



GrAins

Greening Agrifood
in Social Economy



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About the GRAINS project:

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The GRAINS project aims to address:

- the challenges faced by SMEs in agrifood by providing training on sustainable practices and on how to reduce their environmental footprint.

The GRAINS project supports:

- capacity building
- knowledge transfer, and cooperation among social economy SMEs in the agri-food sector



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Description of the WP2:

Objectives:

- The capacity building courses enable social economy SMEs to use inputbased, new digital technologies, knowledge-based, and organizational innovations for green purposes resulting in new business models to improve their productivity, income, and climate resilience in the long term (1st year)
- The capacity-building courses aims at boosting the uptake of sustainable economy practices and enabling the development of local green markets (2nd year)

The four capacity building events organised in the first year were:

- Financial tools for the green transition of Social Economy SMEs – CLNR (online) (25 January 2024)
- Access to technology and digitalisation for the green transition of Social Economy SMEs – PSC (online) (26 March 2024)
- Clusters of Social and Ecological Innovation (CSEIs) and European Digital Innovation Hubs (EDIH) – DIESIS (online) (27 June 2024)
- Branding and green labelling – CRIS (online) (17 September 2024)

Capacity building programme TRAINING MATERIALS

- **CB1_Financial tools for the green transition of Social Economy small and medium enterprises**
- **CB2_Access to technology and digitalisation for the green transition of Social Economy Small and Medium Enterprises**
- **CB3_Clusters of Social and Ecological Innovation (CSEIs) and European Digital Innovation Hubs (EDIHs)**
- **CB4_Branding and green labeling**



Financial tools for the green transition of Social Economy small and medium enterprises

Capacity building programme

25 January 2024



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Abbreviations

CAP	Common Agricultural Policy
EAGF	European agricultural guarantee fund
EAFRD	European agricultural fund for rural development
EaSI	EU Programme for Employment and Social Innovation
EC	European Commission
ESG	Environmental, Social and Governance
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
MFI	Microfinance institution
RDP	Rural Development Programme
R&D	Research & Development
SDG	Sustainable Development Goals
SE	Social Economy
SME	Small and medium enterprise



Financial Challenges and Opportunities in the EU Agri-Food Sector: A Roadmap for Sustainability

The agri-food ecosystem is a comprehensive network that spans the entire food supply chain, involving farmers, retailers, suppliers, researchers, and public authorities. Despite its critical role, the ecosystem confronts numerous challenges. In 2021, the food product manufacturing sector, a pivotal component for the EU, generated €585 billion in value added, contributing 4.84% to the overall EU value added and providing employment for 16.3 million people¹.

The agri-food sector is a complex network encompassing extensive supply chains involving agriculture, forestry, fishing, manufacturing, wholesale and retail trade, transportation and storage, as well as accommodation and food services. In the European Union (EU), approximately 11 million agricultural enterprises produce food products, alongside 300 thousand food processing companies and 2.8 million businesses in the food distribution and catering sector. The food and beverage industry, the EU's largest manufacturing sector, employs 4.2 million people, generating a turnover of 967 billion euros and an added value of 190 billion euros in 2019 (Interreg Europe, 2022). However, this figure decreased to 585 billion euros in 2021 (equivalent to 4.84% of the EU's overall added value)².

Small and medium-sized enterprises (SMEs) form the backbone of the agrifood ecosystem, representing 99% of the 289,000 businesses in the food and beverage sector. They contribute approximately 48% of the turnover and employ over half of the workforce in food and beverage production. The remaining 1% of large enterprises in the food and beverage sector generates over 50% of the sector's turnover. Although agricultural enterprises are not officially classified as SMEs in business statistics, the majority could be considered SMEs, given that only 1% of EU agricultural enterprises have an annual turnover exceeding 500,000 euros³.

European businesses in the food and beverage sector are predominantly small and medium-sized enterprises (SMEs), constituting 99.2% of the sector's businesses. However, recent years have presented significant challenges for agrifood SMEs, including the COVID-19 pandemic, the Ukraine-Russia war, extreme weather events linked to climate change, rising commodity prices, and heightened global demand from Asia and Africa^{4 5}.

¹ SWD (2021) 351 final, Annual Single Market Report 2021. The report uses data of NACE codes A, C10, C11 and C12 for analytical purposes.

https://commission.europa.eu/system/files/2021-05/swd-annual-single-market-report-2021_en.pdf

² SWD(2023) 263 final. COMMISSION STAFF WORKING DOCUMENT. Co-creation of a transition pathway for a more resilient, sustainable and digital agrifood ecosystem. <https://data.consilium.europa.eu/doc/document/ST-12301-2023-INIT/en/pdf>

³ Ibid

⁴ European Commission (2020), Food 2030 pathways for action, Research and innovation policy as a driver for sustainable, healthy and inclusive food systems

⁵ (14) European Commission (2021). Preliminary impacts of the COVID-19 pandemic on European agriculture: a sector-based analysis of food systems and market resilience



The agrifood ecosystem, one of the fourteen industrial ecosystems identified in the updated New Industrial Strategy, encompasses the entire food chain. It includes farmers, fishermen, aquaculture producers, the food and beverage industry, retail, and wholesale food product sales, catering services, input and service providers, and all actors and organizations involved from field to table. In this context, the term "agrifood ecosystem" holistically refers to the EU's food system, extending its scope to consumers, the research community, public authorities, socio-cultural aspects, and institutional components of food systems.

The EU agri-food ecosystem confronts major challenges, including environmental issues, climate change impacts, securing incomes for farmers and fishers, ensuring sustainable diets, and addressing a skilled workforce shortage. Financial challenges are evident as farmers and fishers report lower incomes, face input cost increases, and grapple with market uncertainties. Additionally, the sector faces generational renewal issues, with fewer young people entering the industry.

Agri-food SMEs, including farmers, require investment, up-skilling, and resources for the green and digital transition. Large companies, although globally competitive, struggle with workforce challenges and limited innovation. Overall, the ecosystem faces increased input costs, especially in energy, impacting competitiveness. The COVID-19 pandemic underscored the importance of resilient food supply chains, revealing both challenges and opportunities for the agri-food sector.

The unprecedented surge in energy, gas, and commodity prices in 2022 highlighted the agri-food system's dependency on fossil fuels. This dependency resulted in higher costs across the board for food producers, posing risks to food affordability, particularly for low-income groups⁶. Climate change further exacerbated these challenges, reducing yields and impacting global food security⁷.

The financial challenges inherent in greening agri-food underscore the intricate interplay between economic, environmental, and social dimensions within the food system.

The agri-food sector, a cornerstone of the EU economy, faces economic hurdles such as lower R&D investment, talent acquisition difficulties, and increased costs precipitated by external shocks like the Russian invasion of Ukraine and the energy crisis⁸.

Moreover, the sector's global competitiveness is juxtaposed against vulnerabilities exposed by geopolitical events. Amid these challenges, the role of international trade becomes pivotal for food security. Modern EU trade agreements emphasize sustainability, aligning with the broader objectives of the EU Green Deal. Simultaneously, the imperative of environmental sustainability is underscored, necessitating a delicate balance between food productions and mitigating environmental impacts.

⁶ <https://www.fao.org/worldfoodsituation/foodpricesindex/en/>

⁷ European Council (2023). [Food security and affordability](#)

⁸ SWD(2023) 263 final. COMMISSION STAFF WORKING DOCUMENT. Co-creation of a transition pathway for a more resilient, sustainable and digital agrifood ecosystem. <https://data.consilium.europa.eu/doc/document/ST-12301-2023-INIT/en/pdf>



The Common Agricultural Policy (CAP) has made strides, yet non-uniform progress persists across EU Member States. Embracing a digital transformation becomes paramount for sustainable competitiveness, with advanced technologies offering solutions from precision farming to digital traceability and e-commerce. Challenges in digitalization, including data access rights and cybersecurity concerns, necessitate attention. Nonetheless, there is a growing recognition of the potential of digital tools to enhance transparency, traceability, and customer confidence, opening avenues for a more sustainable and resilient agri-food ecosystem.

The concept of sustainable competitiveness in the agri-food sector revolves around the capacity to generate inclusive wealth without compromising future resources. This multifaceted challenge intersects with economic stability, environmental resilience, and social equity. The stability of the agri-food supply chain, dependent on a resilient farming community, directly influences economic sustainability. Disruptions caused by climate events and resource constraints result in economic shocks, affecting supply availability and price volatility. Despite being a leading sector in the EU, the food and drink industry encounters challenges such as low R&D investment, talent shortages, and rising costs exacerbated by geopolitical crises. The sector's global competitiveness is sustained through exports, making international trade a critical factor. The EU's commitment to sustainable trade relations, evidenced by regulations like the deforestation-free products rule, aligns with the broader goal of the EU Green Deal⁹.

Investments in the agri-food sector are driven by three core dynamics: modernization of farms and machinery, expansion of production, and adaptation of practices to comply with regulations, consumer preferences, and the impacts of climate change.

Despite being an attractive industry for investments, a financing gap exists, particularly affecting small and medium-sized enterprises (SMEs). These SMEs require financing to manage their daily operations, procure raw materials, and repay liabilities upon selling processed foods. However, they face challenges in accessing finance due to their lower equity ratios, which make it difficult to provide sufficient collateral¹⁰.

The European Agriculture Fund for Rural Development (EAFRD) is a significant financial vehicle supporting investments in the agri-food sector, especially through the Rural Development Programme (RDP) measure 'Support for investments of processing and marketing of agriculture products.'

One of the key challenges in the sector is the skepticism of financial intermediaries towards innovations in smaller and new agri-food enterprises, driven by low equity ratios and a lack of benchmark data. This skepticism hinders the progress of innovation in the agri-food sector

⁹ Ibid

¹⁰ fi-compass, 2020, Financial needs in the agriculture and agri-food sectors in the European Union, Summary report, 94 pages. Available at: https://www.fi-compass.eu/sites/default/files/publications/financial_needs_agriculture_agrifood_sectors_eu_summary.pdf.

compared to other industries. Additionally, small-sized agri-food enterprises often face loan rejections due to a lack of collateral and unfavorable loan conditions¹¹.

The financing gap varies across Member States. To address this challenge, it is recommended to leverage EAFRD resources to strengthen existing guarantee instruments or create targeted ones, focusing on investment loans with long-term maturities. Risk-sharing structures for loan funds and efforts to enhance financial literacy among micro and small-sized enterprises are also suggested. For Member States with a high inclination towards innovation, the development of equity or quasi-equity instruments is proposed. Furthermore, the new legal framework provides opportunities for managing authorities to design dedicated support packages, combining financial instruments and grant support to address the specific needs of the agri-food sector¹².

Financial Instruments for green agrifood system

The agri-food sector in the European Union (EU) has received an annual investment of approximately €3 billion in 2019, which is considerably lower than other sectors such as health, which received €41 billion.¹³

Relative to revenue, European agri-food companies spent only 0.2% on innovation, trailing behind their US and Japanese competitors with investments of 0.44% and 0.65%, respectively (160). The COVID-19 pandemic has highlighted the need for investments in the sustainable competitiveness of the EU's agri-food sector, underscoring the significance of public investment for sector sustainability.

The reformed Common Agricultural Policy (CAP) plays a key role in this regard, aiming to transition towards a smart, sustainable, competitive, resilient, and diversified agricultural sector. The policy supports viable farm income, introduces eco-schemes to encourage sustainable farming models from 2023, and provides specific support for young farmers and those in areas facing natural constraints (157). The CAP Strategic Plans for 2023-2027 will mobilize over €35 billion in EU and national funding to support investments, particularly at the farm level but also extending to processing and marketing projects (162). This support includes not only grants but also financial instruments like loans and guarantees, leveraging additional support beyond the European Agricultural Fund for Rural Development (EAFRD) grant budget.

The reformed CAP has included a new financial reserve of at least €450 million per year, and member states have recognized the need to address future crises. In response to the Russian invasion of Ukraine, a €500 million support package has been outlined, utilizing crisis reserves to assist affected producers. Furthermore, EU Member States play a crucial role in providing

¹¹ Ibid

¹² Ibid

¹³ <https://data.consilium.europa.eu/doc/document/ST-12301-2023-INIT/en/pdf>



financial assistance through mechanisms such as the Temporary Crisis Framework for State Aid measures (TCF) and the European Maritime, Fisheries, and Aquaculture Fund (EMFAF) crisis mechanism, which supports fishers.

The Technical Support Instrument (TSI) offers tailored assistance for member states' reforms, including those in the agri-food sector, with a budget of €864 million from 2021-2027. The EU's broader financial framework, including the Multiannual Financial Framework (MFF) and NextGenerationEU recovery instrument totaling over €2 trillion, provides essential resources. The Recovery and Resilience Facility (RRF) program, funded through NextGenerationEU, is crucial for channeling these resources to support the agri-food ecosystem. Additionally, the Single Market Programme (SMP) allocates €4.208 billion for 2021-2027, focusing on governance strengthening and supporting competitiveness, particularly for micro, small, and medium-sized enterprises.

Under InvestEU, a significant EU guarantee of €26.3 billion is expected to catalyze €372 billion in additional investments for the EU economy. This support extends to agriculture, agri-food, rural businesses, and digitization, presenting a diverse array of financial products. The European Investment Fund (EIF) under its Framework Operations has created financial products worth €7.8 billion, providing support for the agri-food sector. BlueInvest contributes to early-stage businesses, SMEs, and scale-ups in the blue economy, aligning with the European Commission's Smart Specialisation Platform for Agri-Food (S3P Agri-Food). Horizon Europe, the world's largest public R&I program, allocates around €9 billion for Cluster 6, focusing on 'Food, Bioeconomy, Natural Resources, Agriculture, and Environment.' This comprehensive strategy aligns with the EU's commitment to mobilize at least €1 trillion in sustainable investments over the next decade, with 30% of the multiannual budget dedicated to green investments and Member States mandated to allocate 37% of Recovery and Resilience Facility financing to climate objectives.

The financial tools for greening agrifood sector are diverse and could vary from grants, subsidies, microfinance, public and private procurement to crowdfunding, green bonds, and so on. After the EU Green Deal, the EU and national policies have developed various financial mechanisms for supporting green and sustainable agriculture. There are income support schemes (e.g. eco-schemes), but also financial Instruments that can be used for greening agrifood businesses.

Public subsidies

A subsidy represents a benefit given to an individual, business or Institution by the government.

Public subsidies in the agrifood sector involve both front-end (e.g. subsidized fertilizer price or diesel price) and back-end subsidies (e.g. support for export or for eco-packaging). the subsidies are provided from EU funds (mainly from European Agricultural Guarantee Fund) or from national/ regional budget.

Governments may encourage green and sustainable growth in agrifood sector by reforming subsidies schemes. This is the case with the CAP policy, where EU decided to promote the



measures from EU Green Deal and 40% of the funds will be dedicated to climate actions between 2021 - 2027.

The common agricultural policy in EU countries is supported by two funds:

1. European Agricultural Guarantee Fund (EAGF) (1st pillar of CAP) - with an allocation of €291.1 billion between 2021 - 2027. More than 90% (up to €270 billion) are for income support schemes and the rest for supporting agricultural markets.
2. European Agricultural Fund for Rural Development (EAFRD) (2nd pillar of CAP) - allocation of €95.5 billion for 2021 - 2027. Around 8.5% (€8.1 billion) of the allocation is from the next generation EU recovery instrument to help address the challenges posed by the COVID-19 pandemic.

The income support schemes (direct payments) funded by European Agricultural Guarantee Fund (EAGF) are public subsidies and include¹⁴:

- basic payment scheme
- payment for sustainable farming methods (“green direct payments”)
- payment for young farmers

In general, the income support scheme is based on the farm’s size in hectares, but all EU countries also have to offer **eco-schemes** which is a payment for the climate, environment, and animal welfare to promote sustainable farming practices. The eco-schemes represent one of the new measures introduced by CAP 2023 - 2027 to support sustainable farming models that adopt practices friendly with the environment and climate.

The eco-schemes represent EU mechanism for supporting and rewarding farmers who preserve the natural resources and provide public goods with benefits that are not reflected in the market price. For the eco-schemes are defined at EU level a common list of action areas and the practices that could be supported and rewarded are¹⁵:

- organic farming
- agro-ecological practices
- high nature value farming
- precision farming
- agro-forestry
- carbon farming
- animal welfare improvements

The eco-schemes support agricultural practices that:

- cover activities related to climate, environment, animal welfare and antimicrobial resistance;
- are defined based on the needs and priorities identified at national/regional levels in CAP Strategic Plans;
- contribute to reaching the EU Green Deal targets.

¹⁴ https://agriculture.ec.europa.eu/common-agricultural-policy/income-support/income-support-explained_en

¹⁵ List of potential AGRICULTURAL PRACTICES that ECO-SCHEMES could support -

https://agriculture.ec.europa.eu/system/files/2021-01/factsheet-agri-practices-under-ecoscheme_en_0.pdf



Microfinance

Microfinance primarily encompasses micro-loans, typically less than €25,000, designed for micro-enterprises (firms that employ fewer than 10 people), which constitute 91% of all European businesses. It serves individuals aspiring to be self-employed but encountering challenges accessing traditional banking services. Across the European Union, 99% of startups are micro or small enterprises, with one third ed by unemployed individuals.¹⁶

Relative to microfinance markets in South Asia, South America, and Africa, the European microfinance market is relatively young, highly diverse, and expanding. Growth is particularly notable in new Member States and certain Western countries, typically where regulatory frameworks facilitate such activities. Micro-credit institutions within this sector aim for self-sustainability, increased micro-lending capacity, and, in some instances, aspire to transform into banks.

Microfinance is a vital tool for those who are excluded from traditional banking systems due to various reasons. In 2010, the European Progress Microfinance Facility (Progress Microfinance)¹⁷ was launched under the EaSI program¹⁸ to make microcredit accessible for small businesses that aim to establish or grow. Instead of directly financing entrepreneurs, the EaSI program provides guarantees to selected microcredit providers in the EU, sharing the potential risks.




The microfinance ecosystem comprises of various actors, such as the final recipients with diverse financial and social needs, social investors, financial intermediaries, policy makers, and social services providers. To understand this ecosystem better, a 'social impact investment' framework is used. Social impact investment involves providing finance to organisations that address social needs, with the expectation of both measurable social and financial returns. This framework is increasingly supported by national governments, especially in the EU.

Figure 1. Dimensions of social impact investment

¹⁶ <https://www.eib.org/en/products/loans/microfinance/index.htm>

¹⁷ https://www.eif.org/what_we_do/microfinance/progress/progress_Q_and_A_for_Individuals_and%20Micro-enterprises.pdf

¹⁸ <https://ec.europa.eu/social/main.jsp?catId=1081>

	<p>Social: social impact investment's primary objective and starting point is to tackle social needs which include ageing, disability, health, families, affordable housing and unemployment. Microfinance may represent a more flexible and sustainable alternative to grants, reaching a wider range of final recipients.</p>
	<p>Impact: social impact investment looks to produce social change and an improvement in final recipients' lives. To continue to improve its effectiveness, and gain visibility to attract investors, the impact of microfinance has to be measurable and monitored during the financial instrument's entire life cycle.</p>
	<p>Investment: while addressing social goals, the recipient is expected to return the money invested.</p>

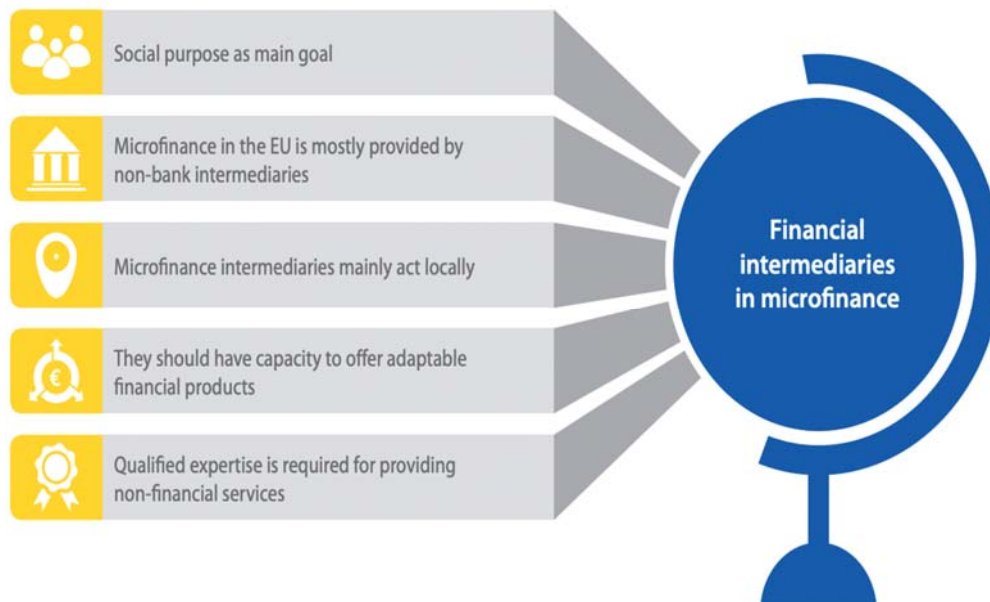
Source: Fi- compass ESF- Financial instruments working with microfinance

Microfinance requires balancing social impact and financial sustainability, with higher management costs and risks leading to relatively higher interest rates. NGOs, foundations, and government bodies play a significant role in markets with low financial service penetration, addressing the financial needs of socially excluded groups. Localized operations by financial intermediaries help establish close relationships with borrowers and ensure tailored solutions.

Microfinance institutions are designed to cater to the social needs of individuals and communities, while also promoting financial operations that create a positive impact on society. Traditional commercial lenders often find it unprofitable to provide small loans to people with low income, inadequate collateral or projects with limited financial sustainability. Microfinance products can be customized to cater to varying social needs and when combined with non-financial services like business development, they become even more effective.

Microfinance services aim to balance both social impact and financial sustainability. However, they often come with higher management costs and risks, leading to relatively higher interest rates. NGOs, foundations, and government bodies play a significant role in markets where financial services are not yet widely available, helping to address the financial needs of socially excluded groups. Financial intermediaries with localized operations establish close relationships with borrowers, ensuring that they receive tailored solutions.

Figure 2. Characteristics of financial intermediaries working with microfinance



Source: Ficompas

Microfinance institutions are specially designed to cater to the social needs of individuals and communities while promoting financial operations that create a positive impact on society. Traditional commercial lenders often find it unprofitable to provide small loans to people with low income, inadequate collateral, or projects with limited financial sustainability.

Credit unions in Lithuania, Romania, and Bulgaria have a significant role in providing loans of smaller amounts, which commercial banks are less interested in approving. Credit unions are more flexible towards their clients and adapt to their needs compared to commercial banks. Microcredit organizations in Romania and Bulgaria serve small farms by disbursing both business and personal micro-loans. They generally offer short-term credit products for working capital, investment purposes (with short maturity), and leasing. Microfinance institutions are more open to financing the agricultural sector and especially small-sized farms because they have adjusted credit analysis, focus on assessing farmers' repayment capacity and adapting collateral requirements, even if the farm is family-owned and semi-professional. They have also adapted delivery channels and a higher presence in the rural area. Moreover, they have simplified credit procedures with less documentation and bureaucracy.¹⁹

In Hungary, small-sized farms are supplied with loans through a solution developed by "integrators" who play an important role. Integrators act as intermediaries between banks and farmers, buying and distributing seeds and chemicals, providing advisory services, and selling commodities. They obtain loans from banks and distribute them to contracted producers, mostly micro and small-sized farms. Although these loans are more expensive, they are often the only option for farmers who lack collateral or are ineligible for bank loans. This

¹⁹ fi-compass, 2020, Financial needs in the agriculture and agri-food sectors in the European Union, Summary report, 94 pages. Available at: https://www.fi-compass.eu/sites/default/files/publications/financial_needs_agriculture_agrifood_sectors_eu_summary.pdf.



system allows banks to concentrate larger loans with reliable enterprises, benefiting them and the integrators.

