional milk vending machines have gradually disappeared in the region, the farm successfully replaced them with its own sales point, increasing product accessibility while maintaining strong ties with the local community.

The Jaroszewo farm represents a model that **combines technological innovation with tradition and customer proximity**. The modern milking robot, 24/7 self-service shop, and consistent implementation of short food supply chain principles make the Swędrowki farm an inspiration for other farmers, demonstrating how technology can support sustainable production, marketing, and the development of local products.

Source: https://www.facebook.com/profile.php?id=100090574698148

Fresh Vegetable Vending Machines – Innovation in Kujawsko-Pomorskie

In the Górzyskowo district of Bydgoszcz, a **"asparagus vending machine"** was installed—a self-service refrigerated unit allowing customers to purchase half-kilogram portions of white and green

asparagus 24/7. The initiative was led by farmer Tadeusz Osuch from Więcbork, and the device was implemented in cooperation with the Pomeranian Housing Cooperative. Customers appreciate the freshness of the products and the convenience of card payments, making the project well-received and popular locally.

Similar innovations have also appeared in City of Bydgoszcz, where a network of **mobile vegetable refrigeration units**, replenished directly from the field and available around the clock, has been introduced. Consumers value them not only for their local character but also for competitive pricing. These vending machines illustrate the implementation of the **short food supply chain concept**, reducing the number of intermediaries, ensuring freshness, and shortening the time between harvest and table.

The development of such solutions is not without challenges. The first machines appeared around 2021–2022, and during peak seasons, there were occasional periods of "empty shelves," highlighting the dynamic nature of demand and the importance of efficient logistics. Nevertheless, local media such as *Pomorska* and *Express Bydgoski* have praised these projects as exemplary cases of combining modernity with the traditional freshness and authenticity of local products.

Innovative vending machines complement more traditional direct sales methods, such as in Łochowo, where a farmer opens a field stand allowing customers to select and purchase asparagus immediately after harvest. Both asparagus vending machines and mobile vegetable units demonstrate how modern technology, and simple logistical solutions can support short food supply chains, promote local production, and foster lasting relationships between farmers and urban residents.

Source: https://bydgoszcz.wyborcza.pl/bydgoszcz/7,48722,28439049,szparagomat-stanal-na-bydgoskim-gorzyskowie-warzywa-sa-dowozone.html; https://bydgoszcz.tvp.pl/70095810/swieze-szparagi-z-automatu

D. Economic Council of East Flanders (Belgium)

a) Sustainable production practices identified in the region

- Adoption of environmental and resource-efficient technologies

Companies feel that they are more or less obligated to make sustainable investments; it is either that or they won't exist anymore in ten years. The interviews with our entrepreneurs show that a lot of them invest in order to remain futureproof and competitive. They also want to scale their production, make the process more sustainable and more continuous, increase the quality and decrease food loss/waste. A lot of them also acknowledge a smaller workload.

Most entrepreneurs talk about resource-efficient investments, such as solar panels, sun boilers, batteries and new machinery that is more energy efficient. Some of them also invest in electric transport. In our interviews, we spoke with a wine producer who followed a training on how to clean with steam instead of water, which is more sustainable since no chemicals are used, and less water is used.

A few of the entrepreneurs have had to move from one building to another in the last ten years. They say that in their new buildings, they did not have a choice but to invest in better insulation, in gas heating (instead of a fuel oil system), LED lighting and movement sensors, renewable energy sources etc.

One of the subsectors of the food industry, the dairy sector, has made a nice overview of the sustainability investments of the sector. These promising figures are shown[24]:

- Decrease of 26% of the carbon footprint for 1 liter of raw milk (from 2000 to 2015)
- 30% of the dairy farms produce its own sustainable energy
- Decrease of 14% of fuel consumption (from 2008 to 2022)
- 69% of all dairy transport complies with the strictest emission standards (Euro 6)
- 13% of all dairy producers have extra activities in societal context (touristic activities, farm shop, care farm, children's farm)
- 86% of fairy farms always have the same veterinarian
- 57% pay attention to a clean company/farm environment and more environmentally friendly waste management
- 41% uses alternative water sources (rain or surface water)

- Use of circular economy principles and clean energy

The Flemish Government aims to make Flanders a circular leader in Europe. It aims to achieve this by investing in circular innovation, decoupling the material footprint of our consumption from economic growth, and reducing it by 30% by 2030. Therefore, Flanders is investing in the

[24] https://www.buurtsuper.be/nl/nieuws-uit-de-sector/meten-is-weten-en-resultaat-boeken?utm_medium=email&utm_campaign=Nieuwsbrief%2022%20april%202022&utm_content=Nieuwsbrief%2022%20april%202022+CID_e4491e52c231196134b4360b3f60056a&utm_source=mailr&utm_term=Lees%20meer - date of access: July 30, 2025

ambitious Flanders Circular partnership, which includes six work agendas and seven levers (more information: https://vlaanderen-circulair.be/nl.).

However, the food chain also faces several challenges in its efforts to become more sustainable. The work agenda aims to elevate circularity within the food chain: circularity 2.0. The food chain has traditionally been inherently circular: byproducts from food products are used to feed livestock. The animal manure is used to maintain the fertility of the land and to grow high-yielding crops. These crops are then used to produce food. This brings us back to the side streams, and the circle is complete.

Yet, the circle is not entirely closed. Over time, the various sectors have increasingly used external inputs and are responsible for emissions to the environment. The current focus is primarily on making internal processes more sustainable and reducing production losses. This focus has its limitations when it comes to minimizing the material footprint of the entire food chain. To go a step further, a system perspective is needed, shifting the focus from an individual actor to the interconnectedness of these individual challenges, creating an opportunity for the entire food chain. Such a transformation makes it clear that a circular food chain 2.0 requires the participation of many parties. The first cross-sector initiatives are gradually finding their way to the market. The food chain work agenda aims to stimulate this dynamic so that existing initiatives can be scaled up and new initiatives can find inspiration and fertile ground within it to create a significant circular dynamic within the food chain and beyond.[25]

We see that entrepreneurs are slowly becoming more familiar with the idea and more willing to make these sustainable investments. It all starts with the right training and coachings. More and more entrepreneurs first want to learn about circularity principles and how exactly they can implement these in their own companies. Some of them are really taking big steps. We talked with an entrepreneur who installed its own biological water purification system, which allows them to reuse water. Another invested in a vacuum pump, which prevents residual water from entering the sewer and allows them to reuse it.

Others are being circular by working with partners, mainly in the processing of residual flows. A bakery fills a bio box with leftover dough, which is collected for free and turned into biogas. A cheesemaker uses its cheese whey to feed the goats (who provide the milk for the cheese). Whey is an important source of protein for them, so it’s a win-win for everyone.

A coffee roaster (Vandekerckhove) from Ghent keeps investing in a more sustainable production process. They invested in 28 solar panels, a heath pump and floor heating and they reused rain

[25] Departement Landbouw & Visserij en Fevia Vlaanderen. Startcharter - werkagenda voedselketen. https://vlaanderen-circulair.be/src/Frontend/Files/userfiles/files/Werkagenda's/WA_voedselketen_startcharter.pdf

water. They even have a roof garden to stimulate biodiversity in the region and also to create a cosy place for themselves.

- Regional and local examples of successful sustainable practices

Apart from the examples we already mentioned above, we do have another very nice example of a sustainable value chain practice, namely the one of Breydel. This is a meat producer who specializes in artisanal and sustainable pork which is farmed exclusively for them by local farmers. Since 2019 they organise this complete sustainable short chain "from stable to plate", following the model of a small farm butchery, but on a large scale: 750 pigs a week, on three different locations. Everything (raising the pigs, feed installations, slaughter process, cutting plant and meat processing) is organised within a 25 kilometre radius. The pig feed is mixed with local waste streams from human food. That is how they created their own pork and pig meat industry with their own specifications based on four pillars: local, healthy, animal-friendly and sustainable. Because of this short chain method, every piece of meat is 100% traceable, which means that the consumer knows exactly what he's eating. Breydel always focuses on its corporate social responsibility, by being energy-efficient, by guaranteeing a better income for the farmers, by ensuring the best animal treatment, by keeping things local.

b) Sustainability in the product value chain identified in the region

- Practices related to logistics, traceability, eco-packaging, waste management, etc.

Packaging

Pack4Food is a consortium of companies in the food and packaging industry and their suppliers.

Pack4Food helps companies package food better and supports them with their daily packaging challenges and innovations. They bring companies and research institutions together to realize large and small innovations throughout the entire packaging chain, and to provide advice and training, initiate and coordinate research projects, and offer a network.