Microfinance products can be customized to cater to varying social needs and, when combined with non-financial services such as business development, become even more effective. **Green microfinance** broadly refers to the operational practices of microfinance institutions (MFIs) that support environmental sustainability while serving low-income clients. While commonly associated with microloans for clean energy solutions, MFIs can adopt a range of green strategies, from "do no harm" policies to initiatives with positive environmental impacts. These strategies include managing internal and external environmental risks, fostering green opportunities, and adopting a formal environmental strategy.

[EaSI Technical Assistance for social enterprise finance.](#)

The European Fund for Strategic Investments has recognised the potential impact that social economy enterprises can have on society and has launched various financial instruments to support them. One such initiative is the provision of technical assistance under EaSI, which was initially intended for microcredit providers but has since been expanded to include support for social enterprise finance intermediaries. A consortium led by the European Center for Social Finance, in collaboration with experts, delivers these services on behalf of the European Commission.

The technical assistance services provided under EaSI include capacity building through analysis, training in financial instrument design, tool application, quality assurance, mutual learning, exchange of best practices, networking, partnering, and monitoring and evaluation.

There are two types of support services available under EaSI:

1. Provision of Targeted Capacity Building Services: This is a 1:1 format that focuses on investment readiness, impact assessment, fundraising, or strategic and operational topics.
2. Exchange and Dissemination of Good Practices: This includes peer-to-peer trainings, study visits, and thematic workshops covering operations, finance, impact, and market-related aspects.

Public and private procurement

The large number of people at risk of poverty and social exclusion, of those that are facing in-work poverty, the increased risks associated with insufficient environmental protection have led at EU level to the introduction in the legislation on public procurement of the possibility of making acquisitions with social impact and green acquisitions. Stimulating public institutions to make purchases with social and environmental impact is one of the measures provided in the strategies of social inclusion and environmental protection and contributes to the achievement of sustainable development goals.



If in other European countries the procurement with social and environment impact is widely used by public institutions, but also by companies, in the Eastern and Central Europe countries the situation is not the same. The majority use of the lowest price criterion in public procurement. Limited knowledge of how to make social and green procurement, lack of rapid mechanisms to identify entities eligible for reserved contracts, lack of information and education on the effects of these types of procurement on society are main causes of the limited implementation of these measures in public procurement.

Public or private procurement is a tool to achieve public policy objectives of governments as well as business development objectives. The high level of procurement spending in general makes it extremely important for the achievement of public and business sustainability objectives. The business community has understood this, and big companies have been introduced environmental, transparency or social evaluation criteria in their choice of suppliers (e.g. ESG criteria - see the section below).

With a share of around 14% of GDP at EU level, public procurement has become an important tool for achieving the public policy objectives of EU countries. The 2014 EU public procurement regulation responds to this increased importance of the field for the European Union's public policy objectives and introduces provisions for social and environmental clauses that can be used to help implement social and environmental policy objectives in the context of the development of the European Pillar of Social Rights and the European Green Pact.

Socially responsible procurement is the procurement of products/services/works that aims to achieve a positive social impact from the purchasing process, intending to bring social benefits, reduce social risks or existing inequalities.

Green procurement aims at a reduced environmental impact throughout the life cycle of the goods, services and works contracted. There are specific criteria developed for green procurement for 14 economic fields of activity at the EU level²⁰. The EU Ecolabel logo certifies the quality of a product while meeting the highest environmental standards and could be used as an award criterion in green procurement.

Financial Instruments of European Commission

European Commission developed a range of financial Instruments that can be used to stimulate and increase the capacity of the agrifood sector²¹. These financial instruments co-funded through EAFRD are implemented in all EU countries²² and include²³:

- Loans
- Guarantees
- Equity
- Quasi-equity

²⁰ https://green-business.ec.europa.eu/green-public-procurement/gpp-criteria-and-requirements_en

²¹ <https://www.fi-compass.eu/info/new-to-financial-instruments>

²² <https://www.fi-compass.eu/country-data>

²³ <https://www.fi-compass.eu/sites/default/files/publications/ESIF-factsheet-FI-products.pdf>



Loans may be available where no institution (e.g. banks, credit unions) provides them commercially or may be offered on better terms commercially (e.g. with lower interest rates, longer repayment periods, or with less collateral required). In case of agri-food sector, where the small farmers have small incomes and from a unique source, loans could help them to diversify their sources of income by developing new related activities (e.g. agritourism, local gastronomic points, restaurants selling local food). Also, loans could provide investment support for young farmers, or in increasing the production capacity (e.g. investment in agricultural machineries).

Microcredits represent smaller loans made to people sometimes excluded from access to finance, often provided over a short term and with no or low collateral required (e.g. loans to farmers to purchase inputs or equipment).

Guarantees is an assurance given to a lender that his/her capital will be repaid if a borrower is not able to repay a loan (e.g. may be beneficial for enterprises aimed at investing in the bio-economy or in resource efficiency). They are “Written commitment to assume responsibility for all or part of a third party’s debt or obligation or for the successful performance by that third party of its obligations if an event occurs which triggers such guarantee, such as a loan default”.²⁴

Equity represents capital investment in return for total or partial ownership of a firm; the equity investor may assume some management control of the firm may share the firm’s profits and may sell, at a later stage, the acquired shares realizing again profits. It is a “Provision of capital to a firm, invested directly or indirectly in return for total or partial ownership of that firm and where the equity investor may assume some management control of the firm and may share the firm’s profits”²⁵.

Financial instruments could be implemented in combination with grants, subsidies and other forms of financial assistance. The main benefits of the financial instruments are²⁶:

1. Money is paid back and may be used repeatedly for other investments.
2. Increase attractivity for other private investments (e.g. so-called ‘business angels’ may invest in small businesses alongside EU funded instruments; Banks may lend to entrepreneurs unable to offer collateral because of an EU-backed guarantee fund).
3. More expertise from private investors who want to secure the investment.

²⁴ European Commission (2015). Guidance for Member States on Financial Instruments – Glossary

²⁵ Idem

²⁶ <https://www.fi-compass.eu/info/new-to-financial-instruments>

Green finance for agrifood system

“Green finance” then refers to any financial instruments whose proceeds are used for environmentally sustainable projects and initiatives, environmental products and policies under the single goal of promoting a green economic transformation toward low-carbon, sustainable and inclusive pathways. The objectives of these financing mechanisms are to reduce climate footprints while taking care of market-based economic return.

Sustainable finance is crucial for achieving the goals outlined in the European Green Deal and the EU's international commitments on climate and sustainability. The European Union emphasizes the importance of sustainable finance in channeling private investment towards building a climate-neutral, resilient, resource-efficient, and fair economy, complementing public funds. This approach is seen as vital for ensuring that investments contribute to economic resilience and a sustainable recovery from the impact of the COVID-19 pandemic. The EU has been a leader in fostering a financial system that supports sustainable growth.

Transition finance²⁷, a subset of sustainable finance, focuses on financing both existing environmentally friendly initiatives (green finance) and those transitioning to eco-friendly practices over time. It involves funding private investments aimed at reducing current greenhouse gas emissions and other environmental impacts, facilitating the shift toward a climate-neutral and sustainable economy. Transition finance supports investments in environmentally conscious production methods and efforts to minimize environmental footprints, particularly in cases where green technologies are not yet available. This financing is urgently required to achieve a 55% reduction in greenhouse gas emissions and environmental impact by 2030. Transition finance is particularly relevant for companies seeking to become sustainable gradually, allowing them to finance their journey toward a sustainable future, taking steps over time based on their unique starting points. The European Commission underscores the significance of sustainable finance, aligning with its commitment to fostering a low-carbon, resource-efficient, and sustainable economy.

Green finance includes a range of financial instruments that are used to fund sustainable development, climate action, and policies that aim to promote low-carbon, sustainable, and equitable pathways. The core objectives of green finance are:

1. to lower the perception of risk,
2. to internalize environmental externalities.

There is a variety of potential financial products for green finance for agrifood sector: green bonds, green loans, green asset finance, green insurance etc (see Figure 3).

Figure 3. Potential financial products for green finance to the agrifood sector

²⁷ https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance_en

Green finance products		Important features
1.	Green bonds	These bonds are created to fund projects that have positive environmental and/or climate benefits, which may include land and water use, agricultural production systems, etc.
2.	Green loans for sustainable farming	These are loans that can be used to fund a range of environmentally sustainable farming with reduced GHG emissions. These loans may be structured as bilateral loans or syndicated loans (blended).
3.	Sustainability-linked loans	The attractiveness of sustainability-linked loans is their linkage between pricing and a borrower's ESG performance. These loans are structured to offer a pricing discount when a borrower meets or outperforms its ESG targets.
4.	Green asset finance	This type of finance is a subset of asset financing (mitigation infrastructure, etc.) that supports sustainable agricultural and forestry development.
5.	Green insurance	Green insurance includes a large spectrum of insurance products which are either related to climate risk insurance (in agriculture), or a bundled package that includes credit to promote energy-efficient investments, or macrolevel insurance among regions or states that seek to pool risk against large-scale catastrophic events (such as hurricanes, earthquake, tsunami etc.).
6.	Other allied financial products <ul style="list-style-type: none"> • Blue finance • Landscape finance • Livelihoods finance • Green credit cards 	These are financial products offered to consumers and businesses that either provide environmental benefits or reduce negative environmental impacts. Examples include financing for fisheries, landscapes, livelihoods, green agricultural machinery loans, energy efficient mortgages, green credit cards, and ecosavings deposits.

Source: Das, P.K. & Cungu, A. 2023. Green finance as a critical lever for delivering sustainable agrifood systems – A global landscape study. Rome, FAO, p. 62. <https://doi.org/10.4060/cc7402en>

ESG

ESG (Environmental, Social, and Governance) investing serves as a financial tool utilized by socially conscious investors to evaluate and screen potential investments based on a company's commitment to responsible business practices. The three pillars of ESG criteria provide a comprehensive framework for assessing a company's impact on the environment, its relationships with stakeholders, and the quality of its governance structures.²⁸

Environmental criteria delve into a company's efforts to safeguard the planet, encompassing policies addressing climate change, energy use, waste management, pollution control, and conservation of natural resources. This includes evaluating a company's carbon footprint, use of renewable energy sources, and compliance with environmental regulations. Given the increasing urgency of global environmental issues, such assessments gain significance in the context of mitigating climate change and preserving ecosystems.

²⁸ OECD (2021), ESG Investing and Climate Transition: Market Practices, Issues and Policy Considerations, OECD Paris, <https://www.oecd.org/finance/ESG-investing-and-climatetransition-Market-practices-issues-and-policy-considerations.pdf>.



Social criteria focus on a company's interactions with both internal and external stakeholders. This involves evaluating how a company treats its employees, engages with suppliers, serves its customers, and contributes to the communities where it operates. Considerations encompass workplace conditions, diversity and inclusion practices, community engagement initiatives, and adherence to ethical supply chain standards. Socially responsible investing (SRI) aligns closely with this aspect of ESG, emphasizing themes such as social justice, diversity, and ethical corporate behavior.

Governance criteria pertain to the structure and practices of a company's leadership. This includes assessing the transparency and accuracy of accounting methods, the integrity and diversity of leadership, and the accountability to shareholders. Governance standards aim to ensure that companies operate ethically, avoid conflicts of interest, and uphold principles of transparency and fairness.

ESG investing has gained substantial traction in recent years, with mutual funds, brokerage firms, and robo-advisors offering investment products aligned with ESG principles. Investors are increasingly seeking to integrate their values into their portfolios, and institutional investors, such as public pension funds, are also incorporating ESG considerations into their investment strategies.

While ESG investing can contribute to positive societal and environmental impacts, it comes with certain trade-offs. Investors may not have access to the full universe of stocks available in the market, as certain industries, like tobacco and defense, are often excluded from ESG portfolios. Additionally, ESG-friendly investments may trade at a premium, potentially impacting returns. The ultimate success of ESG investing depends on whether it effectively encourages companies to adopt sustainable and responsible practices or merely leads to checkbox compliance and superficial reporting. As investors navigate the ESG landscape, various financial firms provide ESG ratings and scoring systems, offering insights into a company's compliance with ESG standards and initiatives. In conclusion, ESG investing represents a dynamic and evolving approach that seeks to align financial goals with environmental, social, and governance considerations, reflecting a broader movement toward responsible and sustainable investment practices.

Investing in ESG has the potential to revolutionize the concept of smart villages, which are self-sufficient communities that rely on technology and innovation to improve living standards, education, and healthcare. Through funding infrastructure, education, and healthcare, ESG investment can support the development of these communities, which help reduce poverty, increase resource access, and promote sustainable living.

Moreover, ESG investment can also drive positive changes in agritech innovation. The integration of technology in agriculture can enhance yields, reduce waste, and improve efficiency. Agritech has the potential to transform food production and distribution, making it more sustainable and efficient. Precision agriculture, for instance, leverages sensors and data analytics to optimize crop growth, reduce waste, and conserve water.



Access to Technology and Digitalisation for the Green Transition of Social Economy SMEs

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INTRODUCTION

Welcome to a pivotal journey toward the sustainable evolution of your enterprise. In this era, where the pulse of innovation quickens, embracing the dual transition to a greener and more digital economy is not just an option but a strategic imperative for Social Economy SMEs and entrepreneurs like you. This document is designed to navigate you through the complexities of integrating technology and digitalization into your business models for an effective green transition. It aims to serve as a beacon, illuminating the path towards a resilient, competitive, and sustainable future.

The Essence of the Twin Transition

At the core of this transformation lies the twin transition—a seamless integration of green practices with digital innovation. The twin transition represents a harmonious blend where environmental sustainability and digital advancement feed into each other, creating a synergy that propels Social Economy SMEs towards unprecedented efficiency, competitiveness, and environmental stewardship.

Digitalization: A Catalyst for Green Transition

Digital technologies offer powerful tools for SMEs to optimize resource use, reduce waste, and streamline operations. From energy-efficient production processes to blockchain for traceability in the supply chain, digital solutions not only enhance operational efficiency but also enable you to make informed, sustainable decisions. This digital empowerment is pivotal for SMEs aiming to reduce their carbon footprint and embrace a low-carbon economy.

Renewable Energy: Elevating Competitive Edge

Incorporating renewable energy sources into your business operations directly impacts your bottom line by reducing energy costs and safeguarding against fluctuating fossil fuel prices. Beyond economic benefits, it strengthens your brand's commitment to sustainability—a crucial differentiator in today's market. This document will guide you through practical insights on harnessing solar power effectively, addressing challenges such as seasonal variations, and ensuring alignment with your enterprise's energy needs.

Empowering Through Knowledge

Understanding the landscape of EU policies, incentives, and technological advancements is essential for navigating the twin transition. This document synthesizes key information, presenting it in a manner that is accessible yet comprehensive. It aims to equip you with the knowledge to leverage the Social Economy Action Plan, understand the Council's recommendations for social economy framework conditions, and explore the opportunities presented by Europe's Digital Decade.



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Your Role in the Sustainable Future

As leaders in the social economy, you play a vital role in shaping a sustainable future. Your decisions and actions set a precedent for responsible business practices, driving societal change towards greener, more inclusive economies. This document is a testament to your commitment to this journey, offering guidance, inspiration, and practical solutions to ensure your success in the twin transition.

As you delve into the following sections, we invite you to engage with an open mind and a forward-thinking attitude. The path toward a sustainable, digital future is rich with opportunities for growth, innovation, and leadership. Together, let's embark on this transformative journey, paving the way for a greener, more digital economy that benefits us all.



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SECTION 1: DIGITAL EMPOWERMENT FOR SUSTAINABLE GROWTH IN AGRI-FOOD SMES

1.1 The Role of Digital Transformation

Introduction to Digital Technologies in the Agri-Food Sector

In the dynamic realm of the agri-food sector, integrating digital technologies has become essential for achieving sustainable development. This chapter is designed to guide social economy SMEs and entrepreneurs through the impactful role digital innovations play in revolutionizing farming methods and food production processes. These advancements are pivotal in enhancing efficiency, bolstering productivity, and promoting environmental sustainability.

The onset of the COVID-19 pandemic, officially declared by the World Health Organization (WHO) on March 11, 2020, imposed significant hurdles on public health and the worldwide economy, notably affecting food supply chains and overall food systems. The pandemic's challenges, intensified by stringent measures like lockdowns and social distancing, led to labor shortages across the food value chain, thus disrupting established food systems and altering consumer dietary habits. This situation underscored the critical need for adaptability and resilience in ensuring a resilient and sustainable food supply, with a growing emphasis on food safety, quality, and traceability among consumers and producers alike.

In response to the pandemic-induced disruptions, there has been a concerted effort to explore innovative strategies, alternative approaches, and technological advancements to alleviate the pandemic's effects. While the trend towards digitalization in the agriculture and food industry predates the pandemic, the crisis has undeniably accelerated the shift towards digital transformation, emphasizing the importance of digital and automated solutions in enhancing productivity and optimizing resource utilization, aligned with the goals of a more sustainable food system.

Digitalization's essence is intricately connected to Industry 4.0, or the fourth industrial revolution, which is characterized by the fusion of digital, physical, and biological spheres through technologies such as artificial intelligence (AI), the Internet of Things (IoT), big data, robotics, 3D printing, and smart sensors. These technologies are at the forefront of creating intelligent digital farms and factories. Although there is no universally accepted classification of Industry 4.0 technologies, the agri-food sector commonly recognizes the significance of



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additional technologies including blockchain, cloud computing, digital twins, and cyber-physical systems in driving forward this digital revolution¹.

As we delve into this chapter, we aim to equip you, the social economy SMEs and entrepreneurs, with a comprehensive understanding of how digital technologies can be leveraged to navigate the complexities of the agri-food sector, fostering innovation, sustainability, and resilience in your endeavors.

Digital Empowerment: Catalyzing Sustainable Growth in Agri-Food SMEs

In today's rapidly evolving digital landscape, agri-food SMEs stand on the brink of transformational growth, powered by cutting-edge technologies. This section delves into how Artificial Intelligence (AI), the Internet of Things (IoT), and Blockchain are pivotal in fostering sustainability and enhancing efficiency within your business operations.

Harnessing AI and Big Data for Informed Decisions

At the heart of digital innovation, AI and big data analytics offer profound insights and solutions to prevalent challenges within the agri-food sector. From public health safeguards to risk mitigation and sustainability efforts, these technologies are reshaping the landscape. AI enhances decision-making, improves yield forecasts, and delivers precise pest and disease control, leading to smarter resource use, reduced waste, and heightened efficiency. The synergy of big data and cloud technologies, particularly post-COVID-19, underscores the need for robust computational infrastructure to manage the vast data generated across the food supply chain. Cloud computing emerges as a beacon, facilitating on-site data generation and real-time analysis, thus streamlining food safety controls and compliance, all while reducing costs².

IoT and Smart Sensing: The Eyes and Ears of Precision Agriculture

IoT technology introduces real-time data collection across the food supply chain through advanced sensors, monitoring everything from farm conditions to storage environments. This network of sensors not only predicts product quality and shelf life but also enhances food safety by detecting adulteration. In agriculture, the application of smart sensors for weather, soil quality, and crop monitoring contributes to increased yields and cost savings, marking a significant step towards sustainable farming practices³.

Blockchain: Ensuring Transparency and Trust

Blockchain technology revolutionizes traceability and transparency in the food supply chain. By creating an immutable record of every transaction, it ensures the integrity of food products from origin to consumer, effectively combating food fraud and minimizing waste. When

¹ A. Fraser, The Digital Revolution, Data Curation, and the New Dynamics of Food Sovereignty Construction. *The Journal of Peasant Studies*, Vol.47, pp. 1-19 (2020). DOI: <https://doi.org/10.1080/03066150.2019.1602522>

² Jin, C., Bouzembrak, Y., Zhou, J., Liang, Q., van den Bulk, L. M., Gavai, A., et al. (2020). Big data in food safety- a review. *Curr. Opin. Food Sci.* 36, 24–32. doi: 10.1016/j.cofs.2020.11.006

³ Misra, N. N., Dixit, Y., Al-Mallahi, A., Bhullar, M. S., Upadhyay, R., and Martynenko, A. (2022). IoT, big data and artificial intelligence in agriculture and food industry. *IEEE Internet Things J.* 9, 1–1. doi: 10.1109/JIOT.2020.2998584





combined with IoT, blockchain technology enhances real-time visibility and reliability across the supply chain, ensuring food safety and quality⁴.

Robotics and Smart Machinery: Automating for Efficiency

The deployment of robotics and smart machinery across agricultural production and processing signifies a leap towards automation. These technologies perform a myriad of tasks, from cultivation to harvesting, and provide valuable data for precision agriculture and optimal breeding choices. Robotics also extend their utility to post-harvest operations, including sorting, packaging, and shipping, replacing manual labor with efficiency and precision⁵.

Digital Twins and Augmented Reality: Modeling the Future

Digital twins offer a virtual representation of physical entities, enabling modeling activities that drive productivity, resource, and energy efficiency. While augmented reality (AR) finds applications in various sectors, its role in agriculture and food management is burgeoning, showing potential in areas such as weight management and operational training⁶.

Conclusion

The integration of AI, IoT, Blockchain, and other digital technologies not only propels the agri-food sector toward unprecedented sustainability and efficiency but also opens new avenues for SMEs and entrepreneurs to innovate and excel in a competitive market. As you navigate this digital revolution, embracing these technologies can be a game-changer, positioning your enterprise at the forefront of the sustainable agri-food industry.

1.2 Overcoming the Digital Divide in Agri-Food SMEs

The journey towards digitalization in the agricultural and food sectors holds immense promise for sustainability and efficiency. However, this path is fraught with challenges, especially for small-scale farmers, SMEs and social economy entities. Understanding these hurdles and the EU's initiatives to bridge the digital divide is crucial for empowering these stakeholders.

Challenges in Embracing Digital Technologies

Small farmers and social SMEs encounter several barriers when adopting digital and advanced technologies such as AI, IoT, and blockchain. Key obstacles include:

- **Infrastructure and Access:** A significant lack of adequate digital infrastructure and access to technology hampers the ability of small-scale farmers and food companies to integrate digital solutions.
- **High Costs and Investment Needs:** The initial investment required for digital technologies often exceeds the financial capabilities of small entities, making it difficult to justify the cost against potential returns.

⁴ Attaran Mohsen et al., 2019, *Food Industry*, in M. Attaran, A. Gunasekaran, *Applications of Blockchain Technology in Business*, Springer, Cham

⁵ Basso B. et al, 2020, 'Digital agriculture to design sustainable agricultural systems', *Nature Research*, 3

⁶ Chai, J. J. K., O'Sullivan, C., Gowen, A. A., Rooney, B., and Xu, J.-L. (2022). Augmented/mixed reality technologies for food: a review. *Trends Food Sci. Technol.* 124, 182–194. doi: 10.1016/j.tifs.2022.04.021



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- **Skills and Training:** There's a pronounced gap in digital literacy and technical skills among staff and decision-makers within these organizations, limiting their capacity to leverage new technologies effectively.
- **System Integration:** Integrating digital solutions into existing processes and routines poses significant challenges, requiring time and resources that many small operations do not have.
- **Ethical and Privacy Concerns:** Issues related to data privacy, security, and ethical use of technology like AI and big data analytics remain prominent concerns.
- **Regulatory and Socio-economic Barriers:** Diverse regional regulations and socio-economic conditions further complicate the adoption of digital technologies.

Addressing these barriers requires a concerted effort from all stakeholders, including governments, technology providers, and the SMEs themselves⁷.

EU's Role in Promoting Digital Inclusion

The European Union recognizes the pivotal role of digitalization in transforming the agricultural sector into a more sustainable, efficient, and competitive domain. Several EU initiatives and policies aim to foster digital inclusion among small farmers and SMEs:

- The **Transition Pathway for Proximity and Social Economy** outlines strategic directions for integrating digital technologies within the social economy, emphasizing support for SMEs in their digital transition [Transition Pathway](#).
- Europe's Digital Decade vision aspires to achieve digital sovereignty, laying out clear targets for 2030 that include digital skills, infrastructure, and the digital transformation of businesses, with a focus on the agricultural sector [Europe's Digital Decade](#).

To specifically address the challenges faced by the agricultural sector:

- [The "From Farm to Fork" Strategy](#) under the European Green Deal prioritizes the digital and technological transition of agriculture to enhance climate and environmental outcomes. This strategy supports innovation and digital technology as catalysts for sustainable agri-food systems From Farm to Fork Strategy.
- [Common Agricultural European Data Space](#) is an ambitious project aimed at facilitating cross-domain data sharing, supported by the Data Governance Act and the forthcoming Data Act, to improve sustainability, productivity, and competitiveness in the agricultural sector.
- [The Common Agricultural Policy \(CAP\) 2023-2027](#) plays a crucial role in shaping the digital landscape for agriculture across Europe. This policy framework is designed to influence and support the digitalization of agriculture, aiming to actively involve and benefit the broad spectrum of small to medium-sized farmers that define Europe's agricultural landscape. A cornerstone of this policy is the enhanced focus on building Agricultural Knowledge and Information Systems (AKIS). These systems are instrumental in spreading digital skills and knowledge, thus facilitating a grassroots-level adoption of digital technologies across the agricultural and food sectors. The CAP's strategic

⁷ Rudenko M. , The Impact of Digital Technologies on Agricultural Production: a Methodical Aspect. Scientific Notes of Taurida National V.I. Vernadsky University. Series: Economy and Management, Vol. 30(69), pp. 30-37 (2019). DOI: <https://doi.org/10.32838/2523-4803/69-6-28>





approach emphasizes not just the adoption of digital technologies but also the empowerment of farmers through knowledge and information sharing, ensuring that digitalization benefits reach every corner of the European agricultural sector.

- [The 2019 Declaration on a Smart and Sustainable Digital Future for European Agriculture and Rural Areas](#) marks a significant commitment by nearly all EU Member States towards the digitalization of agriculture. This declaration underscores the collective resolve to harness digital technology for tackling economic, social, climatic, and environmental challenges facing the sector. By fostering collaboration on digital advancements, the declaration sets the stage for a unified approach to transform European agriculture into a more efficient, sustainable, and socially inclusive industry.
- [The 2019 Global Forum for Food and Agriculture](#) brought together 74 Ministers of Agriculture who collectively recognized the transformative power of digital agriculture. Through their resolutions, they committed to four primary objectives aimed at leveraging digitalization for enhancing agricultural efficiency, sustainability, and rural livelihoods. These objectives include:
 - Identifying and exploiting the full potential of digitalization to streamline agricultural practices and improve living conditions in rural areas.
 - Broadening farmers' access to digital technologies via comprehensive training programs, ensuring they possess the necessary skills for the digital age.
 - Enhancing the management and security of digital data, affirming the sovereignty and ownership rights over data produced by farmers.
 - Utilizing digital technologies to manage structural changes within the agricultural sector, thereby revitalizing rural areas and addressing the challenge of depopulation.

To support these digital transitions, the EU is committed to achieving 100% access to fast broadband internet in rural areas by 2025, recognizing the critical role of digital infrastructure in enabling the adoption of advanced technologies in agriculture.

Conclusion

For agri-food SMEs navigating the digital transition, understanding both the challenges and the comprehensive support framework provided by the EU is vital. By leveraging EU initiatives and policies, SMEs can overcome barriers to digitalization, ensuring their competitive edge in a rapidly evolving market. The collective effort towards digital inclusion promises not only to enhance the sustainability and efficiency of the agricultural sector but also to ensure its resilience against future challenges.

1.3 Practical Applications and Innovations

Transformative Digital Technologies in Agriculture and Food Production

As you navigate the evolving landscape of the social economy SMEs, understanding the practical applications of digital technologies in agriculture and food production becomes imperative. These technologies are not just innovations but tools that redefine how food reaches our tables, enhancing both sustainability and quality.



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Precision Agriculture and Smart Farming: The integration of artificial intelligence (AI), Internet of Things (IoT), smart sensors, and drone technology into agriculture has given rise to precision agriculture and smart farming. These technologies allow for more efficient farming practices by enabling precise monitoring and management of crop health, soil conditions, and water usage. For instance, AI can forecast agricultural outputs by analyzing current and historical data, minimizing risks like pest infestations and diseases. IoT devices, on the other hand, play a significant role in soil and crop monitoring, livestock management, and farm equipment optimization, elevating the productivity and sustainability of farming operations⁸.

Drones and Robotics: The deployment of drones and robotics in agriculture is streamlining tasks that were previously labor-intensive or challenging, from soil analysis to planting, monitoring, and harvesting crops. Robots equipped with AI and machine learning algorithms can now accurately perform tasks like picking fruits or planting seeds, reducing the manual labor required and increasing efficiency⁹.

Precision Livestock Farming: This approach uses digital technology to monitor the health and well-being of livestock, leading to better productivity and animal health. Smart sensors and AI analyze data from various sources (e.g., cameras, microphones) to monitor livestock conditions, ensuring optimal health and production levels¹⁰.

Despite the clear benefits, the adoption of smart farming technologies faces challenges, including the need for infrastructure, skills training, and overcoming barriers related to cost, privacy, and data security.

Digital Technologies for Smart Factories

The concept of the "smart food factory" embodies the application of automation and digitalization to enhance food production efficiency, safety, and quality. Among the different Industry 4.0 innovations, robots, AI, big data, cloud computing, blockchain, and smart sensors are considered the main contributors to the smart food factory.

Key technologies driving this transformation include:

Robotics and AI Integration: The food sector is increasingly relying on robotics for a variety of operations from sorting to intricate processing tasks. AI plays a crucial role in augmenting these robots' abilities to undertake complex functions and make decisions independently. For instance, the integration of smart sensors and the Internet of Things (IoT) allows for the identification of production anomalies and the swift adjustment of environmental conditions

⁸ Musa, S. F. P. D., and Basir, K. H. (2021). Smart farming: towards a sustainable agri-food system. *Br. Food J.* 123, 3085–3099. doi: 10.1108/BFJ-03-2021-0325

⁹ Rejeb, A., Rejeb, K., and Keogh, J. G. (2021). Enablers of augmented reality in the food supply chain: a systematic literature review. *J. Foodserv. Bus. Res.* 24, 415–444. doi: 10.1080/15378020.2020.1859973

¹⁰ Bao, J., and Xie, Q. (2022). Artificial intelligence in animal farming: a systematic literature review. *J. Clean. Prod.* 331, 129956. doi: 10.1016/j.jclepro.2021.129956





within production lines. Another area of notable advancement is the use of compact smart sensors employing spectroscopy to continuously monitor the quality of food products¹¹.

3D Food Printing: This technology stands at the forefront of food manufacturing innovation, attracting attention for its capability to fabricate foods in intricate shapes or from unconventional protein sources like insects, fungi, and algae. The advancement in AI and related digital technologies has unlocked the potential for 3D printing to revolutionize food design and production.

Blockchain for Enhanced Supply Chain Visibility: Blockchain technology is transforming the agri-food supply chain by bolstering transparency and traceability, ensuring the integrity of food from production to consumption. This not only secures food safety and quality but also empowers consumers with detailed insights into the origins and journey of their food. When blockchain is synergized with IoT and big data, it significantly elevates food safety transparency and enhances the satisfaction of both businesses and consumers by providing dependable information on the provenance and handling of food products¹².

IoT in Reducing Food Waste: The application of IoT in managing food waste showcases the potential of digital technologies to tackle sustainability challenges head-on. By delivering instant data on food production and waste, these innovations promote the more judicious use of resources and help in minimizing waste¹³.

The Significance of Industry 4.0 in Transforming the Agri-Food Landscape

The infusion of Industry 4.0's core tenets—interconnectivity, automation, artificial intelligence (AI), and the utilization of real-time data—is revolutionizing the agri-food domain. This transformative wave is ushering in an era of precision agriculture and intelligent manufacturing facilities, propelling the sector towards more robust and eco-friendly food systems.

Influences of Industry 4.0: The embracement of Industry 4.0's suite of technologies is pivotal in elevating food standards, safety, and traceability while also boosting profitability and curtailing waste alongside operational costs. The strategic deployment of robotics, the Internet of Things (IoT), and advanced sensing technologies plays a critical role in refining agricultural practices, safeguarding food quality, and augmenting the visibility across supply chains.

Agriculture 4.0: A Digital Renaissance: Mirroring Industry 4.0, Agriculture 4.0 epitomizes the seamless integration and digitalization of farm operations. It signifies a digital ecosystem where all facets of farming are interconnected, facilitating streamlined communication with stakeholders and automated data analytics. The advent of internet-based platforms supports

¹¹ Dzedzickis, A., Subaciute-Žemaitiene, J., Šutinys, E., Samukaite-Bubniene, U., and Bucinskas, V. (2022). Advanced applications of industrial robotics: new trends and possibilities. *Appl. Sci.* 12, 135. doi: 10.3390/app12010135

¹² Zhang, Y., Chen, L., Battino, M., Farag, M. A., Xiao, J., Simal-Gandara, J., et al. (2022). Blockchain: an emerging novel technology to upgrade the current fresh fruit supply chain. *Trends Food Sci. Technol.* 124, 1–12. doi: 10.1016/j.tifs.2022.03.030

¹³ Rykovska O. and Fraier O., Digital Technologies in Rural Economic Activity. In *Inclusive Rural Development in Ukraine*. Kyiv, Institute for Economics and Forecasting, NAS Ukraine, pp. 89-98 (2020).





the management and analysis of extensive data sets, fostering collaboration within and outside farm boundaries¹⁴.

Emergence of Smart Agriculture and Digital Farming: Underpinned by smart technologies, these paradigms represent the next frontier in agricultural innovation. Equipped with sensors, actuators, and advanced connectivity, these smart systems are at the forefront of redefining traditional farming practices.

Digital Agriculture's New Horizons: The digitalization of agriculture, propelled by the interconnected and data-driven ethos of Industry 4.0, opens up unprecedented prospects. This digital leap forward is characterized by the pervasive integration of sophisticated computational technologies, setting the stage for a data-rich agricultural environment.

Agri-Food 4.0: Bridging Innovation and Agriculture: This concept extrapolates the technological advancements of Industry 4.0 to the agricultural sphere, emphasizing the critical role of digital solutions in tackling the contemporary challenges of farming and food production. By concentrating on smart farming, streamlined logistics, and enhanced transparency, Agri-Food 4.0 highlights the imperative of adopting digital technologies for improved farm management and consumer engagement¹⁵.

In conclusion, the adoption of Industry 4.0 innovations within the agri-food sector transcends mere trend-following; it is an essential strategy for ensuring global food security and ecological sustainability. For you, the entrepreneurs and SMEs in the social economy, this transition not only promises operational excellence but also paves the way for achieving sustainable growth and environmental stewardship.

1.4 Strategic Guidance for Amplifying Green and Digital Startups

To navigate the complex landscape of digital transformation and bolster food sustainability, we recommend a strategic approach centered on inclusivity and innovation. This pathway is particularly critical for social economy SMEs and entrepreneurs aiming to make significant strides in the green and digital sectors. Here are four pivotal strategies to guide this journey¹⁶:

1. **Cultivating a Digital Mindset and Skillset:** At the core of digital integration into agriculture and the food industry lies the transformation of mindsets coupled with the enhancement of digital competencies. Priority should be given to designing and implementing training initiatives that foster knowledge exchange and continuous learning among all stakeholders. This foundational step is critical in preparing the ground for a seamless incorporation of digital solutions.

¹⁴ Colantoni A. et al, 2018, 'Smart Machines, Remote Sensing, Precision Farming, Processes, Mechatronic, Materials and Policies for Safety and Health Aspects', in *Agriculture*, 8(4)

¹⁵ Lattanzi P., 2017, 'L'agricoltura di fronte alla sfida della digitalizzazione. Opportunità e rischi di una nuova rivoluzione, *Rivista di diritto agrario*, 4, 1

¹⁶ Digital innovation ecosystems in agri-food: design principles and organizational framework. Available: <https://www.sciencedirect.com/science/article/pii/S0308521X22001949?via%3Dihub>





2. **Building Robust Digital Infrastructure:** The acceleration of digital transformation, especially in less developed regions, hinges on establishing comprehensive digital infrastructure and services. This endeavor demands significant investment and support from governmental bodies, alongside active engagement from policy makers. Ensuring universal access to digital tools and services is a cornerstone for leveling the playing field and fostering equitable growth.
3. **Fostering Interdisciplinary Collaboration:** The synergy between different scientific disciplines and the collaboration between the public and private sectors are indispensable for unlocking the full potential of digital agriculture. This holistic approach aligns with the ethos of Industry 4.0, advocating for a cross-sectoral collaboration that spans across borders, involving a wide spectrum of participants from the agri-food ecosystem. Encouraging such partnerships can catalyze the adoption of innovative technologies and practices.
4. **Implementing Effective Data Governance:** In an era where food production systems are increasingly data-driven, establishing robust data governance and cybersecurity measures is paramount. This ensures that data can be shared and utilized effectively, paving the way for informed decision-making and enhanced operational efficiency.

Five Principles for Nurturing Digital Innovation Ecosystems¹⁷:

1. **Embrace the Multi-Actor Approach:** Creating environments that foster experimentation and trust, such as living labs and sandboxes, is crucial. Innovation should be agile, responsive, and rooted in local contexts while being connected to broader networks for scalability.
2. **Pursue Technical Interoperability:** Developing a common technical framework with open standards is essential. This requires concerted efforts from standardization bodies, governmental support for public-private data integration, and the development of guides showcasing the practical application of these infrastructures.
3. **Adopt a User-Centric Design:** Innovations should be driven by the needs and insights of end-users, aiming for equitable and collaborative business models. The value of data sharing within a data economy context, along with ethical considerations, should be integral to the design process.
4. **Engage Stakeholders Effectively:** Strategic engagement of partners throughout the innovation cycle is key. Leveraging local Digital Innovation Hubs (DIHs) and sector-specific organizations can facilitate access to resources, insights, and investment, driving sustainable growth.
5. **Articulate a Shared Vision:** A unified strategy supported by key stakeholders, adaptable to the rapid evolution of digital technologies, is vital. This approach should foster synergies across projects and sectors, ensuring collective progress towards sustainable innovation.

Conclusion

Digital solutions hold immense promise for advancing sustainability in the agri-food sector. However, the challenge lies not in the technology itself but in orchestrating a cohesive and

¹⁷ Navigating the Twilight Zone Pathways towards digital transformation of food systems. Available: <https://edepot.wur.nl/552346>





effective digital innovation process. By adhering to these strategic and operational principles, stakeholders can enhance the adoption of digital technologies, driving meaningful change in the green and digital landscapes.



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SECTION 2: INCREASING COMPETITIVENESS AND SUSTAINABILITY THROUGH RENEWABLE ENERGY

2.1 Overview of Renewable Energy in SMEs: Enhancing Competitiveness through Cost Reduction

In today's economic environment, characterized by fierce competition and narrow profit margins, small and medium-sized enterprises (SMEs) increasingly recognize the necessity of cost-efficiency strategies. Among these, renewable energy, particularly solar power, is gaining traction as a sustainable avenue for reducing operational expenses and bolstering business competitiveness. Solar energy, with its wide accessibility, scalability, and considerable potential for lowering costs, is particularly appealing for SMEs aiming to diminish one of their most substantial variable expenses: electricity costs.

Leveraging Solar Power for Financial Efficiency

The shift towards solar energy offers SMEs an excellent opportunity to significantly curtail their electricity expenses, which are a considerable burden on their finances. The upfront cost of procuring and installing solar panels is quickly offset by the enduring savings on energy bills, rendering this a sound investment for businesses seeking to enhance their financial performance.

Solar Energy: A Catalyst for SME Competitiveness¹⁸

- **Autonomy from Energy Providers:** Solar energy affords SMEs greater independence from the unpredictable nature of energy prices and utility providers. By producing their electricity, businesses can protect themselves against unforeseen spikes in energy costs, thus gaining more control over their operational expenses.
- **Sustainability as a Market Differentiator:** In an era where consumer preferences are increasingly skewed towards environmentally conscious businesses, SMEs that adopt solar energy can distinguish themselves in the marketplace. This commitment to sustainability can attract a broader base of eco-aware customers, improving market competitiveness.
- **Brand Value and Customer Appeal:** In today's market, a company's commitment to sustainability can be a strong differentiating factor. SMEs that invest in green energy solutions often experience a positive shift in brand perception, appealing to a growing segment of eco-conscious consumers. This alignment with sustainability can enhance customer loyalty, attract new clients, and even open doors to partnerships with like-minded businesses. In essence, green energy adoption not only contributes to the planet's well-being but also builds a brand image that resonates with contemporary values.

¹⁸ Gąsior A., Grabowski J., Based on Eco-Innovation as a Determinant of the Energy Efficiency of the Economy, <https://www.mdpi.com/1996-1073/15/19/6965>





- **Incentives and Governmental Support:** Various incentives, including tax benefits, rebates, and grants, are available to support renewable energy adoption. These incentives not only make the transition to solar energy more economically feasible but also underscore government backing for businesses at the forefront of sustainable practices.
- **Predictability and Reliability:** The reliability and low maintenance associated with solar power systems contribute to more predictable energy costs for SMEs, unlike the volatility of traditional energy sources. This predictability aids in more accurate financial planning and budget management, enhancing business resilience.

Embracing Technological Progress

The evolution of solar technology has led to the development of more efficient, cost-effective solutions. Innovations in photovoltaic (PV) panels, energy storage, and management software have made solar energy an increasingly advantageous option for SMEs. By keeping pace with these technological advancements, businesses can optimize their solar energy systems, further diminishing energy costs and reinforcing their competitive advantage.

European SMEs, vital for economic growth, innovation, and job creation, have faced challenges due to fluctuating fossil fuel prices. There's a growing demand for substantial investments in local renewable energy projects, alongside support for SMEs to generate their power. Additionally, there's a call to eliminate administrative hurdles to enable SMEs to implement solutions that build resilience and rejuvenate their operations¹⁹.

Securing a Competitive Edge through Sustainability

The adoption of solar power transcends environmental advocacy, representing a strategic business move with the potential to enhance the competitiveness of SMEs significantly. Through cost savings, energy autonomy, improved market position, and leveraging government incentives, solar energy presents a comprehensive solution to the economic hurdles SMEs face. By committing to renewable energy, businesses not only contribute to a greener future but also cement a more robust, resilient standing in the competitive arena, aligning with initiatives like the Social Economy Action Plan, Council recommendations for social economy framework conditions, the transition pathway on proximity and social economy, and Europe's Digital Decade, which collectively advocate for sustainable, inclusive economic growth.

2.2 Adapting to Solar Energy's Seasonal Dynamics: Strategies for Social Economy SMEs

Deciphering Solar Energy's Seasonal Fluctuations

Embarking on a journey with solar energy unveils unique challenges, particularly the pronounced seasonal variations in energy output. The capacity of solar installations to generate power can diminish significantly during the winter months, at times by up to eightfold compared to summer outputs. This stark variability necessitates strategic planning to ensure your business remains operationally efficient and energy-reliant throughout the year.

¹⁹ Cooper, D. (2018), "Energising agriculture value chains for sustainable business in remote areas", http://minisites.ieep.eu/assets/2367/En-Ag_nexus_-_COP24_DCooper.pdf





Strategic Approaches to Optimize Solar Utilization

Addressing these fluctuations demands a holistic strategy aimed at bolstering energy efficiency and securing a consistent energy supply. Key strategies include:

- **Integration of Energy Storage Technologies:** Counteracting seasonal variability is achievable through energy storage solutions. Storing excess energy during periods of peak production ensures a reliable energy supply during times of diminished solar output, thus maximizing the efficacy of your solar investment.
- **Demand Side Management (DSM):** Aligning your energy consumption with periods of high solar availability can significantly bolster efficiency. Planning high-energy activities during peak solar hours and minimizing use during low production periods is streamlined with smart energy management systems, allowing for real-time adjustments based on solar output.
- **Hybrid Renewable Solutions:** Combining solar energy with renewable sources, like wind energy, creates a more reliable and diversified energy supply. This strategy offsets low solar production periods, ensuring continuous energy provision.
- **Implementation of Energy Efficiency Measures:** Reducing overall energy demand through efficiency initiatives helps alleviate the impact of seasonal variations. Adopting energy-efficient technologies and optimizing business processes reduces your energy requirements, making solar energy a more viable option year-round²⁰.

Opportunities for Innovation through Collaboration

The inherent variability in solar power production also unveils opportunities for creative collaboration and energy coordination. Engaging in energy-sharing programs or becoming part of local energy cooperatives facilitates the exchange of surplus energy, bolstering network resilience and efficiency. These collaborative efforts not only mitigate the challenges posed by seasonal shifts but also foster community engagement and collective benefit.

Harnessing Digital Technology for Enhanced Energy Coordination

Digital innovation is pivotal in advancing energy coordination efforts. Smart grids and IoT-enabled devices provide invaluable real-time data on energy generation and consumption, facilitating the efficient management of energy resources. Such technologies enable the precise balancing of energy supply with demand, optimizing solar energy use across all seasons²¹.

Conclusion: Transforming Seasonal Challenges into Strategic Gains

The seasonal variability of solar power, while challenging, also propels opportunities for strategic energy management, innovation, and operational optimization. By leveraging storage solutions, DSM, hybrid energy systems, and energy efficiency measures, your enterprise can navigate these challenges successfully. Further, embracing digital innovations and collaborative

²⁰ CEEW (2018), "Solar for irrigation: A comparative assessment of deployment strategies", www.ceew.in/sites/default/files/CEEW-Solar-for-Irrigation-Deployment-Report-17Jan18_0.pdf.

²¹ Inutu Lukonga, Harnessing Digital Technologies to Promote SMEs and Inclusive Growth in the MENAP Region, file:///Users/usa/Downloads/wpiea2020135-print-pdf.pdf





models enhances your sustainability efforts, positioning your business as a resilient and forward-thinking player in the renewable energy landscape.

Understanding and mitigating the impact of environmental factors, time of day, and seasonal shifts on solar energy output is crucial. By adapting to these dynamics, your business can ensure a steady and sustainable energy supply, contributing to the broader goals of energy resilience and sustainability outlined in the EU's Social Economy Action Plan, Council recommendations, and the Transition Pathway for the Proximity and Social Economy.