Pack4Food initiates and coordinates projects in collaboration with companies and research institutions at both the Flemish and European

levels. A key driver in this is the roadmap ‘Food Packaging of the Future’, which was officially launched at the end of 2019. In 2020, a strategic partnership with Flanders' FOOD was established to roll out this roadmap through various projects, together with companies, knowledge partners, other spearhead clusters, and stakeholders in the food packaging chain. By 2030, all food packaging must be circular, and the rapid evolution of digitalization and personalization is unavoidable. Pack4Food and the spearhead clusters Flanders' FOOD (food), VIL (logistics), SIM (new materials), and Catalisti (chemicals and plastics) have been working on a Roadmap for future food packaging since September 2018. This Roadmap outlines research directions for the coming years (2018-2030) to develop advanced packaging, focused on the needs of the future, in collaboration with industry, government, and knowledge institutions.[26]

Short chain and logistics

Awareness of short-chain sales outlets is growing, as is awareness of Week of the Short Chain (56% awareness) and the participation rate. The image and familiarity of farm-to-farm sales are also evolving positively. The time gained during the COVID-19 lockdowns had a significant, albeit temporary, impact on direct farm sales. High inflation in 2022 and 2023 led to smaller baskets and growth in hard discounters. This puts pressure on farm sales but resumes growth in 2024. Combined farm and farmer's market turnover grew by 27% last year. The farm's core clientele consists primarily of retirees and older couples without children. Retirees also form the farmers' market's core clientele, and specifically, upper-class retirees.[27]

Half of Belgians (51%) indicate that they attach importance to the country of origin when purchasing fresh food. This trend has been rising for years but accelerated further due to the COVID19-crisis. This trend has since subsided somewhat, but we continue to see a long-term increase. Almost everyone prefers domestically produced products, especially for typical products that are significantly produced in Belgium, such as eggs, potatoes, milk and vegetables. Support for local farmers and the domestic economy is a key reason for this preference for domestic products. Furthermore, reduced transport also plays a significant role in this preference for domestically produced products. This reduced transport results in a lower environmental impact, greater freshness, and cheaper products. Thanks to years of industry effort, Belgians have confidence in domestic production and the inspections that are carried out, and they appreciate the taste and quality of domestic products. 69% are proud of our Belgian food products, and 68% think it's a shame to import products when a Belgian version also exists. Unfortunately, only 38% indicate that Belgian products are easily recognizable at the point of sale, while 61% say that if a

[26] https://pack4food.be/nl/projecten/roadmap - date of access: July 31, 2025
[27] VLAM. Trends in short-chain sales in Flanders. 2024

product clearly indicates its Belgian origin, they are more likely to choose that product, and 48% say that if a supermarket prioritizes domestic products, they are more likely to shop there.[28]

A brewery in Ghent follows the short chain principle as they deliver directly to the buyer whenever possible. This means customers get a lower price, fresher beer and a faster delivery while helping the environment. In Ghent, they organise 90% of their deliveries by renewable-powered electric bike directly from the brewery.

- Regional and local examples of sustainable value chain practices

We see that a lot of producers and farmers offer their customers the possibility to buy their products locally, on the production site or on the farm itself, in a small shop or in vending machines. This decreases the food kilometres and the packaging, while it increases the traceability and the consumer trust. To give an example: ‘t Pauwenhof has bought 16 meters of vending machines (80.000 euros) and a cooling system (20.000 euros) where they sell their own products, from pieces of meat to complete meals that only have to be heated. They sell potatoes, goat cheese, juices, partly their own products, but also other producers and farmers in the region get the opportunity to sell their products in the vending machines.

Another valuable example is Vanier (translated in English “From here”). Vanier is a cooperative web platform and B2B-webshop for the short food supply chain in Ghent, enabling local farmers to deliver their products directly to Ghent shops, restaurants and commercial kitchens. Vanier not only manages logistics and platform, but also organizes meetings between producers and buyers and promotes low-package deliveries to combat food waste. The initiative, part of the cooperative platform Linked.Farm, is supported by the City of Ghent and aims to strengthen local agriculture, promote sustainable production, and guarantee a fair price for farmers.

c) Measurement and assessment tools

- Existing tools used by SMEs in the region to monitor sustainability (e.g., LCA, carbon footprinting, environmental performance indicators)

Of the companies we interviewed, there were not many monitoring their sustainability impact, even though there are already a couple monitoring systems that are offered for free by the

[28] VLAM. Het belang van herkomst en voorkeur voor inlandse producten blijft hoog. 2023

government. MVO Vlaanderen (knowledge center for sustainable entrepreneurship) has created the Sustatool, which is a free and user-friendly dashboard to make sustainable entrepreneurship concrete, tangible, measurable and feasible. It's a tool for both SMEs who are just taking their first steps in the sustainable or circular landscape and for entrepreneurs who want to scale up their sustainable policy and report on it according to European standards. From mapping the impact to developing targeted actions and monitoring results: Sustatool allows entrepreneurs to build a future-proof business model and make their commitment to sustainability visible.

First the company is being scanned, based on 14 sustainability themes – from energy and climate to governance and value chain. These themes seamlessly align with the European Reporting Standards (ESRS) and the VSME standard. The data, actions, and indicators you enter are easily tagged based on ESRS, SDGs, or VSME standards and can be easily filtered afterwards. In the final step, a clear report is being generated. For SMEs, the Sustatool is a particularly useful tool for preparing a VSME report or answering questions from CSRD-obligated clients[29].

Nevertheless, the entrepreneurs in our interviews did not talk about Sustatool. Only two of them had a concrete answer to our question:

- A meat producer, Breydel, creates an annual sustainability report in which countless data is being collected. This report concludes that their business already is quite sustainable.

- Nobel, a vineyard, has contacted an external service provider who has done an energy analysis of the company, in order to make necessary changes.

All in all, we can see that a lot of work remains to be done on the mapping and monitoring of sustainability innovations and their impact on our food industry.

E. Coimbra Region Intermunicipal Community (Portugal)

The Coimbra Region has been increasingly recognised as a testbed for innovative and sustainable agri-food production practices, combining traditional knowledge with applied research. Several domains of action can be highlighted:

In the Baixo Mondego valley, precision irrigation and fertigation techniques have been tested within pilot farms under projects, achieving significant water savings without compromising

[29] https://www.mvovlaanderen.be/nl/sustatool - date of access: July 31, 2025

yields. These interventions respond directly to climate change risks identified by the Intermunicipal Climate Change Adaptation Plan[30].

Regional bakeries are piloting recovery of surplus bread and dough for redistribution or transformation into feed and brewing substrates[31]. Olive oil mills and wineries increasingly invest in biomass boilers using pruning residues and olive pomace, reducing fossil fuel dependency. Meat processing plants in the region have introduced photovoltaic systems with heat recovery to improve energy self-sufficiency, in line with national energy efficiency programmes for agri-food SMEs.

The PROVERE "Queijos do Centro de Portugal" programme integrates environmental management with territorial branding, supporting artisanal cheese producers in implementing hygienic milking, effluent control and pasture management. In the rice sector, Carolino rice from the Baixo Mondego valley[32], certified as PGI, illustrates sustainable production by linking traditional irrigation with ecosystem preservation and water reuse. The University of Coimbra coordinates a project funded by the European Union to develop sustainable mushroom cultivation systems, focusing on the reuse of agricultural residues as substrates and enhancing circular bioeconomy potential in the regional agri-food chain[33].

Despite these encouraging developments, adoption remains highly uneven. Larger and medium-sized enterprises, often with stronger technical departments or links to research institutions such as the University of Coimbra, are better positioned to integrate eco-technologies. By contrast, micro-SMEs face significant barriers in financial capacity, technical knowledge and access to specialised services. This divide was clearly reflected in the stakeholder questionnaire, where respondents pointed to limited human resources, bureaucracy and lack of technical support as main constraints. Bridging this gap will require tailored support schemes, demonstration projects and broader dissemination of best practices.

Sustainability challenges and opportunities extend across the food value chain in the Coimbra Region, spanning traceability, packaging, logistics, and waste management. In terms of traceability and digitalisation, medium-sized firms in the dairy and wine sectors have already adopted ERP and LIMS systems that allow for product monitoring from farm to consumer, thereby responding both to food safety standards and to increasing consumer demand for transparency. However,

[30] CIM Região de Coimbra. (2017). *Plano Intermunicipal de Adaptação às Alterações Climáticas (PIAAC)*. Coimbra: CIM-RC. Available at https://climagir.cim-regiaodecoimbra.pt/application/views/assets/documentos/piaac-cim-rc.pdf

[31] Prato Certo. (2021). Mediterranean Diet and Food Waste Manual. Coimbra: ACSA. Available at https://www.pratocerto.pt/uploads/modulos_ficheiros/manual-da-dieta-mediterranica-e-do-desperdacio-alimentar-na-regiao-de-coimbra.pdf.

[32] DGADR. (2020). Arroz Carolino do Baixo Mondego – Indicação Geográfica Protegida. Lisbon: DGADR. Available at https://www.dgadr.gov.pt/pt/?view=article&id=433:comissao-europeia-reconhece-o-arroz-carolino-do-baixo-mondego&catid=27&highlight=WyJhcnJveiIsImNhcm9saW5vIl0=.