2.3 Practical Insights and EU Policy Context: Maximizing Returns from Solar Investments

Assessing Solar Energy Investments for Enhanced Financial Outcomes

Transitioning to solar energy represents a strategic investment that promises significant financial returns for your business. This segment provides a clear pathway to understanding the financial implications and benefits of integrating solar energy solutions, focusing on the crucial aspects of Return on Investment (ROI) analysis.

Critical Factors for ROI Assessment

- **Upfront Investment:** This encompasses the purchase and installation costs of solar panels, potential modifications to your facility, and grid integration expenses.
- **Operational Cost Savings:** Post-installation savings on electricity bills are pivotal. It's important to project these savings over time, considering the rising costs of traditional energy sources.
- **Government Incentives:** Acknowledge the impact of tax benefits, rebates, and feed-in tariffs that can significantly reduce initial capital outlay.
- **Maintenance Expenditure:** Account for the minimal yet essential maintenance costs of keeping your solar power system at peak efficiency.
- **Asset Depreciation:** Considering the 25-30 year lifespan of solar panels, depreciation becomes a financially advantageous element, offering tax benefits over time.
- **ROI Formula:** To ascertain ROI, the formula encapsulates the net financial gains from a solar investment against the total investment cost, expressed as a percentage²².

EU Support Framework for Solar Energy Transition

Energy efficiency and renewable energy use have been on the EU's policy agenda since the 1990s, gaining particular prominence over the past fifteen years. The current framework is ambitious, committing the European Union to a 55% reduction in CO₂ by 2030 and climate neutrality by 2050. Familiarity with EU directives and support mechanisms can substantially benefit your financial planning and strategic decision-making.

²² Tinsley E and Agapitov N., Private Sector Solutions to Helping Smallholders Succeed. Social Enterprise Business Models in the Agriculture Sector, <https://documents1.worldbank.org/curated/en/851711521095180329/pdf/124304-WP-PUBLIC-AgriBookMar.pdf>



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- **Social Economy Action Plan:** Aimed at fostering a sustainable and inclusive economy, this plan includes provisions for financial assistance to social economy enterprises investing in green technology. [Social Economy Action Plan](#)
- **Council Recommendation on Social Economy Framework Conditions:** Offers guidelines for financial support and an enabling environment for sustainable practices within the social economy sector. [Council Recommendation](#)
- **Transition Pathway for Proximity and Social Economy:** Part of the broader European Green Deal, this pathway delineates the crucial role of the social economy in achieving a sustainable economic overhaul, spotlighting renewable energy investment opportunities. [Transition Pathway](#)
- **Europe's Digital Decade:** While primarily focused on digital transformation, this policy emphasizes the synergy between digital and green innovations, offering insights into support structures for SMEs navigating this dual transition. [Europe's Digital Decade](#)
- **The Green New Deal for Europe** stands out as a comprehensive framework that addresses the climate crisis with vigor and innovation. Introduced by EC President Ursula von der Leyen in 2019, The Green New Deal integrates three pivotal pillars: Green Public Work, The Environmental Union, and the Environmental Justice Commission, setting a dynamic and proactive response to climate challenges. [The Green New Deal for Europe.](#)

Energy Efficiency Directive (EED) and Its Impact on SMEs

A cornerstone of the EU's energy policy, the [Energy Efficiency Directive \(EED\)](#), established measures to improve energy efficiency across the Member States, setting ambitious targets to be met by 2020 and extended to 2030. The directive plays a critical role in shaping the energy performance of SMEs through:

- **Energy Audits and Management Systems:** Article 8 mandates developing programs encouraging SMEs to conduct energy audits and implement energy management systems. These audits offer valuable insights into energy consumption patterns, identifying opportunities for efficiency improvements and cost savings.
- **Continuous Improvement:** The focus on energy management systems supports SMEs in adopting ongoing practices that enhance energy efficiency, directly contributing to the operational sustainability and financial viability of solar investments.

The amendment of the EED as part of the Clean Energy for All Europeans package, aligned with the ambitious goals of the European Green Deal and the ["Fit for 55%" package](#), underscores the EU's commitment to a 32.5% improvement in energy efficiency by 2030—a target subject to further upward revisions. This legislative framework not only propels SMEs towards more sustainable energy use but also provides a conducive backdrop for integrating solar energy solutions, amplifying the environmental and economic benefits of such investments.

Maximizing EU Support for Solar Energy Transition

The EU extends various financial aids and advisory services to bolster SMEs' solar energy adoption journey. These include grants, loans, and project development assistance, significantly easing the financial hurdles associated with solar energy projects.



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Direct Funding & Stimulating Investment

In the wake of the COVID-19 pandemic, the European Union has launched the [Recovery and Resilience Facility](#), a strategic initiative designed to fortify Europe's economic resilience and promote sustainability. With an allocation of 673 billion EUR in loans and grants, the Facility earmarks at least 37% of its funds for climate-focused investments and reforms. Each EU Member State has crafted a National Recovery and Resilience Plan, outlining targeted reforms and investments across seven key areas, notably renewable energy projects under "Power Up" and building renovations under "Renovate." These plans include mechanisms to assist SMEs in transitioning towards more ecological and energy-efficient operations.

Beyond this immediate response mechanism, the [European Structural and Investment Funds](#) stand as vital resources for long-term investments, particularly in supporting SMEs. The European Regional Development Fund prioritizes low-carbon economic advancements, emphasizing "a greener, carbon-free Europe" for the 2021-2027 period. The Cohesion Fund targets support for regions with a gross national income per capita below 90% of the EU average, financing energy projects that yield environmental benefits, enhance renewable energy use, or boost energy efficiency. This Fund also plays a crucial role in realizing the [Energy Union](#), facilitated by the Energy and Managing Authorities Network.

Complementing these established funds, the EU has developed novel financial tools under the [European Green Deal Investment Plan](#) (EGDIP). This plan integrates portions of the EU budget with the InvestEU Programme, aiming to attract private investments by offering guarantees to financial intermediaries that back SMEs. The European Green Deal framework introduces the [Just Transition Mechanism](#), encompassing the Just Transition Fund, the [InvestEU](#) Just Transition Scheme, and a Public Sector Loan Facility from the European Investment Bank. The Just Transition Fund specifically aids regions heavily impacted by the transition to a low-carbon economy, supporting the economic diversification of businesses and enabling SMEs to modernize carbon-intensive facilities. Member States are tasked with formulating Territorial Just Transition Plans, which require the European Commission's approval to access these funding instruments.

These initiatives represent the EU's comprehensive approach to not only recover from the pandemic's economic impacts but also to ensure a sustainable, inclusive future for its economies, particularly benefiting SMEs in the social economy sector.

Addressing market barriers

The EU's [Financial Instrument for the Environment](#) (LIFE) program stands as a cornerstone in the union's funding strategy, particularly for environmental and climate action projects. This initiative, which has a rich history of supporting the European environmental policy framework, is specifically designed to bolster SMEs and corporations in their green transition efforts. For the 2021-2027 cycle, the LIFE program is set to play a pivotal role in facilitating the shift towards a low-carbon economy. Within its "[Clean Energy Transition](#)" sub-program, the focus will be on overcoming market obstacles to expedite the adoption of innovative technologies, digital transformation, novel services and business models, while also boosting the market's professional competencies in energy efficiency and renewable energy solutions on a smaller scale. The inaugural calls under this program are anticipated to launch in 2021.



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In addition, the EU is rolling out the [Single Market Programme](#) (SMP), a successor to the COSME program, crafted to enhance the competitive edge of SMEs. The SMP aims to streamline access to financing and international markets for small and medium-sized enterprises, offering tailored advice on navigating the low-carbon transition. This support is extended through the [Enterprise Europe Network](#), ensuring SMEs are well-equipped to adapt and thrive in an evolving market landscape focused on sustainability.

These initiatives reflect the EU's commitment to not only advancing environmental goals but also to ensuring that SMEs are central to this transformative journey. Through targeted support and resources, these programs are designed to empower entrepreneurs in the social economy space to innovate and lead in the transition towards a more sustainable and low-carbon future.

Technical assistance and knowledge sharing

In addition to the financial backing available, a broad spectrum of advisory services stands ready to assist. Among the most notable is the [European Local Energy Assistance](#) (ELENA), a facility offering grants for technical assistance to both public and private entities. This support encompasses the development of technical studies, execution of energy audits, and provision of legal consultation. Furthermore, the European Commission extends [Technical Assistance](#) for the effective implementation of Commission-funded programs. This aid is accessible upon request by Member States within their European Regional Development Fund (ERDF), Cohesion Fund (CF), and European Social Fund (ESF) Operational Programmes, aimed at enhancing the capabilities of authorities and beneficiaries in managing and utilizing the funds more efficiently. This suite of advisory services is designed to empower social economy SMEs and entrepreneurs, providing them with the tools and knowledge necessary to navigate the complexities of funding utilization and project implementation.

Conclusion: Strategic Financial and Environmental Synergy

In the quest for environmental sustainability within the agri-food sector, the integration of renewable energy stands out as a financially astute and strategically beneficial move. This initiative aligns perfectly with the European Union's vision for a sustainable and robust economy, demonstrating that investing in renewable energy not only champions ecological stewardship but also heralds a sound financial strategy.

A critical challenge confronting the global agri-food system is the inefficiency marked by the startling fact that approximately one-third of all food produced is never consumed. This inefficiency translates into a colossal waste of energy throughout the food supply chain, contributing significantly to environmental degradation. The irony of food waste piling up in landfills, where it emits methane—a potent greenhouse gas—without any energy recovery, underscores the urgency of rethinking our energy use in food production, storage, and distribution.

Renewable energy, particularly through innovative food-energy systems, offers a comprehensive solution. These systems not only bolster energy and food security but also create employment opportunities, support gender equality, and enhance climate resilience.



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The synergy between renewable energy and the agri-food sector is pivotal for achieving the Sustainable Development Goals and fulfilling the Paris Agreement on Climate Change.

The adoption of renewables in the agri-food sector can significantly mitigate its environmental impact. For instance, decentralized cold storage powered by renewable energy can dramatically reduce food loss and waste by preserving perishables for smallholder farmers and isolated fishing communities. Moreover, renewable energy sources like solar and wind can power environmentally friendly packaging processes, reducing the carbon footprint of food packaging.

Sustainable bioenergy plays a crucial role in this transition. Agri-food by-products, such as crop residues and livestock manure, can be transformed into valuable sources of bioenergy, providing electricity, heat, and transport fuels. This not only utilizes waste effectively but also reduces dependency on fossil fuels, closing the loop in a truly circular economy.

The decentralized nature of renewable energy solutions means they are uniquely suited to meeting the diverse energy needs of the agri-food sector sustainably, affordably, and securely. From powering irrigation systems to processing facilities, renewable energy can transform the entire value chain.

By embracing renewable energy, agri-food SMEs and entrepreneurs can achieve substantial socio-economic benefits, addressing the twin challenges of climate change and food security. Furthermore, investing in renewables offers a path to financial sustainability. Through careful return on investment analysis and tapping into EU support mechanisms, businesses can confidently transition to solar energy and other renewables, ensuring long-term profitability and environmental stewardship.

In conclusion, leveraging renewable energy in the agri-food sector is not merely an environmental imperative but a strategic financial decision. This transition promises to reduce waste, lower emissions, and foster a more resilient and sustainable food system. As we move forward, the integration of renewable energy into agri-food practices will be crucial for building a greener, more sustainable future.

2.4 Best Practices and Case Studies: Shining Examples of Renewable Energy in SMEs

The transition to renewable energy is not just a trend; it's a strategic move towards sustainability, cost reduction, and enhanced business resilience. Within this landscape, numerous SMEs have emerged as pioneers, demonstrating that renewable energy is not only viable but also profitable. Let's explore some illustrative examples and distill the best practices that have steered these enterprises towards success.

Case studies: Increasing the competitiveness and sustainability of enterprises through the implementation of renewable energy sources.



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Farming enterprise 'Veles Vita'

In a pioneering initiative, Veles Vita, an esteemed farming enterprise, embarked on a journey to revolutionize its energy consumption through the integration of renewable energy sources. This case study exemplifies how renewable energy, specifically solar power, can significantly contribute to greening the agri-food sector, delivering both environmental and economic benefits.

Project Objectives: Veles Vita set forth an ambitious goal to reduce its reliance on conventional electricity by harnessing the power of the sun. The primary objective was to construct a solar power plant capable of generating 60 kW, with a future expansion option to 120 kW. This initiative aimed not only to fulfill the internal energy requirements of the farm but also to set a benchmark for sustainability in the agri-food sector.

Implementation Process:

1. **Needs Assessment and Technical Evaluation:** The initial phase involved a comprehensive analysis of Veles Vita's specific needs and the technical feasibility of the project. Understanding the unique energy requirements of the farm and assessing the terrain conditions were crucial for tailoring a bespoke solution.
2. **Design and Planning:** A custom-designed solar power solution was developed to align with the farm's operational needs and the geographical layout. Special attention was given to optimizing the solar field's placement on a pitched roof to maximize sunlight capture.
3. **Regulatory Compliance and Documentation:** Navigating the legal landscape, we secured all necessary documents and permits, ensuring the project adhered to regulatory standards and received the green light for construction.
4. **Installation and Testing:** The solar panels were meticulously installed on the facility's roof, followed by the system's connection and integration. Rigorous testing was conducted to fine-tune the setup for optimal performance and reliability.
5. **Innovation in Lighting:** Recognizing the specific requirements of agri-food operations, we developed and tested unique lamps suitable for food facilities. These lighting solutions passed stringent sanitary and epidemiological evaluations, marking a significant advancement in farm lighting technology.

Amplifying Green Benefits:

The Veles Vita project serves as a beacon of how renewable energy can revolutionize the agri-food sector. By transitioning to solar power, the enterprise not only slashed its carbon footprint but also paved the way for a more sustainable and cost-effective energy solution.

This greening effort:

- Reduces greenhouse gas emissions, contributing to global efforts to combat climate change.
- Lowers energy costs, translating into financial savings and improved competitiveness in the agri-food market.



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- Demonstrates a commitment to environmental stewardship, enhancing the brand's reputation and appeal to eco-conscious consumers.
- Promotes energy independence, reducing vulnerability to fluctuations in energy prices and supply disruptions.

In total, the SPP project took 18 working days to complete and the technical specifications of the plant were as follows:

- Power of the SPP (inverter) - 100 kW;
- Solar field capacity - 60 kW;
- The area of solar modules is 280 sq.m;
- Power of one module - 550 W;
- Type (module) - Monocrystalline;
- Additional load on the roof - 13kg/m.sq;
- Tilt angle - 20 degrees;
- Orientation - South

Conclusion:

Veles Vita's successful integration of solar energy underscores the vast potential of renewable energy in fostering sustainable agri-food systems. For social economy SMEs and entrepreneurs, this case study illustrates the tangible benefits of embracing green energy solutions. By investing in renewable energy, agri-food enterprises can achieve not only environmental and economic gains but also position themselves as leaders in sustainability. The Veles Vita project is a compelling example of how innovation, when aligned with sustainability goals, can create resilient and eco-friendly agri-food systems for the future.

Greenhouse farm 'Plantex'

In a landmark project aimed at ushering in a new era of sustainability, Plantex LLC embarked on a transformative journey to integrate renewable energy into its operations. This case study highlights the pivotal role that solar power plays in advancing the greening of the agri-food sector, showcasing the environmental and economic benefits of such initiatives.

Project Overview:

Plantex LLC set forth with a clear vision to reduce its dependence on traditional energy sources by harnessing solar power. The project's ambitious goals were twofold:

1. Construction of Two Solar Power Plants:
 - A 32.4 kW plant operating under a green tariff, designed to directly offset a portion of the company's electricity demand without solar power storage.
 - A 50 kW hybrid power plant equipped with battery storage, offering enhanced flexibility and energy security.

Execution Highlights:



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1. **Strategic Planning and Design:** A meticulous analysis of Plantex's specific needs and the site's characteristics laid the groundwork for a tailored solar power solution. This step was critical in designing systems that perfectly align with the greenhouse farm's operational requirements and spatial constraints.
2. **Legal and Regulatory Compliance:** Navigating the intricacies of legal and regulatory requirements, we secured all necessary documentation and permits, ensuring a smooth transition to solar energy.
3. **Installation and Optimization:** The solar panels were strategically installed on the facility's pitched roof, maximizing exposure to sunlight. Subsequent testing and fine-tuning of the systems ensured their optimal performance and reliability, setting a benchmark for efficiency in renewable energy applications in agriculture.

Amplifying Green Benefits:

The integration of solar energy into Plantex's greenhouse operations marks a significant stride towards sustainable agri-food production. This initiative not only demonstrates a commitment to environmental stewardship but also yields tangible benefits:

- **Reduced Carbon Footprint:** Transitioning to solar power significantly lowers greenhouse gas emissions, aligning with global efforts to mitigate climate change.
- **Operational Cost Savings:** Leveraging renewable energy translates into substantial savings on energy costs, enhancing the financial sustainability of agri-food operations.
- **Energy Independence:** The adoption of solar power, especially with the hybrid system's battery storage, fosters resilience against energy price volatility and supply disruptions.
- **Sustainability Leadership:** Plantex sets an exemplary standard for the agri-food sector, illustrating the feasibility and advantages of green energy solutions in agricultural settings.

In total, it took 14 working days to implement the Green Tariff project and the technical specifications of the station were as follows:

- SPP (inverter) power - 27 kW;
- Solar field capacity - 32.4 kW;
- The area of solar modules is 140 sq.m;
- Power of one module - 540 W;
- Type (module) - Monocrystalline;
- Additional load on the roof - 13kg/m.sq;
- Tilt angle - 20 degrees;
- Orientation - South

It took 18 working days to implement the Hybrid Station project and the technical characteristics of the station were as follows:

- Power of the SPP (inverter) - 50 kW;
- Solar field capacity - 50 kW;
- Battery capacity - 5.12 kwh
- The area of solar modules is 160 sq.m;
- Power of one module - 540 W;



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- Type (module) - Monocrystalline;
- Additional load on the roof - 14kg/m.sq;
- Tilt angle - 20 degrees;
- Orientation - South

Conclusion:

The Plantex greenhouse farm case study underscores the transformative potential of renewable energy in the agri-food sector. For social economy SMEs and entrepreneurs, this narrative serves as an inspiration and a guide on integrating sustainable practices into their operations. By embracing renewable energy, agri-food enterprises can achieve environmental goals, realize economic gains, and position themselves as frontrunners in the journey towards a more sustainable and resilient food system. The success of Plantex illuminates the path for others in the sector to follow, promising a greener future for our planet.

Key Takeaway: Diversify your energy portfolio with solar power to reduce costs and appeal to a broader customer base. The commitment to renewable energy can become a unique selling proposition that differentiates your brand in a crowded market.

Case studies: Reducing energy consumption and reducing electricity bills through the implementation of automated systems for collecting and analyzing detailed data in energy management at agri-food enterprises

Lviv Bread Plant No. 1 'Concern Khibprom' PJSC

<https://hlibprom.com.ua/>

Lviv Bread Plant No. 1, under 'Concern Khibprom' PJSC, embarked on an ambitious project to enhance its energy efficiency and integrate sustainable practices into its operations. This initiative, spanning two phases in 2016 and 2017, exemplifies the profound impact of integrating renewable energy solutions and advanced metering systems in greening the agri-food sector. Tailored for social economy SMEs and entrepreneurs, this case study sheds light on the transformative benefits of adopting green technologies.

Project Implementation:

The project unfolded in two strategic phases, each aimed at incrementally enhancing the plant's energy management systems:

- **Phase One:** Focused on establishing an advanced electricity metering infrastructure, the first phase involved:
 - Crafting detailed project documentation for system construction.
 - Installing 50 multifunctional FRER electricity meters and integrating them into a unified computer network.
 - Developing and deploying a Vijeo Citect SCADA system configuration (now AVEVA Plant SCADA) alongside requisite workstation software, including a



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PostgreSQL database and Jasper Report Server BI system for comprehensive energy consumption monitoring.

- **Phase Two:** Aimed at broadening the scope to include gas and heat metering, this stage encompassed:
 - Preparing project documentation for the system's expansion.
 - Integrating additional meters for gas (18) and heat (4) into the system.
 - Enhancing the SCADA server with additional screens and reports for a more granular analysis of gas, heat, and production metrics.

Outcomes and Benefits:

The project's successful implementation yielded significant results, setting a precedent for sustainable practices in the agri-food industry:

- **Enhanced Resource Management:** By facilitating distributed metering of electricity, gas, and heat consumption, the plant can now accurately attribute energy costs to specific products, fostering greater transparency and accountability in energy use.
- **Operational Efficiency:** The system's granular reporting capabilities empower the plant to identify and mitigate excessive energy consumption areas without compromising production processes.
- **Strategic Energy Consumption:** The ability to analyze energy consumption patterns enables the plant to optimize its production schedule according to time-differentiated energy pricing, resulting in substantial cost savings and more environmentally conscious operations.

Amplifying Green Benefits:

This case study underscores the pivotal role of renewable energy and efficient metering in greening the agri-food sector. By adopting such technologies, agri-food SMEs and entrepreneurs can significantly reduce their environmental footprint, enhance operational efficiency, and contribute to a more sustainable food system. Moreover, these initiatives align with global sustainability goals and consumer expectations for eco-friendly practices, bolstering the competitive edge of businesses in the agri-food sector.

In conclusion, the Lviv Bread Plant's proactive approach to energy management and sustainability serves as an inspiring model for the agri-food industry. By leveraging renewable energy technologies and advanced metering, businesses can achieve not only economic benefits but also advance their sustainability agenda, paving the way for a greener, more resilient future in agri-food production.

Key Takeaway: Implementation of technological solutions in energy management involving digitalisation of processes allows to reduce production costs and heat energy emissions.

For up-to-date best practices, case studies, and guidance on renewable energy implementation within SMEs, consider exploring the following sources:

1. **International Renewable Energy Agency (IRENA) Publications:** IRENA offers a wealth of reports and case studies on renewable energy across various sectors, including SMEs.



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Their resources can provide insights into successful implementations of renewable energy projects around the world.

- Visit: <https://www.irena.org/publications>
- 2. **European Commission - Energy:** The European Commission's energy section provides information on policies, funding opportunities, and best practices for renewable energy in the EU, focusing on supporting SMEs in their transition to green energy.
 - Visit: <https://ec.europa.eu/energy/>
- 3. **Clean Energy for EU Islands Secretariat:** While focused on islands, this initiative offers inspiring examples of renewable energy projects that SMEs can learn from, demonstrating innovative approaches to energy independence and sustainability.
 - Visit: <https://euislands.eu/>
- 4. **The Business Renewables Centre (BRC) Europe:** BRC Europe provides tools, resources, and a platform for businesses, including SMEs, to engage in renewable energy projects, offering case studies and best practices.
 - Visit: <https://www.brc-europe.com/>
- 5. **Sustainable Energy for All (SEforALL):** This organization works with leaders in government, the private sector, and civil society to drive further, faster action toward the achievement of Sustainable Development Goal 7 (SDG7), which includes ensuring access to affordable, reliable, sustainable, and modern energy for all.
 - Visit: <https://www.seforall.org/>

Crafting Your Path to Renewable Success

These case studies illuminate the path for SMEs considering renewable energy solutions. Here are actionable strategies inspired by these success stories:

1. **Conduct a Feasibility Study:** Before embarking on your renewable energy journey, assess the specific needs of your business and the potential return on investment. Consider factors like location, available space for installations, and local government incentives.
2. **Leverage Financial Incentives:** Many governments offer subsidies, tax breaks, or other incentives to encourage renewable energy adoption. Explore these opportunities to offset initial setup costs.
3. **Engage Your Stakeholders:** Communicate your sustainability goals and achievements to your customers, employees, and partners. This not only boosts your brand but also encourages a culture of environmental responsibility.
4. **Monitor and Adapt:** Renewable energy technology is rapidly evolving. Stay informed about new advancements and be prepared to adapt your strategy to incorporate more efficient solutions over time²³.