[33] University of Coimbra. (2023). Sustainable mushroom cultivation project receives €400,000 funding. Coimbra: UC. Available at https://www.uc.pt/sustentabilidade/noticias/cultivo-sustentavel-de-cogumelos-recebe-apoio-de-400-mil-euros.

smaller enterprises still rely heavily on manual processes, creating a digital divide that limits their competitiveness and capacity to participate in more demanding value chains.

Packaging has also become a focus for sustainability efforts. Several wineries in the Bairrada sub-region, integrated within CIM-RC, are reducing their environmental footprint by introducing lightweight glass bottles and piloting biodegradable materials, particularly for export markets, in line with EU circular economy priorities[34]. In the bakery sector, producers have tested paper-based and compostable packaging solutions as part of regional campaigns against plastic use[35].These initiatives illustrate how consumer expectations and regulatory pressures are stimulating innovation in packaging across the value chain.

Logistics and distribution remain a key challenge, given the fragmentation of producers and the rural-urban geography of the region. The Food Strategy promotes shared logistics hubs and local markets to shorten supply chains, reduce transport emissions, and valorise local products. Pilot actions already implemented include inter-municipal coordination of producers for collective distribution in farmers' markets across Coimbra and neighbouring municipalities[36]. These cooperative approaches demonstrate the potential for reducing costs and carbon intensity while increasing the visibility of local products.

Waste management is another critical area for sustainability. The *Mediterranean Diet and Food Waste Manual* documents regional initiatives where bakeries, restaurants, and local associations collaborate to redistribute surplus food to social programmes, tackling both food waste and social vulnerability. In the olive oil sector, the use of biomass boilers fuelled by pomace and pruning residues provides a concrete example of circularity and by-product valorisation in agro-industries

At the consumer end, the Coimbra Gastronomy Route, developed under the European Region of Gastronomy designation, connects producers, restaurants, and consumers to promote sustainable diets and support short supply chains[37]. Taken together, these initiatives confirm that the Coimbra Region is progressively embedding sustainability principles across its food value chain, even though challenges remain in scaling practices among micro and small enterprises.

[34] CIM Região de Coimbra. (2017). *Plano Intermunicipal de Adaptação às Alterações Climáticas (PIAAC)*. Coimbra: CIM-RC. Available at https://climagir.cim-regiaodecoimbra.pt/application/views/assets/documentos/piaac-cim-rc.pdf

[35] Prato Certo. (2021). Mediterranean Diet and Food Waste Manual. Coimbra: ACSA. Available at https://www.pratocerto.pt/uploads/modulos_ficheiros/manual-da-dieta-mediterranica-e-do-desperdacio-alimentar-na-regiao-de-coimbra.pdf.

[36] CIM Região de Coimbra. (2017). *Plano Intermunicipal de Adaptação às Alterações Climáticas (PIAAC)*. Coimbra: CIM-RC. Available at https://climagir.cim-regiaodecoimbra.pt/application/views/assets/documentos/piaac-cim-rc.pdf

[37] [20] URBACT. (2021). Região de Coimbra – Um milhão de estórias gastronómicas. Brussels: URBACT. Available at https://urbact.eu/articles/regiao-de-coimbra-um-milhao-de-estorias-gastronomicas.

Monitoring and evaluation of sustainability in the Coimbra Region's agri-food sector remains fragmented and inconsistent, with notable differences between medium-sized enterprises and micro-SMEs. Research institutions such as ESAC have applied advanced tools, including Life Cycle Assessment (LCA) and carbon and water footprinting, in academic and pilot projects, but these practices are rarely mainstreamed among local companies. The majority of SMEs continue to lack structured systems for measuring environmental performance, which hinders benchmarking and collective monitoring across the value chain.

Some medium-sized firms in the dairy, wine, and olive oil sectors have engaged in energy and environmental audits, often supported by EU or national programmes, identifying opportunities for efficiency gains in heat recovery, refrigeration, and wastewater treatment. However, the adoption of such practices is uneven, and many businesses lack the technical or financial capacity to implement the recommended improvements.

Certification schemes are widespread, particularly in relation to food safety (HACCP, IFS, BRC), and they have indirectly contributed to traceability and process monitoring. Nonetheless, these certifications do not provide a comprehensive picture of environmental sustainability. There is no standardised regional framework for environmental indicators, and companies report difficulties in choosing appropriate metrics or tools. This was highlighted in the stakeholder questionnaire, where respondents pointed to the absence of simple, practical, and affordable metrics as one of the main barriers to progress.

In response to these gaps, Food Strategy is piloting an ecological footprint calculator specifically adapted to local producers, providing a more accessible entry point for sustainability monitoring[38]. This tool is expected to support SMEs in quantifying their environmental impact in areas such as energy, water, and waste, facilitating comparison across firms and aligning practices with EU reporting standards.

Overall, while the technical capacity exists within regional research institutions, its translation into widespread SME adoption remains limited. Bridging this divide will require investment in capacity building, demonstration projects, and the establishment of a common set of KPIs at the regional level. Such an approach would enable systematic tracking of progress, greater transparency in supply chains, and stronger alignment with national and European sustainability objectives.

4. Key Challenges, Regional Strengths and Gaps

Across the regions, agri-food SMEs face systemic challenges that slow the transition to sustainability. Common barriers include limited financial resources, high costs of new technologies, fragmented or complex regulations and underdeveloped infrastructure for waste management, logistics and bioproduct valorisation. Many SMEs also lack the technical skills and tools to measure sustainability performance, while ageing workforces and low levels of digitalisation hinder innovation and succession.

Despite these constraints, the regions demonstrate notable strengths. Agricultural potential remains high in Central Macedonia and Kujawsko-Pomorskie, while South Ostrobothnia and the Coimbra Region leverage strong RDI ecosystems and East Flanders, Coimbra and Kujawsko-Pomorskie benefit from distinctive gastronomic traditions and food branding. Strategic assets such as export infrastructure (Central Macedonia, South Ostrobothnia), collaborative innovation networks, and participation in European projects reinforce their capacity to adapt.

Persistent gaps include weak monitoring frameworks, limited cooperation across the value chain, insufficient SME participation in innovation ecosystems and underexploited opportunities for green branding and international competitiveness. Addressing these will require targeted investment in infrastructure and digitalisation, simplified and better-aligned regulatory frameworks, capacity-building for SMEs and stronger cooperative structures to scale sustainable practices across the agri-food system.

A. Region of Central Macedonia (Greece)

Identification of Systemic Challenges

Despite clear progress and strategic orientation toward sustainable agri-food development, Central Macedonia faces a series of systemic and structural barriers that inhibit the widespread adoption of sustainability practices among SMEs.

- Regulatory and policy fragmentation: There is poor coordination across policy domains which leads to confusion and underutilisation of sustainability instruments.

- Technical limitations: SMEs report a lack of technical capacity to apply complex environmental management tools and smart technology for monitoring sustainability without external support. This is aggravated by the absence of region-specific guidance and accessible consultancy services for SMEs.

- Infrastructural deficiencies: biowaste management infrastructure is underdeveloped.

  An OECD regional study [3] underscores Central Macedonia's potential in the circular bioeconomy, driven by its strong agricultural base. Yet, it critically notes remaining challenges in waste management - 90 % municipal waste still ends up in landfills, though waste-sorting and biowaste collection systems are emerging.

  There are limited shared facilities for energy recovery, composting or waste-based bioproduct transformation, especially in rural zones.

- Socioeconomic constraints: the ageing demographic profile of farmers and SME owners impedes innovation uptake and succession planning. Young professionals are reluctant to engage in the agri-food sector.

- Financial constraints due to low awareness of EU funding opportunities that support sustainable transformation.

Regional Strengths and Innovation Capacity

Despite challenges, Central Macedonia is strategically positioned to lead the transition toward a sustainable and circular agri-food economy, backed by both structural and institutional assets.

- Strategic location and export infrastructure: Thessaloniki Port and road networks provide strong access to international markets, enhancing the competitiveness of regional agri-food SMEs
- Dynamic clusters and innovation networks
- Participation in Interreg and Horizon Europe projects has boosted capacity for knowledge transfer
- Academic and research excellence with institutions which are national leaders in agricultural innovation**,** circular economy and environmental monitoring.
- SME export orientation and adaptability

Gaps That Indicate Areas for Improvement, Investment or Policy Change

The assessment reveals several priority gaps that should enhance policy intervention and business support strategies:

- Monitoring and measurement gaps: Central Macedonia lacks a regional observatory or integrated data platform to monitor sustainability metrics (e.g., GHG emissions, resource efficiency, biowaste recovery rates) across the agri-food sector. There is no standardised approach or support toolkit for SMEs to assess sustainability performance.
- Skills and capacity gaps: Low environmental literacy among SME owners and workers impedes the adoption of modern practices. Current training efforts are fragmented and not scaled.
- Policy and investment gaps: Funding programmes do not sufficiently prioritise or condition green innovation and circular economic investments. Eco-conditionality in grants or tax incentives is rare at the regional level.
    - Policy misalignment between strategies, e.g. national CAP implementation, RIS3CM priorities and local development strategies result in fragmented action and reduced impact.
    - There is low integration of sustainability criteria into regional food branding, even for certified PDO/PGI products. This limits market differentiation and international competitiveness.