Conclusion

The journey towards renewable energy adoption is unique for every SME. Yet, the underlying principles of strategic planning, leveraging incentives, engaging stakeholders, and staying adaptable are universally applicable. By drawing inspiration from these case studies, you can

²³ Renewable Energy as a Path to Resilience. SME Perspectives on the Energy Crisis July 2023, https://beyondfossilfuels.org/wp-content/uploads/2023/07/BFF_SME-EnergyCostsSurvey_Final.pdf





navigate the complexities of renewable energy implementation and position your business as a leader in sustainability and innovation.



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SECTION 3: NAVIGATING THE GREEN TRANSITION: A ROADMAP FOR SOCIAL ECONOMY SMES AND ENTREPRENEURS

Understanding the Green Economy Transition

The shift towards a green economy marks a deliberate move to intertwine environmental sustainability with economic activities and social well-being. This transition is characterized by efforts to lower carbon emissions, enhance resource efficiency, and shift towards renewable energy sources. Its goal is to achieve a symbiotic relationship between economic progress and environmental stewardship.

The Advantages of Embracing a Green Economy

The journey towards a green economy is laden with benefits that span environmental, economic, and operational dimensions:

- **Environmental Impact:** By curbing reliance on fossil fuels and investing in renewables, we contribute to climate change mitigation, ecosystem preservation, and biodiversity protection. This proactive stance ensures a healthier planet for future generations.
- **Economic Innovation:** The green economy spurs innovation and opens up new avenues for sustainable technology development. This transition not only catalyzes job creation in renewable energy, eco-construction, and waste management but also propels long-term economic resilience and growth.
- **Operational Efficiency:** Companies that adopt green practices realize significant cost savings through improved resource use, waste reduction, and energy efficiency. Embracing circular economy models not only trims operational costs but also bolsters competitive advantage²⁴.

The SME Perspective: Challenges and Opportunities

For SMEs, the path to greening involves unique challenges and opportunities. These entities often grapple with limited awareness and understanding of environmental impacts and green practices. Additionally, the initial costs and uncertainties associated with environmental technologies can be daunting, compounded by a general focus on short-term gains and a constrained capacity for implementing necessary changes.

However, SMEs inherently possess agility and a capacity for rapid adaptation, potentially outpacing larger enterprises in adopting innovative technologies. The key hurdles include a limited understanding of the benefits tied to green investments and the perennial challenge of accessing finance for such ventures.

Strategic Recommendations for Facilitating Green Transition

1. **Enhancing Access to Green Finance:** Streamlining access to funding for green initiatives is vital. This entails developing efficient financial mechanisms, such as green loans and

²⁴ Gribincea C., Gribincea A., Gribincea A. "GREEN ECONOMY" – THE FUTURE OF WORLD ECONOMY", December 2019, Market economy modern management theory and practice 18(3(43)):42-52, DOI:10.18524/2413-9998.2019.3(43).183630





incentives, and fostering partnerships with financial institutions that understand the unique needs and potential of SMEs in the green sector.

2. **Promoting Green Markets and Value Chains:** Governments can stimulate demand for green products and services through green public procurement policies and by encouraging sustainable corporate value chains. Tax incentives and tariff reductions for sustainable equipment investments can further bolster the business case for green practices.
3. **Navigating Risks and Regulations:** Transitioning to a green economy involves upfront investments in sustainable technologies, infrastructure upgrades, and workforce retraining. Strategic planning and engagement with regulatory frameworks are essential to mitigate these risks and capitalize on the long-term benefits of sustainable investments²⁵.

Mitigating Transition Risks

While the shift towards a green economy is laden with promise, it is crucial to acknowledge and manage inherent risks. High initial costs, the need for strategic realignment, and compliance with evolving regulatory landscapes are significant considerations. Yet, with thoughtful planning and a commitment to sustainability, these challenges can be navigated successfully.

Conclusion:

The transition to a green economy presents a transformative opportunity for businesses, especially SMEs, to drive environmental sustainability, economic growth, and social well-being. Despite the challenges, the potential rewards — from operational efficiencies to innovation and market expansion — are immense. As such, both businesses and policymakers must collaborate to forge an enabling environment that encourages and supports the green transition, ensuring a sustainable and prosperous future for all.





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Capacity building on Greening Agrifood in Social Economy

Clusters of Social and Ecological Innovation (CSEIs) and European Digital Innovation Hubs (EDIHs)

TRAINING MATERIAL

Date of the training: 27 June 2024

Venue: online (Zoom)

Training number: GAINS WP2-CB / 3.

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Abbreviations

CAP	Common Agricultural Policy
DISC	Digital Innovation and Scale-up Initiative
DMA	Digital Maturity Assessment
EAFRD	European agricultural fund for rural development
EEN	Enterprise Europe Network
EC	European Commission
ECR	European Committee of the Regions
EDIH	European Digital Innovation Hub
EIC	European Industrial Clusters
EU	European Union
ECCP	EU Cluster Collaboration Platform
GECEs	Commission Expert Group on the Social Economy and Social enterprises
ICC	Intelligent Cities Challenge
JRC	Joint Research Centre
LAGs	Local Action Groups
NEB	New European Bauhaus
PA	Public Administration
PPC	Public-Private-Collaboration
PPP	Public-private partnership
PTCE	Pôles territoriaux de coopération économique
RDPs	Rural Development Programmes
R&D	Research & Development
SDG	Sustainable Development Goals
SE	Social Economy
SEOs	Social Economy Organizations
SME	Small and medium enterprise
UNIDO	United Nations industrial Development Organisation

1. Green Deal Going Local

The European Commission (EC) has set the ambitious target of making Europe the world's first climate-neutral continent by 2050. The European Green Deal¹ provides the roadmap to achieving this impressive goal. An extensive transformation across all aspects of society is required, facing major environmental, economic, and social challenges. Partnerships help drive the huge transformations in environment, society, and economy that the European Green Deal calls for².

The scale of the challenges proposed by the Green Deal demands a multilevel approach to link up policy domains going deep into governance levels, where all the policy areas of the Green Deal are integrated into a defined spatial region. Therefore, the European Green Deal needs to be linked to the governance level closest to the citizens.³

Central to achieving the European Green Deal's ambitious goal is the empowerment of local and regional authorities. These authorities play a crucial role in translating high-level policy objectives into practical, actionable initiatives. One of the core components of this effort is the "Green Deal Going Local" initiative⁴. This initiative aims to inspire and accelerate the clean energy transition while fostering a just and sustainable recovery. It underscores the importance of partnerships and the development of Local Green Deals to mobilize local resources and expertise effectively. Local implementation ensures that the policies are adapted to the unique needs and characteristics of each region, making the transition more relevant and effective for the citizens.

Local implementation is even more critical for rural areas and the agricultural sector. These regions are intimately connected with the specific typology of the soil, climate, and all natural, not only cultural resources. Tailoring policies to the unique characteristics of rural areas ensures that agricultural practices align with environmental sustainability and local conditions, making the transition to climate neutrality both practical and impactful. One of the key actions highlighted in the Common Agricultural Policy (CAP) reform is the enhancement of partnerships. The CAP 2023-27 aims to strengthen the position of farmers in the supply chain and boost the competitiveness of the agri-food sector by improving bargaining power. New rules reinforce producer cooperation, encouraging farmers to work together and enabling them to create countervailing power in the market⁵.

¹ European Commission. (2019). Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, and the Committee of the Regions- The European Green Deal. European Commission. Available at https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF. Accessed 13 June 2024

² European Commission (n. d.). Research and innovation for the European Green Deal. Available at https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/environment-and-climate/european-green-deal_en. Accessed 13 June 2024

³ Ibidem note 1

⁴ European Committee of the Region (n.d.) Green Deal Going Local. Available at https://cor.europa.eu/en/engage/Pages/green-deal.aspx?utm_source=SharedLink&utm_medium=ShortURL&utm_campaign=Green%20Deal%20Going%20Local#:~:text=Green%20Deal%20Going%20Local%20aims,take%20action%20on%20climate%20change. Accessed 13 June 2024

⁵ European Commission (n.d.). The common agricultural policy: 2023-27. Available at https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cap-2023-27_en. Accessed 13 June 2024

The goals of the Local Green Deal are multifaceted, aiming to empower Europe's local and regional leaders to take decisive action on climate change. This includes accelerating the uptake of EU funds by local and regional authorities, showcasing adaptation and mitigation efforts across EU regions, cities, and villages, and improving EU policymaking to amplify the voices of cities and regions.

A critical aspect of implementing local green deals is creating new integrated governance and management structures that incorporate multidisciplinary values—environmental, economic, and social—to support sustainable decision-making and policy development. For example, partnerships that deliver concrete actions through collaboration agreements can align local plans, strategies, and policies with climate neutrality and sustainability goals.

Partnerships play a strategic role in the Local Green Deals' implementation. A multi-stakeholder approach ensures that public, private, community, and voluntary sectors collaborate across the city's industrial ecosystems to achieve common goals.

In the agri-food sector, partnerships are crucial for supporting farmers and agricultural communities in complying with European Green Deal regulations and reducing administrative burdens. The European Committee of the Regions (ECR) has emphasised the need to increase support for farmers, which can be facilitated by regionalizing the management of the CAP. This approach better addresses the unique challenges faced by farmers, promoting environmental sustainability over hectare-based direct payments. Supporting smaller producers and rural development aligns with the European Green Deal's goals of creating a sustainable and resilient agricultural sector.

Rural areas, often referred to as the beating heart of Europe's sustainable food systems, play a pivotal role in the European Green Deal.⁶ These regions face unique challenges and opportunities in contributing to the Green Deal's objectives. The vision for rural areas includes thriving ecosystems, clean air and water, and sustainable agricultural practices that align with agroecology principles.

Recently, the role of the proximity and social economy ecosystem in revitalizing rural areas has gained significant attention. These ecosystems engage local communities in decision-making through inclusive, bottom-up approaches, bringing about sustainable change. Social Economy Organisations (SEOs) are at the heart of this transformation, connecting rural communities with broader networks to share ideas, adapt knowledge, and mobilize resources effectively.⁷

The EC has recognised the potential of these initiatives, aligning them with the goals of the European Green Deal. A key component of this alignment is the New European Bauhaus (NEB), which acts as the soul of the European Green Deal. The NEB, an interdisciplinary initiative, connects the European Green Deal to our living spaces and experiences, emphasising the aesthetic and functional aspects

⁶ European Commission (n.d.) Agriculture and the Green Deal. Available at https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/agriculture-and-green-deal_en . Accessed 13 June 2024

⁷ Costantini et al (2021). Empowering rural communities through social and solidarity economy: Observation and case study. Diesis Network. Available at https://www.diesis.coop/wp-content/uploads/2022/02/Ciriec_Paper_Empower-Rural-Community_AC_Final_edited0701-1.pdf . Accessed 13 June 2024

of sustainable living. This initiative encourages the integration of design, sustainability, and inclusivity, promoting a holistic approach to the European Green Deal that encompasses environmental, economic, cultural, and social aspects. The NEB aims to create beautiful, sustainable, and inclusive spaces, enhancing quality of life and fostering community engagement in the transition towards sustainability.⁸

Moreover, the Intelligent Cities Challenge (ICC) has developed "Local Green Deals – A Blueprint for Action"⁹ to guide cities and towns in implementing the European Green Deal locally. This blueprint provides a step-by-step guide for cities to build momentum and scale up their Local Green Deals, emphasizing the importance of integrated governance, collaborative action, and multi-stakeholder partnerships. By leveraging local capacities and resources, cities can create synergies between their LGDs and existing sustainability policies, ensuring a coherent and effective approach to achieving climate neutrality. This blueprint outlines key elements cities need to deliver the European Green Deal at the local level:

- **Governance:** New integrated and multidisciplinary governance considering environmental, economic, and social values leading to sustainable decision-making and policy development.
- **Action:** A collaborative approach where local partnerships deliver concrete action through collaborative agreements.
- **Integrated goals:** Strategies and policies that bring together targets, local plans, partnerships, funding, and initiatives to ensure climate neutrality and sustainability.
- **Partnership:** A multi-stakeholder approach, where public, private, community, and SEOs cooperate to reach common goals. The setting up of partnerships for the development of local green deals with multilevel governance of strategies, initiatives, and financing issues through vertical (national, regional, and local government) and horizontal cooperation of local actors.

⁸ For more information about the New European Bauhaus, please visit https://new-european-bauhaus.europa.eu/index_en. Accessed 13 June 2024

⁹ European Commission, Durieux, E., Hidson, M., (2021) Local green deals – A blueprint for action – The European Commission's 100 intelligent cities challenge, Publications Office, 2021, <https://data.europa.eu/doi/10.2826/94389>

2. Building Resilience Through Partnerships

2.1 Introduction

On March 10, 2020, the EC introduced a new EU industrial strategy¹⁰ aimed at positioning the European industry at the forefront of both green and digital transformations. The strategy's objective was to enhance the EU's global competitiveness and promote strategic autonomy.

Learning from the COVID-19 pandemic, the Commission updated its strategy in May 2021¹¹ to strengthen the resilience of key industrial networks by initiating transition pathways. In its policy document on the digital and green transition facilitators, the EC identified emerging mega-trends in consultation with stakeholders, emphasising their impact on the ecosystem's resilience. The document highlighted the potential for collaboration between mainstream businesses and the Social Economy (SE) through "cross-fertilization."

During the collaborative process of developing the transition pathway of the proximity and social economy ecosystem¹², stakeholders extensively discussed the potential for cooperation between mainstream businesses and/or public authorities and the SE. The rise of 'impact or mission-led' enterprises and private initiatives for self-recognition presents opportunities for fostering advanced forms of cooperation. Promoting 'business partnerships on an equal footing' with shared objectives has become crucial to establishing equitable ground between mainstream and SEOs. However, numerous barriers hinder more advanced forms of collaboration, such as challenges in integrating business models and undertaking mergers and joint ventures. Stakeholders identified root causes like 'inequality of power,' differences in governance models, divergent mission objectives, and differences in scalability that obstruct cooperation. Raising awareness and changing perceptions among mainstream businesses about the potential benefits of SE models, especially regarding economic performance and sectoral value addition, is vital for fostering such partnerships. Achieving this requires ensuring that SEOs have access to business support that will enable them to form or enhance existing partnerships. Further, national recognition of cooperative and participatory business models would improve the visibility of the products and services offered by SEOs.

¹⁰European Commission (2020), Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, A New Industrial Strategy for Europe, COM(2020) 102 final.

¹¹ European Commission (2021), Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, Updating the 2020 New Industrial Strategy: Building a Stronger Single Market for Europe's recovery, COM (2021) 350 final.

¹² European Commission (2022) Transition pathway for Proximity and Social Economy Ecosystem. Available at <https://ec.europa.eu/docsroom/documents/52015>. Accessed 13 June 2024

Integrating social and circular goals in the purchasing policies of mainstream businesses would further support this collaboration. To achieve this, SEOs must have access to the same business support available to mainstream businesses. The role of business communities, such as sector organizations, chambers of commerce, incubators, and entrepreneurs, is not just significant, but pivotal in achieving this. Besides national and regional initiatives, as well as EU business support initiatives like the Enterprise Europe Network (EEN) and the EU Cluster Collaboration Platform (ECCP), were identified, although they are not yet fully utilised by ecosystem stakeholders.

Building partnerships involves multiple stages influenced by specific ecosystem factors and the parties' circumstances. Mainstream businesses can contribute to green or digital transition initiatives by designing intelligent solutions that operate in harmony with the ecosystem, ensuring that their role is effective, consistent, and aligned with the overall ecosystem perspective.

2.2 Exploring Partnership Models

As highlighted in previous discussions, fostering 'business partnerships on an equal footing' is essential for establishing equitable collaboration and achieving shared objectives. In this subchapter, various models of partnership will be explored that exemplify how mainstream businesses and SEOs can effectively collaborate to enhance economic performance, support sustainability goals, and contribute to the resilience of our industrial ecosystems.

From Triple to Quintuple Helix

The development of innovation systems has produced increasingly intricate models that integrate various societal sectors. Commencing with the Triple Helix, these models have expanded to include the Quadruple and Quintuple Helix frameworks, each introducing additional layers of interaction and contextual elements essential for fostering sustainable and inclusive growth. The interaction among academia, industry, and government is crucial for developing digital technologies and green solutions. Universities provide research and expertise, industries drive technological advancements, and governments create supportive policies and regulations. Including civil society ensures that digital and green transitions are inclusive and address the needs of all societal groups. Public engagement through media and cultural institutions fosters a more democratic approach to innovation¹³.

The **Triple Helix** model, pioneered by Henry Etzkowitz and Loet Leydesdorff¹⁴, delineates the relationship and interactions among three essential institutional spheres: academia (universities), industry (businesses), and government. These sectors collaborate to propel innovation and knowledge production. Initially proposed in the 1990s, the Triple Helix model underscores the dynamic interactions and hybrid organizations that emerge from the collaboration between

¹³ Elias G. Carayannis & David F. J. Campbell & Evangelos Grigoroudis, (2022). "Helix Trilogy: the Triple, Quadruple, and Quintuple Innovation Helices from a Theory, Policy, and Practice Set of Perspectives," *Journal of the Knowledge Economy*, Springer;Portland International Center for Management of Engineering and Technology (PICMET), vol. 13(3), pages 2272-2301, September.

¹⁴ Leydesdorff, L., & Etzkowitz, H. (2003). Can 'the public' be considered as a fourth helix in university–industry–government relations? Report on the Fourth Triple Helix Conference, 2002. *Science and Public Policy*, 30(1), 55–61.

universities, industries, and governments. It reflects a shift from a linear innovation model to a more interactive, application-oriented approach. The Triple Helix model accentuates the significance of trilateral networks and hybrid organizations in establishing a robust national innovation system. It facilitates the development of policies and strategies that enhance innovation capacity by harnessing the synergies among academia, industry, and government.

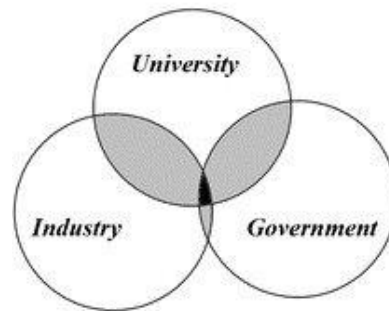


Fig. 1 Triple Helix model. Source Etzkowitz and Leydesdorff, 2003

The **Quadruple Helix model** expands on the Triple Helix by adding a fourth component: civil society. This component encompasses citizens, media, and cultural institutions, emphasizing the role of public engagement and societal context in the innovation process. Developed by Elias G. Carayannis and David F. J. Campbell¹⁵, the Quadruple Helix emerged in the early 2000s, reflecting the growing recognition of the societal dimension in innovation systems. It integrates the civil society and cultural and democratic aspects of knowledge production and application.

The Quadruple Helix model broadens the innovation landscape to include public perspectives, democratic values, and cultural contexts. This approach enriches the inclusivity and relevance of innovation activities, ensuring that they address societal needs and contribute to the knowledge society and democracy. Quadruple helix collaborations, throw up innovation through interactive processes in which different groups of actors coming from the four main categories of players contribute with their knowledge due to their function in society¹⁶. One of the results is the formalisation of the civil society's role that pushes a more transparent innovation process enabling responsible research and innovation. Definitively, innovation processes become more open through the belief that different stakeholders in society jointly and actively are part of creating new ways of innovating.

¹⁵ Carayannis, E. G., & Campbell, D. F. J. (2009). "Mode 3" and "quadruple helix": Toward a 21st century fractal innovation ecosystem. *International Journal of Technology Management* 46 (3/4), 201

¹⁶ Carayannis, E. G., & Campbell, D. F. J. (2009). "Mode 3" and "quadruple helix": Toward a 21st century fractal innovation ecosystem. *International Journal of Technology Management* 46 (3/4), 201

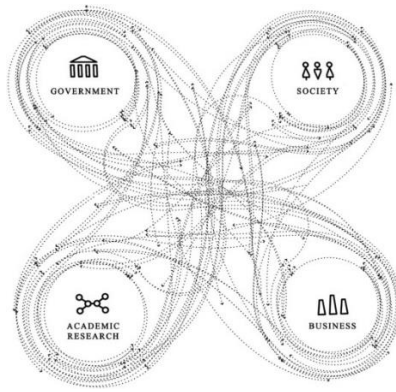


Fig. 2 The Quadruple Helix Model adapted by Fraunhofer (2016), originally developed by Carayannis and Campbell (2009). Copyright © 2015 Fraunhofer.

The **Quintuple Helix model** further extends the Quadruple Helix by incorporating the natural environment as the fifth component. This model emphasizes the interdependencies between social ecology and innovation, highlighting sustainability and environmental considerations. Introduced in 2010 by Carayannis and Campbell¹⁷, the Quintuple Helix represents a comprehensive framework that aligns with the socio-ecological transition identified by the EC¹⁸. It underscores the importance of ecological sensitivity and environmental sustainability in driving innovation. This model integrates ecological challenges as drivers of innovation, promoting a win-win situation between ecology, knowledge, and innovation. It supports the development of sustainable solutions that contribute to the resilience of both the economy and society, fostering a balance between economic growth and environmental protection, encouraging innovations that not only advance technology but also safeguard and enrich the natural environment.

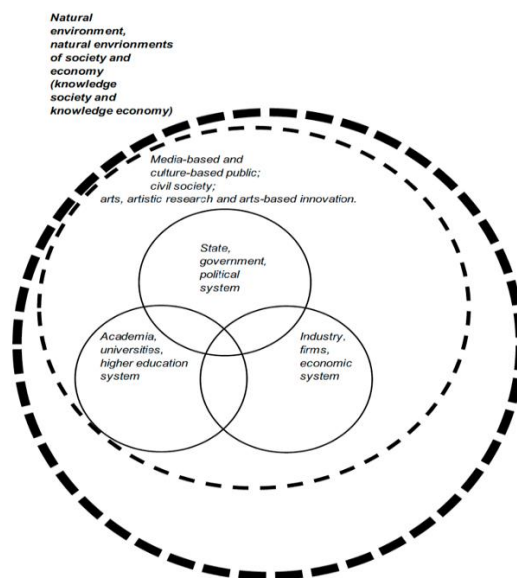


Fig. 3 The Quintuple Helix Innovation System. Source: Carayannis, Campbell and Grigoroudis, (2022).

¹⁷ Carayannis, E. G., & Campbell, D. F. J. (2011). Open innovation diplomacy and a 21st century fractal research, education and innovation (FREIE) ecosystem: Building on the quadruple and quintuple helix innovation concepts and the “mode 3” knowledge production system. *Journal of the Knowledge Economy*, 2(3), 327–372.

¹⁸ European Commission. (2009). *The world in 2025. Rising Asia and socio-ecological transition*. Brussels: European Commission (http://ec.europa.eu/research/social-sciences/pdf/the-world-in-2025-report_en.pdf).

The evolution from Triple to Quadruple and Quintuple Helix models underscores an increasing recognition of the complex interplay between different societal sectors in propelling innovation. These models provide a comprehensive framework for fostering digital and green transitions, particularly in the social economy, by ensuring that innovation is inclusive, democratic, and sustainable.

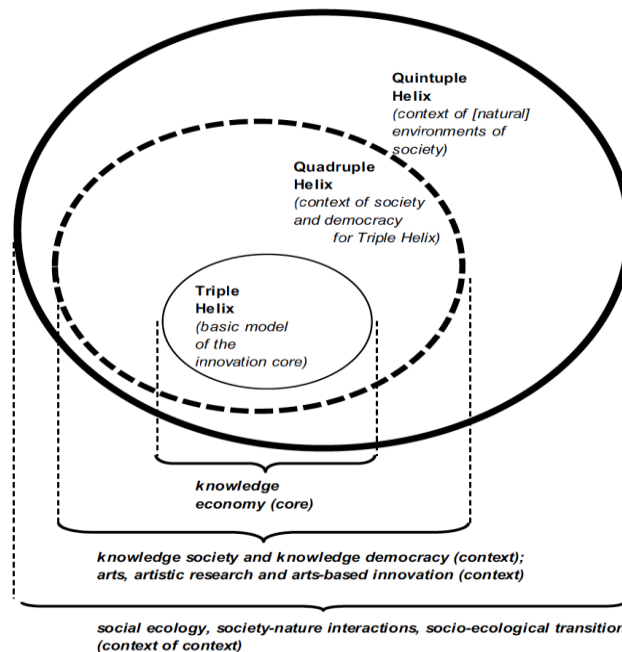


Fig. 4 The Quadruple and Quintuple Helix Innovation Systems in relation to society, democracy, and social ecology. Source: Carayannis, Campbell and Grigoroudis, (2022).

PPP for green transition

A public-private partnership (PPP) is a long-term cooperation contract between private organisations and government agencies to provide public assets or services, in which the private party bears significant risk and management responsibility¹⁹. In this contract, both the public and private sectors have certain advantages relative to each other in performing specific tasks. It is usual that the private sector is responsible for the finance, design, construction, operation, management, and maintenance of the project. PPPs often involve the concession to the private sector of tax or other operating revenue, protection from liability, or partial ownership rights over nominally public services and property. PPP for green transition could be a way to incentivise private investment to accelerate the sustainable transition and address strategic sustainability challenges such as reducing carbon emissions, especially regarding the transition to cleaner energy technologies and sustainable development. As PPP schemes could introduce certain limitations in adapting to the green transition and sustainability needs, several hybrid schemes have emerged from PPPs, for example, the Public-

¹⁹ European Court of Auditors. (2018). Public Private Partnerships in the EU: Widespread shortcomings and limited benefits (Special Report No. 09/2018). Publications Office of the European Union.

Private-Collaboration (PPC), which includes those practices with a governance structure that allows more discretion to the private partners²⁰.

In PPC for green transition or green growth, the government usually supports Research and Development (R&D) in the first stage through financial and non-financial assistance, bringing forward technologies. In the second stage, when technologies are mature, the public sector promotes policy frameworks to unlock private capital. Continuous signals for sufficient investment certainty to the private sector will also contribute to building confidence and ensuring the enabling environment for another innovation.

Community-Led Local Development

Community-Led Local Development (CLLD) is a strategic approach implemented across the European Union to encourage sustainable local development. It emphasizes local involvement and decision-making, advocating for a development process determined and directed by local actors. The CLLD approach builds on the principles of using local resources effectively and fostering cooperation among various community members to enhance their developmental capabilities. It aims to empower communities, build local capacities, and promote an integrated, multi-sectoral approach to ensure long-term, flexible solutions to local development challenges. This framework has been a key part of initiatives funded by the European Structural and Investment Funds (ESI Funds) from 2014 to 2020, focusing on creating lasting change by capitalizing on the unique strengths and potential of each locality.²¹

Green industrial partnerships

Industrial partnerships are medium/long-term agreements among businesses or between businesses and universities, on issues of common interest, aiming to run activities in all fields of cooperation: research and development, innovation, human capital, and corporate social responsibility. They bring together employers across an industry sector to lead the development of skills, with a focus on growth and competitiveness. In this regard, in 2009 a Green Industry initiative was launched by UNIDO (United Nations Industrial Development Organisation)²². It is a platform based on multi-stakeholder partnerships between business, government and civil society for the realisation of a green economy and green growth in the manufacturing and allied industry sectors. Green Industry promotes industrial production and development that does not come at the expense of the health of natural systems or lead to adverse human health outcomes by:

- Scaling up and mainstreaming proven practices to reduce negative environmental impacts.
- Transforming manufacturing and associated sectors into more effective contributors to sustainable industrial development.

²⁰ Green Growth Best Practice Initiative. (2014). Green growth in practice: Lessons from country experiences. Global Green Growth Institute, European Climate Foundation, and Climate & Development Knowledge Network.

²¹ Claudia Petrescu, (2015). Association and cooperation in Romanian rural areas? The leader experience, Journal of Community Positive Practices, Catalactica NGO, issue 2, pages 28-42.

²² UNIDO (n.d.). Green Industry Available at <https://www.unido.org/our-focus/cross-cutting-services/green-industry/green-industry-initiative>. Accessed 13 June 2024

- Helping enterprises improve resource productivity and environmental performance (greening of existing industry);
- Establishing new operations delivering environmental goods and services (creating new green industries).

3. Clusters and Collaboration: A Model for Triple Transition

3.1 Comparison of Traditional Clusters and Social Economy Clusters

The Triple Transition model represents an integrated approach designed to address the interconnected challenges of digital, green, and social transitions. This model is distinguished by its ambitious objectives, which include fostering mutually reinforcing transitions, achieving climate neutrality and circularity by 2050, enhancing the competitiveness and resilience of Europe's industry, and reducing social and territorial disparities through a just transition. On July 5, 2023, the Spanish Presidency of the Council of the European Union convened the event "Triple Transition: shaping international cooperation to address digital, green, and social transitions," setting the stage for the evolution of an enhanced transition policy.²³ In this context, clusters and other partnership models offer a potent framework for realizing the ambitious goals outlined by the European Union.

Clusters, defined by the EC *"as groups of firms, related economic actors, and institutions located near each other, have reached a sufficient scale to develop specialized expertise, services, resources, suppliers, and skills"*.²⁴

Clusters play a crucial role in the European industrial landscape by forming vibrant geographic concentrations of interconnected firms and associated economic entities in a specific field, creating dynamic and synergistic networks of companies, suppliers, service providers, and associated institutions such as universities and research centres.²⁵ This synergy fosters a competitive environment that drives innovation, productivity, and economic growth. Examples of well-known clusters include Hollywood in the film industry, Silicon Valley in technology. The collaborative ethos of clusters ensures that diverse stakeholders, including businesses, research institutions, and governmental bodies, work together to nurture innovation and propel regional development. This integrated approach not only fortifies competitiveness and resilience but also ensures that economic growth is inclusive and environmentally sustainable.

²³ Spanish Presidency Council Of The European Union (2023) . Seminar "Triple Transition: shaping international cooperation to address digital, green and social transitions. <https://spanish-presidency.consilium.europa.eu/en/events/seminar-triple-transition-shaping-international-cooperation-to-address-digital-green-and-social-transitions/>. Accessed 13 June 2024

²⁴ European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Clusters of social and ecological innovation in the European Union, perspectives and experiences – The role of clusters and similar forms of business cooperation in fostering the development of social economy, Publications Office of the European Union, 2021. Page 12

²⁵ Ketels, C. H. M. (2017). Cluster mapping as a tool for development. Institute for Strategy and Competitiveness, Harvard Business School. Retrieved from <https://www.hbs.edu/faculty/Pages/item.aspx?num=53385>. Accessed 13 June 2024

Traditional cluster models exhibit several key characteristics:²⁶

1. **Geographical Concentration:** Businesses within a cluster are typically located near each other, facilitating frequent interaction and collaboration.
2. **Industry-Specific Focus:** Clusters often concentrate on specific industries.
3. **Interconnectedness:** Firms within a cluster are linked through various relationships, including supplier-manufacturer connections and collaborative research efforts.
4. **Competition and Cooperation:** Firms in a cluster compete while also collaborating in ways that enhance their collective competitiveness.

Box 1. Clust-ER Agri-food (Italy)²⁷

Clust-ER Agri-food is a private association comprising public and private entities, social economy SMEs in agrifood, research centers, businesses, and educational institutions. It aims to enhance sector competitiveness by sharing expertise, ideas, tools, and resources. Recognized by the Emilia-Romagna region, Clust-ER promotes innovation through collaborative approaches aligned with regional development policies. Clust-ER focuses on four main research and innovation areas:

- Sustainable and Precision Agriculture: Enhancing economic and environmental sustainability.
- Nutritional Integrity and Quality: Ensuring food safety, quality, authenticity, and traceability, with a focus on human health.
- Processes, Equipment, and Packaging: Improving food quality and sustainability.
- Valorisation of Byproducts and Waste: Increasing the economic and environmental sustainability of agri-food processes.

SE clusters, although a relatively new concept compared to traditional industrial clusters, are gaining attention for their unique structure and benefits. These clusters encompass a variety of sectors and are typically formed in specific geographic areas, yet they maintain an openness that allows for external ideas and values to influence their development. SE clusters interact closely with their communities, aiming to meet local needs²⁸. REVES²⁹ describes SE clusters as flexible, community-

²⁶Catalin Boja, (2011). "Clusters Models, Factors and Characteristics," International Journal of Economic Practices and Theories, Academy of Economic Studies - Bucharest, Romania, vol. 1(1), pages 34-43, July.

²⁷ For more details, please visit <https://agrifood.clust-er.it>. Accessed 13 June 2024

²⁸ Bembenek, B., & Kowalska, K. (2016). SMEs Development within Industrial Clusters - Strategic Challenge for Cluster Management. Modern Management Review, 33-50.

²⁹REVES (European Network of Cities & Regions for the Social economy) (2018). The Role of Clusters and Regions in Scaling Up. European Day of Social economy Enterprises 2018, European Economic and Social Committee, 4 June 2018, Brussels.

rooted networks that include non-governmental organizations, socially-oriented enterprises, and other institutions. These clusters promote cooperation and competition among diverse stakeholders, fostering a culture of shared rights and responsibilities. The benefits of social economy clusters mirror those of traditional clusters, such as the exchange of experience, skill diversification, and innovation.

Box 2. Alaturi de Voi Romania Foundation (Romania)³⁰

ADV Romania is an accelerator for the Social Enterprises Cluster, which comprises 48 member organizations, including 45 SMEs. The organization is dedicated to supporting social entrepreneurs by providing tailored instruments, consultancy, and educational and training activities. Their mission is to foster the growth and competitiveness of social enterprises, thereby amplifying their positive impact on local communities and the environment.

In 2019, ADV Romania launched "The Social Enterprises Accelerator" program, which became the grant administrator for 42 social enterprises across Romania. This initiative evolved into a significant cluster in the social economy by 2020, highlighting the organization's commitment to fostering collaborative and innovative environments. In 2021, ADV Romania, in collaboration with its partners, introduced AFIN, the first Romanian non-banking financial instrument specifically designed to support social enterprises, showcasing their dedication to financial innovation within the social sector. Moreover, through the ADV Academy, the organization invests in education, research, public policies, and social innovation. Their efforts span across Romania, the Republic of Moldova, Ukraine, and the European Union, underscoring their broad impact and commitment to advancing the social economy on a regional and international scale.

Box 3. Torino Social Impact (Italy).³¹

Originating from the Social Entrepreneurship Committee created by the Chamber of Commerce in 2004, TSI formally launched in 2017 with the support of the Chamber and 11 local actors. Torino Social Impact brings together over 240 member organizations, including companies, institutions, financial operators, charities, and foundations. These members collaborate through a shared Memorandum of Understanding, aiming to attract investments and activities that address social issues through sustainable business models. This unique public-private partnership model aims to innovate local governance and strengthen the social economy ecosystem in alignment with Agenda 2030.

³⁰ For more details, please visit <https://alaturidevoi.ro/en/>. Accessed 13 June 2024

³¹ For more details, please visit <https://www.torinosocialimpact.it/>. Accessed 13 June 2024

Below is a table comparing traditional competitive clusters with social economy clusters, based on the findings of the 2021 report from GECES.

Table 1. Comparison of Traditional Competitive Clusters and Social Economy Clusters. ³²

	Traditional Competitive Clusters	Social Economy Clusters
Primary Aim	Drive economic growth through technological advancements and increased productivity	Stimulate local development, promote social entrepreneurship, and address social and ecological issues
Focus	Sector-specific activities	Local needs and aspirations
Guidance	National and local economic policies	Community-driven, participatory and democratic approach
Governance Model	Top-down, technocratic	Bottom-up, democratic and participative
Key Stakeholders	Large multinational firms, SMEs, public authorities	Local authorities, civil society, SMEs, social enterprises
Innovation Focus	Technological innovation	Social and ecological innovation
Funding Sources	National and local governments	Local and regional authorities
Collaboration Potential	Can align business strategies with social values through cooperation	Can integrate competitive logics and enhance welfare, sustainability, and health considerations through cooperation

The Pôles territoriaux de coopération économique

An example of a social economy cluster is the *Pôles territoriaux de coopération économique* (PTCE) in France³³. PTCEs encompass a variety of legal forms, with a dominance of associative structures. Organizations within each PTCE share common strategies and pool resources, reducing individual costs and enhancing collective efficiency. They bring together a diverse array of stakeholders from the SSE, including public and private actors, to foster innovative projects that address local needs. Since 2021, PTCEs have benefited from increased governmental support through a national recovery strategy and operate within the legal framework of the SE Act of 31 July 2014. This legislation defines PTCEs as clusters that unite SEOs within a specific geographical area, partnering with other companies, local authorities, research institutions, and higher education establishments. The primary aim of PTCEs is to promote socially or technologically innovative projects that support sustainable local development and encourage collaboration between public and private SE participants, rooted in strong territorial connections, to expand their activities and maximize their social, economic, and environmental impact to offer socio-economic benefits for local communities.

³² Own elaboration based on the results of the GECES report of 2021 on the role of clusters and similar forms of business cooperation in fostering the development of social economy. Available at <https://data.europa.eu/doi/10.2873/07591> . Accessed 13 June 2024

³³ Le Labo de l'ESS (n. d.) Pôles territoriaux de coopération économique. Available at <https://www.lelabo-ess.org/poles-territoriaux-de-cooperation-economique-ptce-0>. Accessed 13 June 2024.

Box 4. Bou'Sol (France)³⁴

Bou'Sol focuses on establishing a sustainable and inclusive food ecosystem in the wheat, flour, and bread supply chain. It leverages social economy principles to promote collaboration among local stakeholders, addressing various development challenges such as economic, ecological, health, and social issues. A key aspect of Bou'Sol is its "Pain & Partage" network of bakeries, which aims to expand from six locations to an anticipated 20 by 2025. This expansion will improve local food ecosystems by establishing shorter supply chains. Each bakery collaborates with local stakeholders to create an environmentally friendly supply chain for wheat, flour, and bread, ensuring sustainability and high quality from farm to consumer. The initiative emphasizes collective projects that prioritize job creation, the sustainable use of natural resources, and health considerations. Cooperation is central to Bou'Sol's operations, involving a diverse range of participants including consumers, local actors, research centers, and public authorities. These stakeholders engage in decision-making and project development processes, promoting a strong community-based approach to sustainable development.

Bou'Sol has made a significant impact on local employment by creating numerous job opportunities. It also promotes sustainable practices by encouraging shorter supply chains and local cooperation, thereby enhancing environmental sustainability. Furthermore, through collective catering and evolving purchasing behaviors, Bou'Sol expands access to quality food, ensuring that more people can benefit from healthy and sustainable food options. The economic model combines revenue from bakery operations with public subsidies, ensuring the financial sustainability and scalability of the initiative.

3.2 Cluster of Social and Ecological Innovation

A new concept known as **Clusters of Social and Ecological Innovation (CSEI)** has been outlined in the recent report "Clusters of Social and Ecological Innovation in the European Union, perspectives and experiences," which was published in December 2021 by the expert group on social economy and social enterprises (GECES)³⁵. CSEI refers to ecosystems that bring together social economy entities, mainstream enterprises, civil society organizations, public authorities, education, and research institutions in a specific location to enhance local economic, ecological, and societal prosperity and regeneration by promoting cooperation, pooling of resources, and fostering innovation capacity. CSEI are collaborative networks that comprise social economy entities, mainstream enterprises, civil society organizations, public authorities, and educational institutions,

³⁴ For more details, please visit <https://www.bou-sol.eu/>. Accessed 13 June 2024

³⁵ European Commission, Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Clusters of social and ecological innovation in the European Union, perspectives and experiences – The role of clusters and similar forms of business cooperation in fostering the development of social economy, Publications Office of the European Union, 2021, <https://data.europa.eu/doi/10.2873/07591> . Accessed 13 June 2024

aiming to improve local economic, ecological, and societal well-being through cooperation and innovation. Key features of CSEI include:

1. **Quadruple-Helix Model:** Unlike traditional clusters that follow a triple-helix model (industry, government, and academia), CSEI integrates civil society, emphasizing collective interest and amplifying social impact.
2. **Collaborative Approach:** CSEI fosters partnerships across various sectors, facilitating resource pooling, innovation capacity, and shared objectives.
3. **Cross-Sectoral Activities:** These clusters operate in diverse fields, often addressing multiple sectors simultaneously to promote social and ecological innovations.

Box 5. Ceinture Alimentaires (Belgium)³⁶

Ceinture Alimentaires are ambitious territorial projects aimed at cultivating sustainable local food systems through the development of short food circuits. The term "ceinture", which means "belt", aptly characterizes these initiatives as they establish a connected ring of food production, processing, distribution, and consumption encircling metropolitan areas. This model highlights the essential relationship between urban centers and their surrounding rural landscapes, fostering a mutually beneficial partnership. Grounded in the cooperative movement, *Ceinture Alimentaires* projects are built on a foundation of solidarity and mutual support, thereby enhancing local food security and resilience. These projects strive to bolster a robust local food economy by emphasizing the significance of local and organic (bio) labels. This approach not only meets the growing consumer demand for sustainable and ethically produced food, but also ensures that the economic benefits stay within the local community. The cooperative nature ensures active involvement of various stakeholders, from farmers to consumers, in the decision-making process, fostering a strong sense of community ownership and accountability.

Box 6. Regionalwert AG (Germany)³⁷

The Regionalwert AG (RWAG) model enhances the concept of local food clusters by integrating comprehensive rural financing and investment schemes. This model promotes regional cooperation by fostering connections across the entire agricultural value chain, from production to consumption, with a strong emphasis on organic practices. What makes RWAG unique is its financing mechanism that brings together private and institutional investors to support small and medium-sized enterprises (SMEs) in the agri-food sector. Unlike traditional investment funds, RWAG attracts mainly local citizens deeply committed to the sustainable development of their

³⁶ For more details, please visit <https://www.ceinturealimentaire.be/fonctionnement> . Accessed 13 June 2024

³⁷ For more details, please visit <https://www.regionalwert-ag.de/> . Accessed 13 June 2024

region. This grassroots investment approach ensures that the financial gains are reinvested within the local economy, promoting long-term sustainability and community prosperity³⁸.

Furthermore, RWAG goes beyond financial investment by acting as a catalyst for innovation, offering a comprehensive array of services including training, networking, and business support. This holistic approach strengthens the entire regional agri-food ecosystem, ensuring that all participants, from rural businesses to civil society organizations, benefit from enhanced collaboration and resource sharing.

Box 7. CEDRA Split (Croatia)³⁹

CEDRA Split is a CSEI comprising 20 organizations, including 9 SMEs and start-ups. Its mission is to support the agile, integrative, and regenerative development of people, organizations, communities, and ecosystems through training, consulting, projects, and programs.

Founded in 2012, CEDRA Split pioneered a quintuple helix cluster structure, involving public, private, civic non-profit, R&D&I, and education sectors. In 2015, it established CEDRA Split Ltd., a business support organization providing services to social enterprises, SMEs, and public institutions. CEDRA Split focuses on education, consultancy, project development, and strategic planning. Recognized for its innovative eco-socio-economic and technological initiatives, the cluster aligns with the European Green Deal and UN Sustainable Development Goals (SDGs).

The concept of CSEI represents a significant advancement in cluster development. By integrating social and ecological aspects in addition to the traditional economic focus, CSEI's models offer a promising approach to addressing the current transitional challenges in Europe and promoting a sustainable and inclusive economy.

3.3 Services for Partnership

The **European Cluster Collaboration Platform (ECCP)**⁴⁰ is a consortium funded by the EC that aims to provide cluster organisations with opportunities to promote collaborations, expand businesses and take advantage of the various tools/facilities. The ECCP provides networking opportunities and information support for clusters and their members aiming to improve their performance and

³⁸ Pour la solidarité (n. d.) Regionalwert ag bürgeraktiengesellschaft in der region freiburg (RWAG) ; Available at <https://www.ess-europe.eu/fr/bonnepratique/regionalwert-ag-burgeraktiengesellschaft-der-region-freiburg-rwag> Accessed 13 June 2024

³⁹ For more details, please visit <https://cedrasplit.hr/cluster-model/>. Accessed 13 June 2024

⁴⁰ For more details please visit <https://clustercollaboration.eu/>. Accessed 13 June 2024

increase their competitiveness through trans-national and international cooperation. It aims at intensifying cluster collaboration across regional and sectoral boundaries and facilitating SMEs' access to clusters and internationalisation activities. All the partners are associated with the ECCP by a consortium agreement and the consortium is, at the same time, linked with the EC by a contract. The contract has been settled after the selection of the technical offer by the Commission.

The online platform provides a wide range of tools for cluster organisations, cluster partnerships, initiatives and networks, cluster associations and resource efficiency support actors. The different services offered are focused on a range of events and opportunities both online and offline for entities and SMEs to connect with peers from the EU and beyond:

- A unique one-stop shop for news, learning and collaboration opportunities for industrial clusters across Europe.
- Boosting the visibility and showcasing the impact of European clusters in cutting-edge industries and expanding markets throughout the world.
- Supporting business competitiveness through information on resource efficiency and innovation.

Being part of the ECCP community gives cluster organisations access to a vast wealth of knowledge, information and global opportunities. The mission of the ECCP is to be the European online hub for cluster stakeholders (cluster organisations, policymakers and other related stakeholders from the cluster ecosystem) and the reference one-stop-shop for stakeholders in third countries aiming to set up partnerships with European counterparts.

The ECCP acts as a service facility aiming to provide cluster organisations, cluster partnerships, initiatives, meta-clusters and clusters networks, cluster associations and resource efficiency support actors with a variety of modern tools. Furthermore, these tools also enable training providers and public/policy institutions to:

- Make efficient use of networking instruments (search and find potential partners and collaboration opportunities).
- Develop collaboration trans-nationally (within Europe) and internationally (beyond Europe).
- Support the emergence of new value chains through cross-sectoral and cross-industrial cooperation
- Access the latest quality information on cluster development through news announcements and events.
- Improve their performance and increase their – as well as their members' – competitiveness.
- Build up knowledge and capacities on industrial ecosystems and cluster development.