B. Region of South Ostrobothnia (Finland)

a) Identification of systemic challenges, including regulatory barriers or technical limitations

Key factors affecting the region include entrepreneurs' limited skills and resources, and the costs and insufficient financing possibilities for SMEs.
They also face challenges with new regulations such as PPWR and the need to keep up with them, rapid changes in agricultural and other policies and uncertainty regarding the next programming period. Uncertainty about the benefits of sustainability measures and a lack of front runners also pose challenges.

Technological challenges are related to both economic questions and know-how. The cost of new technology can be restrictive for many SMEs without available funding for equipment upgrades. Outdated equipment often contributes to increased emissions, such as higher energy consumption. Another challenge is the lack of awareness about new technologies. A study commissioned by Business Finland (2022) revealed that 33% of SMEs find measurement and monitoring challenging. Many SMEs do not keep up with technological advancements, are unaware of emerging opportunities, or simply lack the time and enthusiasm to explore them. Skills and expertise vary significantly among SMEs.

While companies are interested in sustainability and take small, incremental steps whenever possible, their primary focus mostly remains on survival. They continue using existing equipment and often aspire to new technologies but cannot afford to make those investments. Technological challenges were mapped in the Sustainable Digital Double Transition project. It was concluded that the local companies have good potential for implementing new smart technologies, but this will require investments, development measures, and training from the companies (Laitila et al., 2024).

Retail chains demand corporate social responsibility and environmental sustainability, which trickles down the supply chain. This external pressure also results in SMEs adopting more sustainable practices. According to a study by Business Finland (2022), 71% of SMEs reported that their operations were affected by stakeholder sustainability standards.

b) Regional strengths and innovation capacity

As stated in the Smart specialisation strategy of South Ostrobothnia (2022), sustainable food ecosystem and new bio-economy solutions are the major development targets of the region. This includes high quality and sustainable food systems, sustainable food production and energy solutions, know-how and research in the food technology sector. South Ostrobothnia is also considered a nationally leading center of food industry and a strong center of excellence with several expert organisations and education. South Ostrobothnia's dependency on the food sector is high. Employment impact and regions value-added impact of the food sector is the highest of all regions in Finland. Region is aiming to become Finland's main hub for food exporting. South Ostrobothnia has also received the label of Regional Innovation Valley on Increasing Global Food Security from the European Commission. Region's emphasis on sustainable land use and food systems underlines its commitment to environmental management and resilience. Through investments in agri-tech innovation and circular economy principles, region seeks to enhance productivity while minimizing ecological footprint and promoting biodiversity conservation. S3 strategy has a goal of harnessing the innovation potential of the ecological transition (low carbon, biodiversity) in the food sector and bioeconomy.

The region has a diverse business ecosystem. Extensive development work has been carried out under e.g. the "Food Province" initiatives, which improves the cooperation and innovation capacity. It is also typical for the region that there is a low threshold to contacting between SMEs, RDI organizations and financing authorities. This collaborative and responsive environment underpins the region's strong potential for sustainable growth and competitiveness.

c) Gaps that indicate areas for improvement, investment or policy change

The regional development needs of the food sector have recently been thoroughly mapped and compiled to the The Food Province Strategy (Välisalo et al., 2022). As a result, total of 184 measures implementing 29 objectives have been recorded in the strategy under 5 strategic priorities. The objectives and measures under the "Food business" include e.g. enhancing the status of local food and profitability; supporting growth; product development and local sourcing. The "Food PROvince" refers to the experts and expertise in the Food Province, including RDI cooperation and education. Measures under the "Food Province brand" aim to improve communication and branding." The Food Province family" measures focus in e.g. enhancing consumer awareness on local food, creating community and infrastructure. Measures of the" Accountable Food Province" are e.g.: improving nature's diversity and environmentally friendly food production; improving resilience; carbon neutral logistical solutions; utilizing the side streams; and impactful and networked sustainability work and consciously responsible actions by cooperation and knowhow.

The Regional Climate Roadmap for the Food Sector in Southern Ostrobothnia (Palomäki, A. et al., 2022) was developed together with wide range of food sector stakeholders. From the perspective of FISSH project, the key regional objectives and tasks identified were the following. For Operational Environment Supporting the Climate Activities, they include e.g. implementing standardized methods; enhancing expertise; supporting carbon footprint calculation and monitoring; co-development for e.g. material efficiency and waste reduction; and addressing the markets for plant-based protein sources and responsible animal-based protein sources. Low Carbon Solutions Across the Entire Food Chain include e.g. material efficiency and circular economy solutions by promoting nutrient recycling; utilizing material flows in the food chain; efficient use of raw materials; and increasing recycling. Considering producing and sharing information, the report includes e.g. increasing interaction between RDI activities and companies; exploring the possibilities of new food production technologies; research and development related to strengthening plant-based protein production; making the emission work of food chain companies visible; and advancing the development of a climate-resilient and biodiversity-conscious food production chain in SMEs.

Objectives and tasks for carbon neutral food industry and food processing include the following themes: development of shared, standardized LCA-based calculation methods based on scientific facts; food packaging: promotion of innovative new products and packaging development; advancing the reliable presentation of carbon footprints; reducing emissions from packaging materials; development work to reduce

emissions related to raw materials: product development e.g. utilizing surplus raw materials in products; energy-related measures.
As a conclusion, the roadmap includes recommendations. For companies they include e.g. tracking emissions by calculating their carbon footprint and using this information in marketing; making the climate work visible; networking and finding collaboration partners who can support low-carbon efforts; and creating a plan to adapt to the impacts of climate change. There are also recommendations for policymakers and funders: The green transition needs funding, and it must be fair; the impact of climate work must be assessable and tools to support impact should be developed; new innovations and products need support to expand and spread their operations to achieve impact; and disseminating existing good practices. Considering FISSH project, these conclusions and recommendations form an excellent base for environmental sustainability actions.

Additional gaps identified in the process include market access and trade practices, as well as know-how on certificates related to export. Social aspects, such as workforce engagement and the availability of labour in the food sector were also acknowledged. Especially in agriculture, profitability and the lack of attractiveness of the sector emerge. Also new technologies and data analysis, packaging and waste management were emphasized. In line with previous mappings, the need for direct funding possibilities for new technology, need to develop the skills and knowledge of the SMEs, and the low interest of the SMEs to invest and grow were identified. A group of SMEs is very active in RDI cooperation in the region, but the challenge is to encourage and involve more of them. Participating in RDI cooperation and networking would also benefit in capacity building, knowledge sharing and innovativeness. The region also faces the challenges of low value-added production, with many of the products being sold as raw materials, and many companies acting as subcontractors in the value chain. This, coupled with the weak negotiating position of primary producers in the value chain, limits the growth capacity and is a clear gap to target in the value chain sustainability.
A quickly rising question is also maintaining ambitious targets of sustainability and innovation while considering the needs of the defence industry and security of supply.

C. Kujawsko-Pomorskie Voivodeship (Poland)

Identification of Systemic Challenges, Including Regulatory Barriers and Technical Limitations

1. **Low Innovation and Limited Digitalization in the Agri-Food Sector**

- Kujawsko-Pomorskie has a relatively high level of agricultural production, yet the implementation of modern technologies and innovations in food processing remains insufficient (European Funds for Kujawy and Pomorze 2021–2027). Strategic documents highlight the need for digitalization, investment in precision technologies, and logistics solutions.
- Small and medium-sized farms often lack the resources and expertise to invest in precision farming technologies or production management systems (Acceleration Strategy 2030+).

2. **Regulations and Legal Barriers**
   - Procedures for quality certification, sanitary control, and organic standards are time-consuming and complex, limiting the development of micro and small enterprises (Regional Economic Development Program of Kujawsko-Pomorskie).
3. **Limited Infrastructure and Technical Support**
   - Despite existing advisory services and operational centers, there is a lack of cold storage facilities and modern warehouses in smaller municipalities, as well as limited access to analytical laboratories (Annexes to the Regional Economic Development Program).
4. **Lack of Cross-Sector Integration**
   - Cooperation between farmers, processors, research institutions, and support organizations is limited, hindering the implementation of innovations and adaptation to changing market conditions. These mechanisms need to be developed and strengthened locally (Agricultural Innovation Network – SIR).

Regional Strengths and Innovation Capacity

1. **Strong Agricultural Base**
   - The region is one of Poland's leading producers of cereals, vegetables, and milk, providing a solid foundation for the development of the food industry (Acceleration Strategy 2030+).
2. **Institutions Supporting Development and Innovation**
   - KPODR and SIR provide advisory services, training, and investment support, create networks, and promote best practices (Agricultural Innovation Network – SIR).
3. **Potential for Cross-Sector Collaboration**

- Pilot programs and local initiatives create opportunities for cooperation between farmers, processors, and scientists (Annexes to the Regional Economic Development Program). Innovation forums and pilot initiatives bring together farmers, entrepreneurs, and researchers to jointly develop valuable projects.

4. **Regional Products and Culinary Tradition**
    - Local food products have marketing and export potential, such as cheeses, meats, and fruit and vegetable preserves (Acceleration Strategy 2030+).

Gaps Indicating Areas for Improvement, Investment, or Policy Change

1. **Innovation and Digitalization Development**
    - Investments are needed in digitalization, production and logistics management systems, and data analytics tools (European Funds for Kujawy and Pomorze 2021–2027).
2. **Strengthening Knowledge Transfer and Cooperation**
    - Initiatives supporting collaboration between farmers, entrepreneurs, and research institutions are necessary (Agricultural Innovation Network – SIR).
3. **Expansion of Infrastructure and Advisory Services**
    - Investments in warehouses, cold storage facilities, laboratories, and advisory centers would improve production and sales efficiency (Annexes to the Regional Economic Development Program).
4. **Simplification of Regulations and Support for SMEs**
    - Regional policy should consider simplifying certification procedures and providing financial support for micro and small producers (Regional Economic Development Program of Kujawsko-Pomorskie).

D. Economic Council of East Flanders (Belgium)

The answers to these questions are completely based on what our entrepreneurs had to say about it. The list of the companies that were interviewed can be found in the annex.

a) Regional strengths and innovation capacity

The nature of Flemish people is not to brag or talk about success, so it’s no surprise that we did not get too many answers to this question. In general, our entrepreneurs are quite resourceful and

strong, and there are a lot of possibilities to gain support (funding, expertise, coaching) from the government. SMEs in Flanders are futureproof or at least evolving to be futureproof.

We got only a couple of answers:

- Nobel (vineyard) wants to research if they can make their wine alcohol-free. Since there is a growing health tendency towards beverages without or with less alcohol, this could be an additional target group.

- F. Tierenteyn (mustard) wants to research if they can use Belgian mustard seed to develop their product (also depending on economic feasibility).

- Lerouge (fruit juices) has invested in a very special fruit press, which recycles its own rinse water and has a larger return on juice. Due to a decreased rinse water waste, they are climbing on the sustainability ladder.

b) Gaps that indicate areas for improvement, investment or policy change

This is a topic where Belgians do excel at: talking about what could be better (up to complaining). The first topics are related to sustainability; the ones in a smaller fond are not (directly) related to sustainability but therefore not less important.

- 't Pauwenhof (meat farm) brings up an interesting topic. According to them, the short chain principle does not fit in with the current law. It would be more sustainable to breed the piglets themselves, but it is more expensive to invest in all the necessary machinery (such as a heating and cooling system, an air washer etc.) than to simply buy the piglets. It is a pity that the law does not support these kinds of initiatives.

- De Zuivelarij also brings up the problem of collaboration. If farmers and producers worked together, this could be more profitable and also more sustainable. Farmers often cannot commercialise their products, or take care of the marketing strategy, or work on technical challenges at the same time. A farmer grows crops or breeds animals and that's it. As a cheese producer, they are very close to the farmers, and by collaborating with them, both the farmer and the producer can do what they do best, e.g. De Zuivelarij collects the milk of local dairy farms and makes cheese out of it under the brand of Berloumi. That way both the dairy producer and the farmers receive the appropriate recognition for the work and the effort, and it is more sustainable as well.

- La Confiance (bakery) talks about food waste in supermarkets. All products that have passed the expiration date are taken out of store. Fruit and vegetables with a small stain, strawberries that do not shine… These are not welcome in the supermarkets. It is a pity

because in fact, all of these products are healthy and perfectly fine to eat. No wonder that 20% of food in Europe goes to waste.

- Even though Nobel (vineyard) wants to explore sustainable transportation, they are not (yet) using it because of the small radius and the small loading capacity of an electric van. Other companies are also talking about this.

- A big challenge for a lot of companies (Buizerd & Saars, 't Eikenhof, Breydel, F. Tierenteyn) is staff and succession. In East Flanders, we have a lot of family-owned businesses, but we see that the offspring often don't want to take over the business. Finding the right people for the job, in all kinds of positions in the company, is time-consuming, challenging and often disappointing, even though most companies make a lot of effort to create a nice working environment, where people can learn and evolve. This kind of social sustainability is often hard to achieve.

- Waste management is challenging: a lot of entrepreneurs want to do this sustainably, but this often comes at a high price and not all of them are willing to pay more for it.

- Entrepreneurs such as Buizerd & Saars (coffee roaster) want to work with sustainable suppliers. They select the farmers they want to buy coffee beans from beforehand, preferably when they work sustainably, e.g. by agroforestry. The problem is that you are not 100% sure about this, and to check it yourself is a very time- and money-consuming activity.

- Breydel (meat producer), F. Tierenteyn (mustard) and Nobel (vineyard) both talk about administrative burdens. They think that administration and legislation should be simplified, and even though this is often promised by the government, it often remains a hollow concept. There are also too many controlling bodies who do not trust each other; e.g. if IFS controls the use of labels on packaging, FAVV does the same thing over again. Controlling the controller is useless and expensive. In fact, they do the same thing, but an SME has to pay for both of them. The regulations should be more precise and followed by both the SME ánd the government, which would - indirectly - also be more sustainable.

- De Zuivelarij (diary) is addressing the challenge of scaling up. They want to become the national market leader with their product, and although interest in their product is growing in France and the Netherlands, they can't grow any faster than they already are. Finding the balance between healthy and steady growth and generating sufficient revenue to be profitable is difficult and challenging.

- A lot of small entrepreneurs want their products to be sold with the story they want to tell. Now all of the products, both mainstreams, from large, industrial companies, and those of

artisanal, small producers who want to bring a sustainable story, are sold on the same rack. The latter products lose a part of their identity this way. If the consumer goes to the shop and does not get the entire story, then he won't be eager to pay more for a local product either. This is a major challenge that many companies face.

- In order to make the right investments, a company needs funding. One of the examples was Nobel, a wine producer, who wants to invest in a steam cleaner, a machine for topping the vines and drones to deter birds. A coffee roaster, Buizerd & Saars, is talking about solar panels and an electric coffee roasting machine. Even though most of the companies (certainly the older ones) have a bit of financial reserve, they still need a lot of funding that can't come out of private money alone.

- Price setting is difficult. As a small food producer, it is hard to compete with the prices of the industrial players. Luckily more and more people are willing to pay a bit more for locally produced food, convinced that this also brings better quality and more transparency and also because they want to support local economies. But still the price calculation is difficult, because costs of a small producer are often higher and they are more susceptible to crises, tendencies, variable prices of raw materials or changing regulations.

E. Coimbra Region Intermunicipal Community (Portugal)

The diagnosis of the Coimbra Region's agri-food sector reveals a complex combination of strengths that can be leveraged, structural challenges that persist, and gaps that need to be addressed through targeted interventions.

The region benefits from a consolidated knowledge and innovation ecosystem, anchored by the University of Coimbra and technological centres that generate applied research and training in agri-food sustainability. There are also a strong gastronomic identity and reputation associated with products such as Queijos do Centro, Bairrada wines and Carolino rice from the Baixo Mondego, which are recognised nationally and internationally. The designation of the European Region of Gastronomy reinforces cultural and economic value, creating a favourable environment for linking tradition with innovation.

Despite these strengths, the agri-food sector in the Coimbra Region is largely composed of micro and small enterprises that face significant limitations in scaling up, accessing finance, and adopting advanced technologies. Bureaucracy and slow administrative procedures were repeatedly highlighted in the stakeholder questionnaire as barriers to funding and programme participation. Logistics inefficiencies persist due to fragmented production and limited cooperation, leading to higher transport costs and emissions. Sustainable packaging remains costly and technologically

constrained, particularly for small-scale producers. Climate change impacts: droughts, floods, and extreme weather, further threatening production systems, requiring urgent adaptation.

Several stakeholders have pointed to complex licensing procedures for agri-food facilities, strict but sometimes inconsistent enforcement of environmental regulations, and the absence of streamlined frameworks for circular economy initiatives. Similarly, the lack of harmonised rules for food donation complicates redistribution of surplus food, despite local initiatives documented in the Mediterranean Diet and Food Waste Manual.