The platform offers a comprehensive suite of services designed to support cluster organizations globally. One of its key features is the detailed mapping of over 1,500 cluster organizations worldwide, providing a rich resource for identifying and connecting with potential partners. This

mapping is complemented by a leading information repository, which disseminates the latest news, open calls, and updates through the ECCP newsletter, ensuring that the cluster community stays informed about relevant developments.

In addition to information sharing, the platform organizes a variety of events, including webinars, capacity building seminars, and conferences. These events, orchestrated by the ECCP, ECP (European Cluster Partnerships), and the broader cluster community, are crucial for facilitating capacity building and peer-to-peer discussions. Furthermore, matchmaking events are held to foster cooperation between clusters not only within Europe but also internationally.

The platform's extensive knowledge database is another significant asset. It includes mappings of regional, national, international, and sectoral cluster networks, along with toolkits and publications developed by the ECCP, EC, academia, and the wider community. This database serves as a valuable resource for anyone involved in cluster development.

The platform provides detailed insights into European Cluster Partnerships and offers a dedicated forum for these partnerships. This forum enables members to engage in mutual learning and exchange information on activities and funding opportunities. Cluster Associations and Networks also have a specialized forum to promote the exchange of ideas and best practices.

For those seeking to expand their network, the platform features a partner search facility that helps cluster organizations identify potential collaborators. The ClusterXchange facility enhances this by enabling direct exchanges of offers and demands through private messaging. To keep organizations abreast of future trends, the ECCP Trend Universe offers in-depth insights into how emerging trends might impact clusters. Supporting international cooperation, the platform includes tailored pages featuring profiles of strategically important countries and a technical assistance facility known as SMEs Go International. Moreover, it provides timely updates on key policy areas of the EC, such as green and digital policies, social economy, economic resilience, and industrial ecosystems, ensuring that users are well-informed about policy developments that may affect their activities.

Box 8. Diesis Network (EU)⁴¹

Diesis Network is the unique Meta-Cluster of the Social Economy registered in the ECCP Platform. It gathers 6 regional clusters of the Social Economy Ecosystem around Europe. Diesis Network is one of the widest networks supporting the social economy federating 60 national SE organisations and clusters from 27 countries, of which 16 are EU, 7 other European countries and 4 internationals. The condition to be a meta cluster is to gather at least 3 clusters registered on the ECCP platform.

⁴¹ For more details please visit <https://www.diesis.coop>. Accessed 13 June 2024

The **European Digital Innovation Hubs**⁴² (EDIHs) are support centres that help companies overcome challenges and enhance their competitiveness through digitalisation. They provide tech expertise and testing facilities so companies can improve their processes, products, and services through digital technologies by:

- providing access to technical expertise and testing, as well as the possibility to 'test before invest';
- providing innovation services, such as financing advice, training, and skills development that are central to successful digital transformation;
- helping companies tackle environmental issues, in particular the use of digital technologies for sustainability and circularity.

EDIHs combine the benefits of a regional presence with the opportunities available to a pan-European network. This regional presence leaves them well-placed to provide the services local companies need, through the local language and innovation ecosystem. The European coverage of the network facilitates the exchange of best practices across hubs in different countries as well as the provision of specialised services across regions when the required skills are not locally available.

The **EDIH Network** comprises 228 EDIHs across all EU Member States as well as Iceland, Lichtenstein, and Norway, leveraging cutting-edge technologies in key sectors. The network's core mission is to build up the digital capacities of companies and public sector organisations. With the EDIH network the EC built a vibrant community of hubs and other stakeholders fostering networking, cooperation, and knowledge transfer activities between EDIH, SME and mid-caps, the public sector and the other relevant stakeholders and initiatives.

The EDIH network web portal includes a catalogue to find essential information about the European Digital Innovation Hubs (EDIH), including hub descriptions and organizing them in three types of hubs:

- **Funded under the Digital Europe Programme:** Co-funded by the EC and Member States/Associated Countries.
- **Seal of Excellence:** Positively evaluated in a European competitive call but funded exclusively by national or regional resources.
- **Funded by other initiatives:** Digital innovation hubs with similar activities to EDIHs but not connected to the network.

The EDIH network web portal offers tools to assess the performance and impact of EDIHs on the digital maturity of the organizations they support. The JRC of the EC has developed a Digital Maturity Assessment (DMA) Tool for EDIHs to measure the digital progress of their customers. Each

⁴² For more details please visit <https://digital-strategy.ec.europa.eu/en/activities/edihs> . Accessed 13 June 2024

collaboration between an EDIH and a company is planned and assessed using the DMA Tool, allowing EDIHs to understand each company's digital needs and provide tailored interventions. By evaluating a company's digital readiness before and after collaboration, the DMA Tool provides valuable insights into their digital growth.

By May 2024, the DMA Tool has been widely adopted, with over 4,700 assessments performed. These assessments help map digital transformation journeys and identify improvement areas, resulting in over 7,300 services delivered to SMEs and Public Sector Organizations (PSOs). From March to May 2024, the number of registered services more than doubled, reflecting increased EDIH activity and engagement. The Badge Programme, launched in December 2024, has awarded 149 badges to 75 EDIHs for achievements in various categories, such as Test Before Invest, Support to Find Investment, Training and Skills Development, Networking and Access to Innovation Ecosystems, and DMAs performed. This recognition highlights EDIHs' accomplishments and incentivizes continued excellence. The Digital Speed Test, a tool for quick self-evaluation of digital capabilities, registered over 280 tests by May 2024. The test has been well received, particularly in the education, public administration, and manufacturing sectors⁴³.

Box 9. EDIH in the Social Economy Ecosystem: PAI - Public Administration Intelligence⁴⁴

Public Administration Intelligence is the unique EDIH in Europe targeted to Social Economy SMEs. It is focused in fact on the applicative area of public services to citizens, delivered by Public Administrations (PA) and, increasingly, by SEOs. The convergence of these two actors in delivering services is particularly strong in Italy, where after the reform of the third sector, SEOs have been invested in the role of co-programming and co-designing with PAs that have to ensure their active involvement in the exercise of their functions of planning and organisation at the territorial level of interventions and services in the sectors of activity of general interest. Thus, PAIs targets are PAs and SMEs from the SE sector in Friuli Venezia Giulia, Piedmont and the Aosta Valley in northern Italy delivering public services to citizens.

PAI coordinates public and private ICT providers, a university, a Digital Innovation Hub, training agency from the SE, an independent financial consultant, and representatives of the target.

The expertise is focused on:

- artificial intelligence (AI)
- high-performance computing
- cybersecurity, blockchain and technologies for social good and e-participation of citizens,

⁴³ European Commission (2024). The Impact of the European Digital Innovation Hubs Network. Available at <https://european-digital-innovation-hubs.ec.europa.eu/news/impact-european-digital-innovation-hubs-network>. Accessed 13 June 2024

⁴⁴ For more details please visit [https://european-digital-innovation-hubs.ec.europa.eu/edih-catalogue/pai#:~:text=Public%20Administration%20Intelligence%20\(PAI\)%20is,Social%20Economy%20Organizations%20\(SEO\).](https://european-digital-innovation-hubs.ec.europa.eu/edih-catalogue/pai#:~:text=Public%20Administration%20Intelligence%20(PAI)%20is,Social%20Economy%20Organizations%20(SEO).) Accessed 13 June 2024

- higher technology readiness level solutions given the low level of digitalization of its customers.

The European dimension of PAI is ensured by the coordination with the Digital Transformation Accelerator, the connection with other EDIHs through the EDIH Network, and the participation of the DIESIS Network.

Many EDIHs include organisations that are part of other networks, developing strong connections, and providing a seamless service to SMEs within local and regional ecosystems:

- **Enterprise Europe Network (EEN)**⁴⁵, the world's largest support network for SMEs with international ambitions. The EEN is active worldwide. It brings together experts from member organisations that are renowned for their excellence in business support. Member organisations include chambers of commerce and industry; regional development organisations; universities and research institutes; innovation agencies. Individual businesses can't become Network members, but they can enjoy the many services offered.
- **European Industrial Clusters (EIC)**⁴⁶, is a voluntary association of individual companies, based on the joint interests of its members and their willingness to pool together their efforts through the activities set out in their Program for Efficient and Sustainable Manufacturing to optimize cooperation for joint projects, implementation as well as strengthening and expanding their regional and international market positions through national, regional and trans-border cooperation. The EIC aims to improve the cooperation of its members with universities and technology centers within clusters and across regional and sectoral organizations. The EIC will generate joint actions and projects to fulfill sustainable partnering process for strategic European interregional collaboration in industrial modernization (industry 4.0) to help improve the European industrial environment.
- the **Start-up Europe**⁴⁷ is an initiative of the EC to connect high-tech startups, scaleups, investors, accelerators, corporate networks, universities and the media. It is supported by a portfolio of EU-funded projects and policy actions such as the EU Startup Nation Standard, Innovation Radar and the Digital Innovation and Scale-up Initiative (DISC). It is fully aligned with the SME strategy of the EC.

⁴⁵ For more details please visit <https://een.ec.europa.eu/>. Accessed 13 June 2024

⁴⁶ For more details please visit https://single-market-economy.ec.europa.eu/industry/strategy/cluster-policy_en. Accessed 13 June 2024

⁴⁷ For more details please visit <https://digital-strategy.ec.europa.eu/en/policies/startup-europe>. Accessed 13 June 2024

4. Local partnership for greening SE SMEs in Agri-food

Local partnerships play a crucial role in the development of greening agri-food systems by fostering collaboration among diverse stakeholders, including public institutions, private enterprises, community-based organizations, and voluntary groups. These partnerships, whether formal or informal, enable the pooling of resources, knowledge, and expertise to address local development challenges and create sustainable solutions.

A key aspect of effective local partnerships is their ability to design and implement localized development agendas that are tailored to the specific needs and conditions of their communities. This approach ensures that the strategies and actions taken are relevant and impactful. The partnerships aim to stimulate economic growth, promote social inclusion, and enhance the quality of life through coordinated efforts and integrated policies.⁴⁸

For example, in the European context, the establishment of Territorial Employment Pacts (TEPs) has shown the benefits of embedding the partnership principle into social and economic policies. These pacts have facilitated the creation of multi-agency collaborations that receive government funding to maintain a permanent organizational structure and deliver agreed-upon programs of work. Countries like Ireland, Austria, and the UK have institutionalized local partnerships in the form of registered companies or non-profit organizations, which further strengthens their role in local development.⁴⁹

In the agri-food sector, local partnerships can be instrumental in piloting new projects and services that promote sustainable agricultural practices, reduce carbon footprints, and enhance food security. They involve local actors in defining priorities and designing action plans, ensuring that the strategies are grounded in local knowledge and experience. This participatory approach not only enhances the effectiveness of the interventions but also builds community ownership and commitment to the greening initiatives.

Moreover, successful local partnerships often rely on a supportive framework at the national level, which includes flexible policies, open communication channels, and recognition of local diversity. Governments play a crucial role in providing financial and human resources, as well as in facilitating the exchange of best practices and lessons learned among different partnerships.

⁴⁸ Hofer, A.-R., & Juric, A. (2016). Making partnerships effective in their contribution to local development: Conclusions and recommendations. OECD and USAID.

⁴⁹ European Commission (1993): White Paper on growth, competitiveness, and employment: The challenges and ways forward into the 21st century, COM(93) 700 final.

LEADER⁵⁰ is a local development approach that has been utilized for 30 years to involve local stakeholders in the creation and implementation of strategies, decision-making processes, and resource distribution for the advancement of their rural regions. Approximately 2,800 Local Action Groups (LAGs) implement this method, encompassing 61% of the rural population in the EU. These groups unite public, private, and civil-society stakeholders within a specific area (status as of the end of 2018 - EU-28).

In the realm of rural development, LEADER operates under the national and regional Rural Development Programmes (RDPs) of each EU Member State, with co-financing from the European Agricultural Fund for Rural Development (EAFRD). The LEADER approach, characterized by seven key features, stands out from traditional funding programs by integrating local expertise in rural development. Its bottom-up approach empowers local communities to shape their development paths, ensuring fair participation and decision-making. The area-based focus targets regional strategic priorities, fostering cohesion and utilizing local resources. LAGs form diverse partnerships that drive development through structured governance. These groups create integrated, multi-sectoral strategies that address regional needs comprehensively. Networking enhances collaboration and knowledge sharing among stakeholders, while a focus on innovation encourages novel solutions to local challenges. Cooperation extends the impact of local development by facilitating joint projects with other regions and countries, promoting knowledge transfer and new perspectives. As of 2024, the latest generation of LEADER continues to address the challenges and seize the opportunities in rural areas within the new framework of the 27 Member States and their CAP Strategic Plans.

Box 10. Innovation Cluster for Plant Proteins (Estonia)⁵¹

The Innovation Cluster for Plant Proteins project was promoted by the Estonian non-profit organisation, *MTÜ Taimste Valkude Innovatsiooniklaster*. Over four years, the project explored which crops would be best suited for plant protein production in Estonia. It identified the most appropriate technological approach to extract plant protein from seeds and how to make the best, most consumer-friendly, meat- and milk-like products from plant protein powder. The aim of the cluster project was to valorise protein-rich crops and process them into value-added products in line with customer demand. The project activities incorporated four distinct research and innovation aspects, including crop selection and suitability for protein isolation; isolation, concentration and characterisation of plant proteins; development of extrusion technology for plant proteins; and development of technology for fermented plant milks. Fostering the collaboration between the cluster members (farmers and processors) and the scientific stakeholders were important project features.

⁵⁰ For more details please visit https://ec.europa.eu/enrd/news-events/news/leaderclld-declaration-2021-2027_en.html. Accessed 13 June 2024

⁵¹ For more details, please visit https://eu-cap-network.ec.europa.eu/good-practice/innovation-cluster-plant-proteins_de. Accessed 13 June 2024

Study visit to a rooftop urban garden under GRAINS project

About the study visit:

SMEs in the agrifood sector can promote sustainability by reducing emissions, providing affordable and high-quality food, and generating inclusive employment opportunities. However, these SMEs face challenges such as skills gaps, policy restrictions, and funding constraints. To support capacity building for SMEs in agrifood, as part of the activities, two study visits are organised to meet relevant social economy SMEs in agrifood whose business models and community impacts could serve as valuable inspiration to others.

The first study visit took place on July 3rd in Brussels, and a second one is scheduled in Rome, as it is foreseen in March 2025.

During the first visit, we invited a selected group of participants to explore urban agriculture through a guided tour of the L[ag]UM rooftop garden at Refresh Brussels. Located in the Ixelles neighborhood, this 1500m² space, of which 1000m² is cultivable, features a diverse array of over 50 vegetable varieties, 25 aromatic plants, and edible flowers, all supporting a nearby restaurant and local residents.

The L[ag]UM project is a collaborative effort led by the Ixelles Urban Renewal and Neighborhood Contracts Office, in partnership with Refresh and ULB University. Supported by FEDER and the Brussels-Capital Region under the sustainable neighborhood contract Maelbeek, it highlights a strong commitment to community and environmental sustainability



Study visit to a rooftop urban garden under GRAINS project

About the participants:

CB3 - Clusters of Social and Ecological Innovation (CSEIs) and European Digital Innovation Hubs (EDIHs) included two parts: online training of 4 hours on 27.06.2024 and a study visit on 3.07.2024 in Brussels at L[ag]UM rooftop garden. **At the study visit were 18 participants out of which 10 were from partner organisations and 8 from other social economy organisations. The participants were from 9 countries: Belgium, Italy, Germany, Romania, Ukraine, Hungary, Croatia, Albania, and Montenegro.**

Capacity building 3 – Clusters of Social and Ecological Innovation (CSEIs) and European Digital Innovation Hubs (EDIHs) – 27.06.2024 (online) + study visit in-person (3.07.2024). DIESIS implemented CB3 with the support of all partners.



Capacity building on Greening Agrifood in Social Economy

BRANDING AND GREEN LABELLING

TRAINING MATERIAL

Date of the training: 17 September 2024

Venue: online (Zoom)

Training number: GAINS WP2-CB / 4.

Training provider: Consorzio Ruini Impresa Sociale (CRIS)

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Abbreviations

CAP	Common Agricultural Policy
CREA	Council for Agricultural and Economy Research
DOP	Protected Designation of Origin
EC	European Commission
EU	European Union
EFI	European Forest Industry
FAO	Food and Agriculture Organisation
EAFRD	European Agricultural Fund for Rural Development)
IGP	Typical Geographical Indication
GPP	Green Public Procurement
STG	Guaranteed Traditional Specialty
MASAF	Ministry of Agriculture, Food Sovereignty and Forests (Italy)
PDO	Protected Designation of Origin
PGI	Protected Geographical Indication
PGS	Participatory Guarantee Systems
SDG	Sustainable Development Goals
SME	Small and Medium Enterprise
SRPP	Socially Responsible Public Procurement
WHO	World Health Organisation

CHAPTER 1. The European Commission and the New Sustainable Labelling Framework

1.1 Labelling Framework in the European Union

Labelling provides consumers with essential information about products, helping them make informed decisions. Producers to provide consumers with more information about products/services, enabling consumers to make informed choices. In the European Union countries, it has become increasingly important for consumers to know where a certain product comes from, whether it is not grown with chemicals, whether it is a local product, etc. All these characteristics are certified by the label that a product has, which is an attribute that increases the confidence of customers that they will purchase a quality product. The label requires a third-party certification carried out by an independent body (private or public) that is not involved in the product's production, marketing, or consumption.

At the European Union level, labelling represents an instrument for promoting sustainable development goals. Many labels are for products that are more environmentally responsible, more eco-friendly, but also for those that respect the social and ethical criteria. Many quality systems certify and provide labels for products/ services/ works from various economic activities (social, environment, education, construction, agriculture, energy etc.).

At the EU level are various regulations for labelling, but in the case of the agrifood system one of the most important is related to organic food and organic production¹ (Regulation (EU) 2018/848 on organic production and labelling of organic products). This EU regulation establishes the objectives of the organic production that should be considered also in the labelling process (Regulation 2018/848, art. 4):

- a) contributing to protection of the environment and the climate;
- b) maintaining the long-term fertility of soils;
- c) contributing to a high level of biodiversity;
- d) substantially contributing to a non-toxic environment;
- e) contributing to high animal welfare standards and, in particular, to meeting the species-specific behavioural needs of animals;

¹ [\(Regulation \(EU\) 2018/848 on organic production and labelling of organic products\)](#)

- f) encouraging short distribution channels and local production in the various areas of the Union;
- g) encouraging the preservation of rare and native breeds in danger of extinction;
- h) contributing to the development of the supply of plant genetic material adapted to the specific needs and objectives of organic agriculture;
- i) contributing to a high level of biodiversity, in particular by using diverse plant genetic material, such as organic heterogeneous material and organic varieties suitable for organic production;
- j) fostering the development of organic plant breeding activities to contribute to favourable economic perspectives of the organic sector.

The European Union adopted the EU ecolabel scheme to prevent the overgrowth of environmental labelling schemes and to promote improved environmental performance across all sectors where environmental impact influences consumer decisions. The EU ecolabel scheme is part of the sustainable consumption and production policy of the European Community “which aims at reducing the negative impact of consumption and production on the environment, health, climate and natural resources” (Regulation 66/2010). EU ecolabels promote goods and services that have a high quality and high level of environmental performance and are defined at the EU level by Regulation (EC) No 66/2010 on EU Ecolabel.

As part of the *Farm to Fork Strategy*², the European Commission introduced a proposal for a sustainable labelling framework aimed at empowering consumers to make informed, sustainable food choices. The sustainability labelling framework is a key component of the Sustainable Food System Framework initiative and will regulate the information provided to consumers regarding the sustainability of food products: information on the nutritional, climate, environmental, and social dimensions of food products. The European Commission's sustainable labelling framework aims to foster a market where consumers are empowered with detailed, reliable information about the environmental, social, and health impacts of products. This initiative not only targets food products but also extends to textiles, electronics, and other consumer goods. The goal is to standardize labelling practices across the EU, reduce greenwashing, and encourage producers to meet higher sustainability standards³.

In case of food and feed products, based on the findings of the *Feasibility study EU Ecolabel for food and feed products* (Oakdene Hollins, 2011)⁴, the European Commission has not developed a separate EU ecolabel mainly because there is already an EU-level regulation related to organic products.

² Farm to Fork strategy for a fair, healthy and environmentally-friendly food system https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en

³ https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy/legislative-framework_en

⁴ https://static1.squarespace.com/static/5a60c3cc9f07f58443081f58/t/5ab3c1896d2a73f09efe3419/1521729946668/EC--03_251_v3.pdf

1.2 The Role of Labelling

Food labelling is the primary means of communication between the producer and the consumer. One of the most vexatious problems that exporters of food are likely to encounter is the wide disparity between different countries' requirements regarding labelling. The FAO's Codex first adopted in 1985, called must be regarded as a landmark, a major achievement, in international recommendations for food legislation⁵.

The Food and Agriculture Organisation's *Guidelines for the production, processing, labelling, and marketing of organically produced foods* sets out the principles of organic production at the farm level⁶, preparation, storage, transport, labelling and marketing stages, and provides an indication of accepted permitted inputs for soil fertilizing and conditioning, plant pest and disease control, and food additives and processing aids. For labelling purposes, the use of terms inferring that organic production methods used are restricted to products derived from operators under the supervision of a certification body or authority (Casadei and Albert, 2003)⁷.

Certifications distinguish products that meet rigorous standards, ensuring consumer trust in their quality and sustainability. In particularly regarding food safety and environmental impact. Additionally, certifications can streamline compliance with international trade regulations, thus simplifying market entry for SMEs and enhancing their global competitiveness

Certifications can play a crucial role in helping small and medium enterprises (SMEs) in the agrifood sector transition toward more sustainable, competitive, and market-accessible operations. Certifications facilitate this transition through the following ways:

1. Market access and competitiveness

- **Access to new markets:** Certification to recognized standards (like organic, Fair Trade, GlobalGAP, or ISO 22000 for food safety) can open doors to international markets. Many retailers and distributors require certification as a prerequisite for doing business, particularly in Europe and North America.

⁵ https://www.fao.org/fao-who-codexalimentarius/sh-proxy/es/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXS%2B1-1985%252FCXS_001e.pdf

⁶ Food and Agriculture Organisation. (1999). GUIDELINES FOR THE PRODUCTION, PROCESSING, LABELLING AND MARKETING OF ORGANICALLY PRODUCED FOODS. Adopted 1999. Revisions 2001, 2003, 2004 and 2007. Amendments 2008, 2009, 2010, 2012 and 2013. https://www.fao.org/input/download/standards/360/cxg_032e.pdf

⁷ Casadei, E., Albert, J. (2003). FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS in Caballero, B., Finglas, P., Toldra, F. (eds.). Encyclopaedia of Food Sciences and Nutrition (Second Edition), p. 2587-2593, <https://doi.org/10.1016/B0-12-227055-X/00502-2>

- **Competitive edge:** Certified Products are often perceived as higher quality, safer, or more sustainable, giving SMEs an advantage over uncertified competitors.

2. Consumer trust and demand:

- **Certification boosts consumer confidence by verifying that products meet quality and sustainability standards.** Certification provides assurance to consumers that the products meet certain quality, safety, or sustainability standards. This is especially important as consumers become more conscious of food safety, sustainability, and ethical production.
- **Meeting demand for transparency:** Certifications often require transparency in sourcing, production, and labour practices, which can be appealing to consumers looking for ethical and traceable food products.