The sector lacks a standardised set of indicators for monitoring environmental performance, making it difficult to track progress and compare across enterprises. There are deficits in technical capacity, particularly in micro-SMEs, regarding decarbonisation strategies, water management, eco-design of packaging, and life cycle analysis. Cooperative structures remain weak, limiting bargaining power and collective investment in innovation or logistics. Furthermore, the integration of climate adaptation into agri-food planning is still incipient, despite clear vulnerabilities identified in the Intermunicipal Climate Change Adaptation Plan.

Addressing these gaps will guide the needs for development in the coming years. Priorities include establishing regional KPIs for sustainability, investing in capacity building and technical assistance for SMEs, simplifying regulatory frameworks to support circular economy initiatives, and strengthening cooperative and cluster structures to enhance scale and resilience. By tackling these challenges and building on regional strengths, the Coimbra Region can position itself as a reference in sustainable food production and value chain transformation.

5. Conclusions and Recommendations

The five regions examined reveal a shared ambition to advance sustainable food production and strengthen value chains, yet they face persistent systemic and structural challenges.

In Central Macedonia, SMEs form the backbone of a diversified agri-food sector, but their adoption of sustainability tools remains limited. Fragmented value chains, insufficient infrastructure and low SME capacity constrain progress. Urgent needs include tailored capacity-building, investment in circular infrastructure, coordinated policy frameworks and SME-friendly funding. Recommendations emphasise creating regional observatories, co-innovation pilots and targeted toolkits to accelerate the transition.

In South Ostrobothnia, SMEs struggle with limited resources, regulatory uncertainty and gaps in knowhow, while facing strong market demands for sustainability. Regional strategies already prioritise food system sustainability, but direct funding, training and operational support are critical. Recommendations highlight the importance of targeted RDI cooperation, capacity-building and dissemination of good practices, with a strong focus on digitalisation and technology uptake.

In Kujawsko-Pomorskie, a strong agricultural base and supportive institutions underpin development, but low innovation, digitalisation gaps and regulatory barriers persist. Short food supply chains and local production are recognised as key assets, strengthening authenticity, trust and socio-economic resilience. Recommendations call for investments in technology, infrastructure and marketing tools, alongside simplified regulations and integration of traditional food values with modern communication strategies.

In East Flanders, the agri-food sector is recognised as a growth area under the regional Smart Specialisation Strategy. SMEs are resourceful and willing to adopt sustainable practices but often lack awareness of available support programmes and monitoring tools. The main recommendation is to close the gap between government and entrepreneurs by improving communication, raising awareness of funding opportunities and facilitating sustainability monitoring.

In the Coimbra Region, strong gastronomic identity and advanced research institutions coexist with a fragmented SME-dominated sector constrained by bureaucracy, finance gaps and climate risks. While sustainability is gradually being embedded through precision irrigation, circular practices and digitalisation, adoption remains uneven. Recommendations focus on establishing standardised sustainability indicators, streamlining regulations, scaling up demonstration projects, and strengthening cluster-based cooperation. Tailored technical support and improved logistics and packaging solutions are also critical priorities.

Overall, the five regions show that sustainable agri-food transformation requires coordinated policy frameworks, targeted SME support, investment in circular infrastructure and accessible monitoring tools. Strengthening cooperation between SMEs, research institutions and public authorities, alongside simplifying regulatory and funding mechanisms, will be key to building resilient, low-carbon and competitive food value chains across Europe.

A. Region of Central Macedonia (Greece)

Summary of main findings

The agri-food sector in Central Macedonia is both economically significant and structurally diversified, with SMEs playing a foundational role in production, processing and exports. The region leads nationally in rice, milk, shellfish and fruit production and hosts a strong innovation ecosystem supported by clusters, research institutions and public-private partnerships.

Despite these strengths, the uptake of sustainable practices among SMEs remains limited. While selected enterprises, mainly large companies, demonstrate progress in adopting clean energy, circular practices and traceability systems, systemic challenges persist:

- Low penetration of structured sustainability tools, such as LCA, carbon footprinting and ESG reporting.
- Fragmented value chains and weak inter-actor coordination, limiting systemic circularity.
- Insufficient biowaste infrastructure and poor access to eco-packaging and composting systems.
- Capacity constraints among SMEs, especially in rural areas, hinder adoption of digital and green innovations.
- Policy and funding instruments remain fragmented, with limited green conditionalities or practical guidance tailored to SMEs.

Nonetheless, the region's export orientation, active participation in EU innovation projects and alignment with RIS3 and circular bioeconomy goals create a strong foundation for transition to a more resilient and sustainable agri-food system.

Identification of Urgent Regional Development Needs

1. Capacity-building and technical support for SMEs to adopt and operationalise sustainability tools (e.g., LCA, ESG, traceability).
2. Investment in circular infrastructure, especially for biowaste management, energy recovery and eco-packaging solutions.
3. Coordinated policy frameworks linking national and regional strategies with targeted incentives for SME sustainability transition.
4. Regional observatory or digital platform to track sustainability performance (GHG emissions, water use, resource efficiency).
5. Increased access to funding instruments through simplified processes, technical assistance and SME-friendly eco-conditionality (sustainability criteria).

Recommendations for Future Actions

To enable the sustainable transformation of agri-food SMEs in Central Macedonia, the following forward-looking recommendations are proposed:

1. Establish a Regional TFA2 Council with multi-stakeholder representation for policy co-creation and monitoring
2. Institutionalisation of sustainability monitoring and data platforms / Creation of a Regional observatory and sustainability data hub to track sustainability performance and identify needs
3. Strengthen technical support and capacity-building for SMEs
4. Align and integrate Policy Instruments
5. Fund collaborative innovation pilots between SMEs, universities and municipalities focused on circular processes
6. Develop and disseminate tailored toolkits for SMEs to adopt LCA, ESG reporting and eco-packaging solutions
7. Incentivise local sourcing, short supply chains and sustainable procurement through regional campaigns and public sector engagement
8. Accelerate circular infrastructure investments
9. Facilitate SME access to green finance

B. Region of South Ostrobothnia (Finland)

This report highlights the current challenges and development needs of food industry SMEs in South Ostrobothnia, Finland, based on recent reports and expert interviews, in the context of Interreg Europe project Food Industry SME's Sustainability Support and Help (FISSH), more specifically thematic focus area 2: Sustainable Food Production and Product Value Chain.

Key challenges and development needs for SMEs include know-how in sustainability, processes and packaging, technology, regulation, communication and marketing, and strategic management. Market access and trade practices can also be challenging. There is also a need for coaching to foster growth and export ambitions and collaboration to build capacity. Knowledge sharing through targeted workshops, seminars, and online platforms is encouraged. Key barriers for SMEs' development efforts are limited resources, especially time and funding. Social aspects, such as availability of labour and the attractiveness of the food sector (primary production) were also acknowledged.

The importance of supportive policies, funding, and incentives is emphasized. Strategic documents such as the Smart Specialisation Strategy of South Ostrobothnia and the Regional Strategy of South Ostrobothnia prioritize the sustainable food ecosystem as one of the key development targets for the region and enable initiatives for development.

To help food SMEs improve their sustainability by regional measures, further need for targeted support as RDI activities arise. This should include initiatives in e.g. finding and sharing information in different fields of sustainability as well as new technology, supporting SMEs in their strategy development and communication, and sharing good practices. Strengthening the operational environment to support sustainability-driven SMEs is also important.
Many of these kinds of activities have already been implemented, but in changing operational environment, further assistance and activities are needed. With their limited resources, all the RDI support enhances the competitiveness of the local SMEs and is important for the region. As a critical and specific need, the SMEs would need direct funding for digitalization and new technologies.
In summary, the combined efforts of regional policies, strategic funding, and tailored support mechanisms are essential to drive the growth and sustainability of food SMEs.

As specific recommendations considering the cooperation and exchange of experience in FISSH project, good practices of regional initiatives supporting SMEs concretely in different aspects of sustainability may be very helpful. As stated above, new activities considering e.g. SMEs' know-how in sustainability, processes and packaging, technology, regulation, communication and marketing, and strategic management are called for, as well as coaching to foster growth ambitions and collaboration to build capacity, and activities increasing SMEs' networking and RDI cooperation activity. Direct funding possibilities are often significantly different between regions or countries, but good examples of European level support would be beneficial.

Through the learnings of the FISSH project, different RDI organisations and public bodies will increase their knowledge about the current situation, possibilities and challenges of food sector SMEs within sustainability. Capacity building will be conducted at the individual level, and the acquired knowledge and skills will be transferred to organisations, enabling capacity building at the organisational level as well. As a result of this process, we foresee that also our policy instrument, South Ostrobothnia Regional Programme, will be improved.
Considering TFA 2: Sustainable Food Production and Product Value Chain, specific needs focus on good practices of regional initiatives supporting SMEs concretely in their food production and value chain efforts, as well as strengthening the operational environment to support sustainability-driven SMEs. Good and encouraging examples of food SMEs, that have emphasized sustainability development would be inspiring for the SMEs and help the RDI actors as well. Especially, if this has happened in cooperation with RDI actors.

C. Kujawsko-Pomorskie Voivodeship (Poland)

Summary

The agri-food sector in Kujawsko-Pomorskie has substantial potential due to a strong production base and the presence of institutions supporting innovation. However, it faces challenges such as low innovation, limited digitalization, lack of cross-sector integration, and regulatory barriers. Strategic investments in technology, cross-sector collaboration, infrastructure, and advisory services can enhance the region's competitiveness.

Conclusions and recommendations

Local Food Production: Beyond Economics

Local food production carries significance beyond the economic sphere—it serves as a carrier of culture, tradition, and identity in rural areas, supporting the concept of sustainable development promoted by the FISSH project.

Short Food Supply Chains strengthen product authenticity and build trust between producers and consumers, which is essential for creating added value within the value chain.

The transformation of traditional sales models into **hybrid approaches**, combining marketplaces with online platforms and social media, highlights the need for implementing innovative marketing tools in SMEs within the agri-food sector.

The perception of local products as **natural, healthy, and authentic** forms the foundation of effective value-based marketing aligned with FISSH principles.

The development of short supply chains and local production contributes to retaining rural populations, creating jobs, supporting small-scale producers, and preserving cultural diversity, aligning with the goal of enhancing the socio-economic resilience of partner regions.

Integrating modern communication tools with the traditional values of local food establishes a coherent strategy for sustainable marketing, serving as a basis for sharing best practices within the FISSH project.

D. Economic Council of East Flanders (Belgium)

The food industry is an important and growing sector in Flanders (and more specifically in East Flanders). For the province, the agri-food sector is part of the six pillars of the Smart Specialization Strategy (S3), making it a growth sector with significant potential. The goal of our S3 is to attract

foreign investments in the agri-food industry and to provide a valuable network, practical knowledge and the necessary infrastructure to further develop the sector. Therefore, we can conclude that the future looks bright for this sector.

We also see this reflected in our SME landscape. Although we live in a rapidly evolving, challenging world, SMEs are proving resilient, flexible and creative. They are willing to ambrace sustainable and even circular solutions. Of course, this often involves large investments, and we see that our SMEs haven't yet found their way to the available funding programmes. The government offers many different ways to support SMEs and agricultural businesses, but the vast majority of them have never even heard of these. This is unfortunate, as they could have a much greater impact. The lack of awareness of these initiatives also puts a slight break on the sustainability movement. Increasing SME awareness of existing support mechanisms should therefore be a top priority.

These mechanisms also include data monitoring tools, which are not used for the same reason: being unknown. It's clear that our SMEs don't map or monitor their sustainability impact at all, but even that could provide them with interesting insights. Here too, the government has a key role to play.

A lot of SMEs (not only in the food industry, but in general) feel a large distance from the government; they feel the government only demands and gives little. This is an identity crisis the government needs to overcome, but of course, that won't happen overnight. It is an enormous and time-consuming challenge. In any case, by getting closer to entrepreneurs and citizens, the ecosystem would change more quickly and effectively.

All in all, we can say that things aren't too bad in Belgium. While we like to complain and it's difficult to see our strengths, we have a thriving food sector with many challenges that haven't yet proven insurmountable. We believe we will remain among the best in class and have high expectations for the future.

E. Coimbra Region Intermunicipal Community (Portugal)

The assessment of sustainable food production and value chain dynamics in the Coimbra Region demonstrates a sector with strong cultural roots and internationally recognised products, but also significant structural weaknesses and vulnerabilities. While there are a consolidated knowledge base and growing participation in European initiatives such as Food Corridors and the European Region of Gastronomy, the sector remains dominated by micro and small enterprises with limited capacity to invest in innovation, sustainability, and internationalisation. Climate change risks, bureaucratic obstacles, and fragmented value chains further constrain progress.

The region has begun to embed sustainability across the agri-food system, with examples ranging from precision irrigation in Baixo Mondego rice cultivation to recovery of surplus bread, valorisation of olive oil residues, and the University of Coimbra's project on sustainable mushroom cultivation. Digitalisation and traceability are advancing in medium-sized firms, while initiatives such as the Prato Certo manual and the Coimbra Gastronomy Route show how consumption and waste reduction can be integrated into sustainable value chains. Nevertheless, adoption remains uneven, regulatory frameworks are complex, and SMEs face barriers in access to finance, technical expertise, and cooperative organisation.

The most pressing needs include the establishment of standardised sustainability indicators and KPIs to enable monitoring and benchmarking across the sector; stronger capacity-building and technical support tailored to micro and small enterprises; and simplified regulatory procedures for circular economy initiatives, such as by-product valorisation and food donation. Improving logistics coordination and sustainable packaging solutions also stand out as urgent priorities.

At the practical level, it is recommended that the region prioritise demonstration projects and training programmes focused on water management, energy efficiency, eco-packaging, and digital traceability. Pilot actions under the Food Corridors strategy should be scaled up, particularly shared logistics platforms and the ecological footprint calculator for SMEs. Policy actions should include streamlining licensing and environmental regulations to facilitate circular practices, integrating climate adaptation measures into agri-food planning, and providing dedicated funding lines for cooperative and cluster-based projects. Strengthening the articulation between research institutions and enterprises will be essential to ensure technology transfer and uptake of innovation. Finally, embedding these actions within the Portugal 2030 framework will ensure coherence with national and European priorities, reinforcing the Coimbra Region's positioning as a reference territory for sustainable food production and resilient value chains.

References

A. Region of Central Macedonia (Greece)

1. ELSTAT, Agricultural and Livestock Census, 2021, https://www.statistics.gr/
2. Central Macedonia's One Stop Liaison Office (OSLO), RIS³ Entrepreneurial Discovery Data, https://www.ris3rcm.eu/ (Accessed July 2025)
3. OECD, The Circular Economy in Central Macedonia, Greece, 2024, https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/12/the-circular-economy-in-central-macedonia-greece_6bddf9b1/19f00380-en.pdf (Accessed July 2025)
4. European Commission, Regional Innovation Scoreboard 2025 - Regional profiles Greece, 2025, https://ec.europa.eu/assets/rtd/ris/2025/ec_rtd_ris-regional-profile-el.pdf (Accessed September 2025).
5. Loc-FOOD project, Study on the current situation of traditional products in Greece (Designation, Market potential), 2021, https://blacksea-cbc.net/wp-content/uploads/2021/07/BSB1101_LOC-FOOD_Studies-on-the-current-situation-of-traditional-products-designation-market-potential-in-Greece_EN.pdf (Accessed August 2025).
6. Register of Agricultural Cooperatives of the Hellenic Ministry of Rural Development and Food (as of January 2025), https://www.minagric.gr/ (accessed on July 2025)

B. Region of South Ostrobothnia (Finland)

Business Finland. (2022). Kestävän kehityksen tila suomalaisissa pk-yrityksissä: Business Finlandin kyselytutkimus 2021. https://www.businessfinland.fi/48fb89/globalassets/finnish-customers/news/news/2022/business-finland-kestava-kehitys--kyselytulokset-medialle-.pdf

Laitila, J., Björkbacka, M. & Nikumatti, S. (2024). Seinäjoen seudun yritysten digitaalisuuden nykytila-analyysi. Kestävä digitaalinen kaksoissiirtymä -hanke. Seinäjoen ammattikorkeakoulu. https://urn.fi/URN:NBN:fi-fe20241217103875

Palomäki, A., Laasasenaho, K., Rytkönen, K. & Viitala, J. (2022). Etelä-Pohjanmaan ruokasektorin ilmastotiekartta : kohti hiilineutraalia ruokaketjua / The Regional Climate Roadmap for the Food Sector in Southern Ostrobothnia. Seinäjoen ammattikorkeakoulu. https://urn.fi/URN:NBN:fi-fe2022062148310

Smart Specialisation Strategy in South Ostrobothnia 2021–2027 (2022). The Regional Council of South Ostrobothnia. https://epliitto.fi/wp-content/uploads/2022/03/Smart_Specialisation_Strategy_summary_ENG_WEB.pdf

Summary of the Regional Strategy “Huomisen Lakeus” (2022). The Regional Council of South Ostrobothnia. https://epliitto.fi/wp-content/uploads/2022/11/Maakuntaohjelma_ENG_saavutettava.pdf

Välisalo, T., Huhta, E., Talvilahti, A. & Toppari, J-M. (2022). Ruokaprovinssi 2030, Paras paikka ruokabisnekselle. Etelä-Pohjanmaan ruoka-alan strategia ja kehittämisen tavoitteet 2023–2030 https://ruokaprovinssi.fi/wp-content/uploads/2023/02/Ruokaprovinssistrategia-2030.pdf

Välisalo, T., Huhta, E., Talvilahti, A. & Toppari, J-M. (2022). The Food Province of Finland 2030, Summary in English: https://ruokaprovinssi.fi/wp-content/uploads/2023/02/The-Food-Province-of-Finland-strategy-summary-2023.pdf

C. Kujawsko-Pomorskie Voivodeship (Poland)

Regional Assembly of the Kujawsko-Pomorskie Voivodeship. (2020, December 21). **Development Strategy of the Kujawsko-Pomorskie Voivodeship until 2030 – Acceleration Strategy 2030+** (Annex to Resolution No. XXVIII/399/20).

Board of the Kujawsko-Pomorskie Voivodeship. (2022, February 16). **Economic Development Programme of the Kujawsko-Pomorskie Voivodeship** (Annex to Resolution No. 6/202/22).

Board of the Kujawsko-Pomorskie Voivodeship. (2015, January 14). **Regional Innovation Strategy of the Kujawsko-Pomorskie Voivodeship for 2014–2020** (Annex to Resolution No. 2/14/15).

Marshal’s Office of the Kujawsko-Pomorskie Voivodeship. (2023). **European Funds for Kujawy and Pomerania 2021–2027** (Version 4.0).

Poczta, W., & Hałasiewicz, A. (Eds.). (2024). *Rural Poland 2024. Report on the state of the countryside*. Warsaw: Scholar Scientific Publishing.

Wilkin, J., & Hałasiewicz, A. (Eds.). (2024). *Rural Poland 2022. Report on the state of the countryside*. Warsaw: Scholar Scientific Publishing.

Goszczyński, W. (2023). *Idylls, hybrids and heterotopias. Rurality and food in alternative food networks*. Warsaw: Institute of Rural and Agricultural Development, Polish Academy of Sciences.

Energia dla Wsi. (n.d.). **Local producers and food security**. Retrieved from https://energiadlawsi.pl/lokalni-producenci-bezpieczenstwo-zywnosciowe

Energia dla Wsi. (n.d.). **Examples of organizational forms of short food supply chains**. Retrieved from https://energiadlawsi.pl/przyklady-form-organizacyjnych-krotkich-lancuchow-dostaw-zywnosci

D. Economic Council of East Flanders (Belgium)

- **Publications**

Agentschap Landbouw en Zeevisserij (2024) Landbouwrapport 2024 (LARA). Vlaamse landbouw in cijfers, Brussel.

Dedobbeleer, K., Moerman, N. Baeke P., Gillis, K. Innovation Playground 'In Cijfers'. 2025.

Departement Landbouw & Visserij en Fevia Vlaanderen. Startcharter - werkagenda voedselketen. https://vlaanderen-circulair.be/src/Frontend/Files/userfiles/files/Werkagenda's/WA_voedselketen_startcharter.pdf - date of access: August 4, 2025

European Institute of Innovation and Technology. Trust Report 2024.

Fevia. Duurzaamheidsroadmap. 2025. https://www.fevia.be/sites/default/files/files/2025-03/FEV%20manifest%20affiche%20410x550%20LOWRES%20NL.pdf

Food Inspiration. Trends & Transitie Rapport. 2024

Lecocq, C., Standaert, T. and Andries, P. (ECOOM-Ondernemerschap Gent). Duurzaamheidsbarometer. Duurzaam ondernemerschap bij Vlaamse KMO's - situatie 2024. April 2025. https://www.vlaanderen.be/publicaties/duurzaamheidsbarometer-duurzaam-ondernemerschap-bij-vlaamse-kmos

VLAM. Trends in short-chain sales in Flanders. 2024

VLAM. Het belang van herkomst en voorkeur voor inlandse producten blijft hoog. 2023

Wullaert, A., Byttebier, K. & Smets, V. (2024). Economische impact van de alternatieve eiwitsector in Vlaanderen en Brussel, Green Deal Eiwitshift op ons bord, Departement Omgeving, Vlaamse overheid.

- **Websites**

https://innovationplayground.be/cluster/agro-voeding/ - date of access: July 30, 2025

Statbel | provincies.incijfers.be ; date of access: July 7, 2025

https://www.vlaio.be/nl/subsidies-financiering - date of access August 4, 2025

https://www.buurtsuper.be/nl/nieuws-uit-de-sector/meten-is-weten-en-resultaat-boeken?utm_medium=email&utm_campaign=Nieuwsbrief%2022%20april%202022&utm_content=Nieuwsbrief%2022%20april%202022+CID_e4491e52c231196134b4360b3f60056a&utm_source=mailr&utm_term=Lees%20meer - date of access: July 30, 2025

https://pack4food.be/nl/projecten/roadmap - date of access: July 31, 2025

https://www.mvovlaanderen.be/nl/sustatool - date of access: July 31, 2025

List of interviewed companies

Breydel: meat producing company, located in Gavere, existing since 1979

Buizerd & Saars: coffee roaster, located in Kruisem, existing since 2018

De Zuivelarij: cheese maker (Belgian halloumi), located in Berlare, existing since 2016

F. Tierenteyn: mustard producer, located in Ghent, existing since 1818

Ginstberg: water producer, located in Oosterzele, existing since 1897

La Confiance: biscuits baker, located in Dendermonde, existing since 1920

Lerouge: fruit juices and press, located in Zulzeke, existing since 1993

Nobel: vineyard, located in Lochristi, existing since 2012

Stroom Brouwers: brewery, located in Ghent, existing since 2020

‘t Eikenhof: dairy farm and cheese maker, located in Lokeren, existing since 1985

‘t Pauwenhof: meat farm and butchery, located in Eeklo, existing for three generations (year unknown)

Vandekerckhove: coffee roaster, located in Ghent, existing since 1854

E. Coimbra Region Intermunicipal Community (Portugal)

• CIM Região de Coimbra. (2017). Plano Intermunicipal de Adaptação às Alterações Climáticas (PIAAC). Coimbra: CIM-RC. Available at https://climagir.cim-regiaodecoimbra.pt/application/views/assets/documentos/piaac-cim-rc.pdf

• CIM Região de Coimbra. (2022). Coimbra Region Food Strategy 2022–2030. Coimbra: CIM-RC. Available at https://urbact.eu/sites/default/files/2023-01/FOOD%20CORRIDORS%20CIM%20COIMBRA%20IAP%20Final.pdf

• CIM Região de Coimbra. (2021). Estratégia Integrada de Desenvolvimento Territorial 2021–2027. Coimbra: CIM-RC. Available at https://www.ccdrc.pt/wp-content/uploads/2024/02/CIM_Regiao_Coimbra_EIDT2021-2027_VFinal_abril2021.pdf.

• Datacentro. (2021). Indicadores socioeconómicos da Região Centro. Coimbra: CCDRC. Available at https://www.ccdrc.pt/datacentro.

• DGADR. (2020). Arroz Carolino do Baixo Mondego – Indicação Geográfica Protegida. Lisbon: DGADR. Available at https://www.dgadr.gov.pt/pt/?view=article&id=433:comissao-europeia-reconhece-o-arroz-carolino-do-baixo-mondego&catid=27&highlight=WyJhcnJveiIsImNhcm9saW5vIl0=.

• Direção-Geral da Saúde (DGS). (2020). Programa Nacional para a Promoção da Alimentação Saudável (PNPAS). Lisboa: Ministério da Saúde. Retrieved from https://alimentacaosaudavel.dgs.pt.

• Instituto Nacional de Estatística (INE). (2021). Estatísticas regionais – Região de Coimbra. Lisboa: INE. Available at https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_main.

• Governo de Portugal. (2017). Estratégia Nacional para a Agricultura Biológica 2017–2027 (ENAB). Lisboa: Ministério da Agricultura. Available at https://www.producaobiologica.pt/images/20230213_ConsultaPublica_ENAB.pdf.

• Governo de Portugal. (2020). Resolução do Conselho de Ministros n.º 53/2020: Plano Nacional Energia e Clima 2030 (PNEC 2030). Diário da República, 1.ª série, n.º 129 (6 de julho de 2020). Retrieved from https://diariodarepublica.pt/dr/detalhe/resolucao-conselho-ministros/53-2020-137618093.

• Prato Certo. (2021). Mediterranean Diet and Food Waste Manual. Coimbra: ACSA. Available at https://www.pratocerto.pt/uploads/modulos_ficheiros/manual-da-dieta-mediterranica-e-do-desperdacio-alimentar-na-regiao-de-coimbra.pdf.

• Pordata. (2021). Base de dados Portugal contemporâneo. Lisboa: Fundação Francisco Manuel dos Santos. Available at https://www.pordata.pt.

• University of Coimbra. (2023). Sustainable mushroom cultivation project receives €400,000 funding. Coimbra: UC. Available at https://www.uc.pt/sustentabilidade/noticias/cultivo-sustentavel-de-cogumelos-recebe-apoio-de-400-mil-euros.

• URBACT. (2021). Região de Coimbra – Um milhão de estórias gastronómicas. Brussels: URBACT. Available at https://urbact.eu/articles/regiao-de-coimbra-um-milhao-de-estorias-gastronomicas.