3. Improved operational efficiency:

- **Adoption of best practices:** Certification processes often require SMEs to adopt industry best practices related to production, quality control, environmental management, and food safety. This can improve operational efficiency and product quality.
- **Waste reduction and sustainability:** Environmental certifications (e.g., organic or Rainforest Alliance) encourage sustainable practices like reducing chemical inputs or minimizing waste, which can lead to long-term cost savings.

4. Compliance with regulations:

- **Meeting regulatory requirements:** Certification helps SMEs comply with international regulations on food safety and quality, particularly for exports. This can prevent costly delays or rejections at international borders.
- **Simplified documentation:** Some certifications can streamline compliance with complex international regulations, reducing the administrative burden for SMEs.
- **Grants and subsidies:** Many government and non-government organizations offer financial incentives, grants, or subsidies to help SMEs in the agrifood sector achieve certain certifications, recognizing their role in fostering sustainable development and food security.

5. Access to funding and investment:

- **Attracting investors:** Certified agrifood SMEs often attract more investment because certifications can act as a third-party verification of good business practices, reducing the perceived risk for investors.

6. Supply chain integration:

- **Partnerships with larger corporations:** Many larger agrifood companies and retailers prioritize certified suppliers in their supply chains. Certification can enable SMEs to integrate into larger, more lucrative supply chains.
- **Traceability and food safety:** Certification often requires better tracking and documentation of inputs and processes, which enhances the traceability of products throughout the supply chain, improving food safety and quality control.

7. Risk management:

- **Minimising risks:** Certifications related to food safety (e.g., HACCP or ISO 22000) help SMEs identify, assess, and manage risks in the production process, preventing costly food recalls or reputational damage.
- **Crisis preparedness:** Implementing the systems required for certification can help SMEs be better prepared for crises, whether related to food safety, environmental regulations, or market disruptions.

8. Enhanced reputation and brand value:

- **Building a responsible brand:** Certifications can enhance the reputation of an SME by aligning it with ethical, sustainable, and responsible business practices. This reputation can translate into stronger customer loyalty and brand equity.
- **Recognition and differentiation:** Certifications differentiate an SME from competitors who may not have the same level of verified commitment to quality, sustainability, or social responsibility

In summary, certifications can significantly aid SMEs in the agrifood sector by providing access to new markets, improving operational efficiency, ensuring compliance with regulations, enhancing brand reputation, and attracting investment. They serve as tools for growth and transformation, especially as the agrifood sector becomes more globalized and consumer demands shift toward sustainability and transparency⁸.

1.3 CAP Strategic Plan 2023 – 2027

With the “*European Green Deal*”⁹, European Union will be the first climate-neutral continent by 2050, almost radically transforming the economies and societies of all 27 Member States and committing to reduce emissions by at least 55% by 2030 compared to 1990 levels.

⁸ https://www.etf.europa.eu/sites/default/files/2022-11/Edited%20green%20transition%20policy%20brief_EN.pdf

⁹ https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

The Coronavirus Crisis has underlined the importance of a robust and resilient food system that is able to ensure a sufficient supply of affordable food for citizens, while also protecting the ecosystem that is already severely compromised by droughts, floods, fires and pests. The strategy 'From Farm to Fork: From Producer to Consumer' addresses the global challenges of achieving sustainable food systems, recognising the inseparable links between healthy people, healthy societies and a healthy planet¹⁰.



Figure 1. Sustainable Development Goals

Today the new European Agricultural Policy, "Farm to Fork" strategy, has introduced also an important innovation by introducing a principle of **social conditionality**¹¹ aimed at improving the conditions and quality of work as a critical element of success for the competitiveness of enterprises and capable of ensuring compliance with the social rules and labour regulations proper to each Member State.

The objective of social conditionality is to link CAP payments to respect for workers' rights. This principle is reflected in the definition, in the CAP Strategic Plans, of administrative sanctions, in the form of reduction of payments, to be applied to beneficiaries of FEASR, direct payments and area payments, if they are found not to comply with the requirements on working and employment conditions defined by the same Regulation (EU) 2021/2115 in Annex IV. Specifically, Social Conditionality covers compliance with certain articles of the following EU Directives: 2019/1152/EU, on transparent and predictable working conditions 2009/104/EC, on minimum safety and health requirements for the use of work equipment by

¹⁰ <https://www.agenziacoessione.gov.it/comunicazione/agenda-2030-per-lo-sviluppo-sostenibile/?lang=en>

¹¹ https://www.alpconv.org/fileadmin/user_upload/Projects/EUSALP/Territorial_Brands/Day_1/Antonia_Luetteken_PPT.pdf

workers, and 89/391/EC, on measures to encourage improvements in the health and safety of workers".

The aim of the *Farm to Fork* is to accelerate towards an environmentally friendly food system that preserves biodiversity and contributes to curbing climate change, first and foremost by reducing the use of chemical and hazardous pesticides by 50 per cent by 2030 and by promoting the placing on the market of biopesticides and the adoption of alternative methods for crop protection. On the energy front, the *Farm to Fork Strategy* envisages a gradual shift from fossil to renewable sources, precisely because to date only a few agri-food sectors on clean energy. The *Farm to Fork Strategy* also considered methane emissions from livestock, inviting member states to develop policies that reward farmers who intend to invest in anaerobic digesters to produce biogas from agricultural waste and residues, such as manure. All goals for an ecological transition that has too often been postponed. In fact, among the programmes listed is consumer protection, and manufacturers and retailers are urged to include more information on food origin and nutritional aspects on labels. The adoption of a common labelling standard will enable supermarket customers and canteen users to know what they are eating. Food prices have risen in recent years due to various factors including geopolitical issues. On the trade side, the *Farm to Fork Strategy* calls on states to improve current international cooperation relations.



Figure 2 Farm to Fork Strategy. Source: https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en?

CHAPTER 2: How much is important a green brand image in agriculture

Green branding in agriculture is not merely a trend but a strategic approach that aligns with the growing consumer demand for transparency and sustainability. It involves adopting practices that reduce environmental impact, such as minimizing pesticide use, enhancing biodiversity, and supporting fair trade. A strong green brand can lead to increased market share, customer loyalty, and the ability to command premium prices. Moreover, green branding helps mitigate risks associated with environmental regulations and shifts in consumer preferences towards more sustainable products.

2.1. The Role of the Green Brand

Promoting green agriculture is a successful method for attaining sustainable growth in the agricultural sector. Ensuring food security, enhancing the agricultural product supply capacity, encouraging sustainable land development, and fostering green growth are crucial goals for all nations. Climate change, air pollution, waste generation, and natural disasters create challenges for sustainable agricultural development by impacting the environment where crops are grown. This impacts not just the organisms, but also the economic and social standing of individuals. The consumer movement is urging governments and businesses to do more to tackle climate change, resulting in changes in consumer preferences.

Consumption of green products can somewhat lessen the impact on the environment. The green products, also known as eco-friendly products, are created following the principles of sustainability, ensuring they are safe to purchase and of high quality. Recently, there has been a large rise in the global desire for environmentally friendly products. As a result, there has been a substantial increase in the manufacturing of eco-friendly products.

In a market economy, producers are motivated to create and market green agriculture products based on consumers' interest in purchasing them. Due to the rapid development of production technology, competition in the agricultural products market has grown increasingly fierce. The intense competition seen in the green agriculture products market involves not just price conflicts but also battles over quality, popularity, and reputation. The brand image is a crucial factor that shows consumers' perception of a brand and if there is a positive connection between the brand and the consumer (Uikey and Baber, 2023). Business managers can assess brand images, recognize positive associations within brand images, and concentrate on developing those images in their brand management strategy. With this in mind, it is

crucial for business managers to grasp consumers' perceptions of brands in order to effectively manage them.

Implementing a branding strategy has become crucial for companies looking to enhance their brand competitiveness in the market. Businesses must consider the consumer's point of view to establish a positive brand reputation, which is crucial for driving consumer product selection. Hence, it is crucial to assist companies in cultivating a positive brand reputation for green agricultural goods to boost intention to consume such products, encourage green purchasing, and attain sustainable development promptly. A brand is seen as a commitment to customers regarding the advantages they can expect from the product offered by the company. Consumers' views of a brand comprise its brand image, and consumers are more likely to be loyal to brands with positive images because they are easier to remember. Consumers will rely on the brand image in the absence of any other product information.

Having a strong brand image that is environmentally friendly can give a company a competitive edge, it can boost consumer awareness and, in turn, raise consumer willingness to a certain degree. Customer perceived value is critical, as it balances the cost incurred with the benefits they believe a product or service provides. Therefore, perceived value is a key determinant influencing brand image and consumption intent (Wu et al., 2018). Recently, customer perceived value theory has been increasingly used in agricultural economics to examine the factors affecting farmers' intentions and behaviors, indicating a connection between green agriculture product brand image, customer perceived value, and consumption intention.

2.2 How procurement can support to the transition of the green labelling?

Public procurement represents one of the most powerful policy instruments at the EU level for promoting sustainable and social development considering that it is around 14% of the EU GDP. The EC twin digital and green transition¹² objectives are enforced by public procurement policy through green public procurement (GPP), socially responsible public procurement (SRPP), or innovation procurement.

Public procurement refers to the process by which public authorities/ institutions purchase goods, services, and works. Considering the common policy objectives of the EU member states, the economic regulations and the amount of money spent on public purchasing, in 2014 it was adopted a new directive on public procurement (Directive 2014/24/EU on public procurement) that includes some measures dedicated to environmental protection (green

¹² https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1467

procurement) or social development (socially responsible procurement). To promote green transition and sustainable development, the EU Directive 2014/24/EU on public procurement focuses more on quality criteria instead of lowest price ones and introduces different criteria for awarding contracts that take into account the environmental impact (green criteria, eco-labels, etc.) and the social impact of products and services.

According to the Directive 2014/24/EU on public procurement, in the purchase process, public authorities can ask for specific labels in case of products, services or works with specific environmental, social or other characteristics:

“Contracting authorities that wish to purchase works, supplies or services with specific environmental, social or other characteristics should be able to refer to particular labels, such as the European Eco-label, (multi-)national eco-labels or any other label provided that the requirements for the label are linked to the subject-matter of the contract, such as the description of the product and its presentation, including packaging requirements. It is furthermore essential that those requirements are drawn up and adopted on the basis of objectively verifiable criteria, using a procedure in which stakeholders, such as government bodies, consumers, manufacturers, distributors and environmental organisations, can participate, and that the label is accessible and available to all interested parties.” (Directive 2014/24/EU on public procurement, point 75)

Public procurement and ecolabelling play pivotal roles in promoting sustainability within the agrifood sector, focusing on environmentally responsible practices and supporting eco-friendly food production. In the context of agrifood products or services, it focuses on how governments can use their purchasing power to promote sustainable farming, reduce environmental impact, and encourage the supply of high-quality, eco-friendly food products.

Article 43 of the Directive 2014/24/EU is dedicated to Labels. It defines better the characteristics of labels that can be used in the public procurement process as award criteria or contract performance conditions. EU ecolabels, defined by Regulation no. 66/2010 of the European Parliament and of the Council on the EU Ecolabel¹³ can be used in public procurement processes because it is recognized as the only EU-wide ISO 14024 Type I ecolabelling scheme that promotes goods and services that “demonstrate environmental excellence, based on standardised processes and scientific evidence”. According to the methodology of EU ecolabels, a product/ service/ work is verified by independent experts (third-party verification) to check its compliance with the EU ecolabel criteria.

Green Public Procurement (GPP) refers to the process by which public authorities purchase goods, services and works with a reduced environmental impact throughout their life cycle (Communication COM 2008 400 Public procurement for a better environment¹⁴). By life cycle, all the consecutive and/ or interlinked stages of a product/ service/ work are understood from

¹³ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32010R0066>

¹⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52008DC0400>

“raw material acquisition or generation of resources to disposal, clearance and end of service or utilization” (Directive 2014/24/EU on public procurement).

The European Commission (EC) developed Green Public Procurement (GPP) criteria¹⁵ for some clusters of products/services/ works in order to help the public authorities define them in the procurement process and methodologies. One cluster of products/ services/ works for which are defined GPP criteria is food, catering services and vending machines. Agriculture and food production have several key environmental impacts, including energy consumption in farming and food processing, land use changes such as deforestation that increase CO₂ emissions, depletion of fish stocks and biodiversity loss, excessive use of fertilizers and pesticides, high water consumption and pollution, emissions of pollutants like methane and nitrites from agricultural activities, and waste disposal that contributes to environmental degradation. Considering all these environmental impacts, there were established some green criteria for food purchases that include organic food production (that can be certified by an EU ecolabel or other international certification), more environmentally responsible marine and aquaculture food products, more environmentally responsible vegetable fats, food and beverage waste prevention etc.

Considering agrifood system characteristics, public procurement processes could encourage:

- **Organic food** by prioritising products that are organic, locally sourced, or produced using environmentally sustainable methods.
- **Local agriculture** by prioritizing locally grown products, reducing the carbon footprint related to food transportation, and stimulating local economies.
- **Eco-friendly farming** by requiring that suppliers meet specific sustainability standards, such as organic certifications, eco-friendly farming practices, or ethical sourcing methods.

2.3 The EFI Project: Agroforestry in Italy

The European Forest Institute (EFI)¹⁶ was established in 1993 in Joensuu, Finland, with the aim of improving international forest research and providing decision-makers with science-based information on forests on a pan-European level. To date, EFI has grown and developed into an important and recognised international network organisation with approximately 130 member organisations from 40 countries.

¹⁵ https://circabc.europa.eu/ui/group/44278090-3fae-4515-bcc2-44fd57c1d0d1/library/f69e60f9-9dc6-4345-aa18-b9a4b6dfdbf0?p=1&n=10&sort=modified_DESC

¹⁶ <https://efi.int/about>

The objectives of EFI are:

- facilitate and stimulate forest-related networking and promote the dissemination of science-based and policy-relevant information on forests and forestry.
- support forestry research and the use of scientifically sound information as a basis for forestry policies.

In this framework, we find it as an example that deserves attention with respect to innovation as a driver of development for the many Italian companies and others that are trying to maintain their identity and distinctiveness, while at the same time needing and wanting to be increasingly competitive, in national and international markets, thus responding to numerous challenges:

- starting with globalisation;
- climate change;
- food and water security;
- the circular economy;
- the sustainable and resilient agri-food systems.

The project for the Agroforestry was realised by CREA¹⁷ and want to support the company that residing in Apulia. The focus is on cultivating sustainable cotton in collaboration with one on the symbols of Italian fashion in the world is emblematic with the: Apulian Regenerative Cotton Project.

CREA is an Italian research organisation dedicated to agri-food supply chains. It operates as a legal entity under public law and is supervised by the Ministry of Agriculture, Food Sovereignty and Forests (MASAF). It has a scientific activity that covers crops, livestock, fishery, forestry, agro-industry, food science – and socioeconomics. CREA was established in 2015, from the merging of CRA (Council for Agricultural Research) and INEA (National Institute of Agricultural Economics), two country-wide institutions active since mid of last century

The **Apulian Regenerative Cotton Project** is certainly an experimental project that aims to obtain sustainable cotton that is entirely made in Italy, both in the traditional way and with the original approach of agroforestry, in collaboration with peach trees the first year and with pomegranate and white poplar trees from the second, for a green supply chain to support Italian fashion.

The project managed by EFI (European Forest Institute) in synergy with CREA's Agriculture and Environment Research Centre was also financed by a well-known fashion house. It is therefore a five-year experimental project, which at the moment could be described as the only one of

¹⁷ <https://www.crea.gov.it/en/about-crea>

its kind in Italy and perhaps an annex, aimed at producing cotton with a reduced environmental impact thanks to the use of agroforestry systems.

In May 2023, cotton was planted on one hectare of land, making it the first field experiment in Europe to test cotton in agroforestry with alternative tree species. To better define agroforestry, it is an agricultural system that provides for the cultivation of herbaceous species in the interfiles of tree or shrub plants, contributing to environmental protection processes in agro-rural, peri-urban and urban areas in a logic that is also agro-ecological conversion and countering land consumption. This approach, in fact, makes it possible to reduce evapotranspiration, thus saving irrigation water, and at the same time increasing agricultural biodiversity and introducing more organic matter into the soil, thus increasing its fertility.

The project was implemented in the Apulian territory because:

1. it is an area whose mild climate and peculiar characteristics of environment help the territory in the reintroduction of this crop - it should be noted that the same culture was already present since the 12th century, which is then abandoned in the last fifty years - with a positive impact on local communities;
2. experimental field establishment was initiated in this area, also implementing regenerative farming practices, respectful of natural cycles, with seedbed preparations that involved minimal impact on the soil to avoid consumption of organic matter and the use of the fertigation technique with organic fertilizers;
3. Regular monitoring will be carried out to assess the properties of the cotton grown, as well as to verify the environmental impact and production levels of the areas involved.



Figure 3 The field before cultivating cotton. Source: <https://www.esg360.it/agrifood/arco-il-progetto-di-agroforestry-per-il-cotone-sostenibile/>



Figure 4 The field after cultivating cotton. Source: <https://www.esg360.it/agrifood/arco-il-progetto-di-agroforestry-per-il-cotone-sostenibile/>

This project is clearly in full alignment with the agreement put in place by the Green Deal deploying nationwide directed toward sustainability and eco-innovation, to encourage a transition toward circularity in production systems, in all sectors, from those in the primary sector such as agribusiness to the energy sector and other sectors. Product, process, and system eco-innovation are necessary for a circular and regenerative production model and a use/consumption system characterized by life extension of products, reuse of components, and recycling systems that can ensure high-quality standards of recycled materials and products.

CHAPTER 3: What is a certification? Good practices from Italy and Spain

Certifications such as Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) play a crucial role in safeguarding the heritage of traditional and sustainable agricultural products. These certifications ensure the preservation of unique production methods and help sustain local economies by protecting products linked to their regions of origin. They guarantee authenticity and quality, thus supporting local producers and providing assurance to consumers about the origins and quality of the products they purchase.

Food traceability for agrifood products refers to the ability to track the entire journey of a food item from its origin (farm) to its final destination (table or consumer). This system is essential for ensuring food safety, quality, sustainability, and transparency in the food supply chain. It allows for the monitoring of each step in the production, processing, and distribution process, providing crucial information in case of contamination, recalls, or regulatory compliance. Food traceability systems, therefore, represent a critical component of modern agrifood supply chains, supporting safety, quality, sustainability, and consumer trust.

The certification framework for organic products from Spain illustrates how these schemes operate, highlighting the challenges and opportunities for the growth of the agrifood sector.

3.1 Explaining the certification - how the date can help the sustainability of the products

The quality and variety of agricultural products, often obtained at the outcome of specific and traditional processes, represent, not as of today, important competitive advantages for agricultural enterprises. Promoting the quality of agricultural production means responding to and stimulating a growing demand for unique products on the European market. In this sense, the EU has regulated special "quality schemes" for agricultural products and elaborated specific information tools, useful for communicating to consumers the peculiar characteristics and methods of production, complying with strict specifications, as well as, through proper identification of quality productions and adequate commercial valorization, protecting producers from unfair practices.



The acronym POD (Protected Designation of Origin) designates a product originating from a region and a country whose qualities and characteristics are essentially due to the geographical environment. All production, processing and preparation of the product must take place in the defined area.



The acronym PGI (Protected Geographical Indication) introduces a level of quality protection that focuses more on production techniques than on territorial constraints. The acronym identifies a product originating from a region and a country whose quality, reputation and characteristics can be traced back to its geographical origin and at least one stage of production, processing and preparation of which takes place in the defined area. The Traditional Specialty Guaranteed (TSG) is a mark of origin introduced by the European Union aimed at protecting productions that are characterized by traditional compositions or production methods. This certification is aimed at agricultural and food products that have a specificity linked to the production method or composition linked to the tradition of an area, but which are not necessarily produced only in that area.

The organic logo can only be used on products that have been certified as organic by an authorized inspection body or agency. This means that they have met strict conditions for production, processing, transportation and storage. A code number of the control body must be indicated next to the EU organic logo, as well as the place where the agricultural raw materials were grown.

The current debate following the new objectives of the UN Agenda means that the business world is also called to make its contribution by promoting the change of its organization towards sustainable organizational models.

In this scenario, the SMEs occupy a strategic position as they have always represented an alternative model to the lucrative one. The main activity of the cooperative enterprise consists, in fact, depending on the sector of operation, in providing goods or services or job opportunities directly to the members, at more advantageous conditions than those they would obtain on the market: this is the mutualistic purpose, aimed at satisfying a specific need of the members other than subjective profit.

A cooperative approach therefore guarantees the return to the producer of adequate added value, combining environmental and economic sustainability. Furthermore, a business aggregation helps make the use of new tools in the field of technological innovation more effective and widespread.

3.2 The food traceability and the role of the consumers

Food traceability systems are evolving with the integration of blockchain technology, which provides an immutable record of a product's journey from farm to table. Blockchain allows consumers to access detailed information about food origins, processing, and distribution via QR codes or other digital tools.

This transparency enhances trust and empowers consumers to make informed choices that reflect their values, such as sustainability and ethical sourcing.

At present, there is a growing number of consumers focusing on food safety and environmental sustainability. Nevertheless, the impact of agricultural markets globalisation means that consumers are exposed to a vast array of food options. Despite this, while food market globalisation allows consumers to access products from other countries, it has also led to an increase in the perception of inauthentic products. As a result, customers start requesting details and guarantees regarding the source and the ingredients of food items, as well as the way they are grown and processed. In recent times, there has been an increase in awareness regarding the source and authenticity of food products, which are now considered important factors influencing consumer decisions (Liu and Wang., 2022).

Traceability is recognized as a vital factor for the agri-food industry in providing assurances about all these aspects. Tracking food from production to origin ensures control over the entire process of food production and marketing. Truly, for the purpose of safeguarding public health and the environment, it is an essential tool to prevent intentional or unintentional mislabelling, including food adulteration, deceit, and controversies.

Supply chain management is crucial for achieving sustainability in the food industry. Food traceability systems play an important role here. Traceability systems allow for better tracking and management of the supply chain, providing companies with a greater understanding and control over the entire supply chain - from farm to consumer¹⁸.

By using food **traceability systems**, companies can identify the exact source of their ingredients, which is essential for ensuring that they are sustainably sourced. Additionally, traceability systems allow companies to track the movement of products through the distribution channels, which helps them identify and address any bottlenecks or inefficiencies in the supply chain.

Food traceability systems provide companies with valuable information that allows them to make more informed decisions about sourcing and distribution, ultimately leading to a more efficient and sustainable supply chain (Khan et al., 2022). By implementing such systems, companies can ensure that they are using sustainable practices throughout the entire supply chain and making a positive impact on the environment.

Traceability systems give consumers in-depth details on where and how their food is produced, enabling them to make better-informed decisions about their dietary choices. This increased level of transparency enables consumers to make more informed decisions and also drives the need for sustainable practices in food production. Consumers can guarantee that their food is environmentally friendly by being aware of its source. Consumers are able to determine if the food comes from

¹⁸ <https://www.foodnavigator.com/Article/2024/01/08/eu-sets-the-gold-standard-for-supply-chain-traceability>

nearby farms, uses organic farming techniques, or is produced sustainably. This information can also assist consumers in recognizing products that might have been made with harmful methods, like too much pesticide use, or those that could have been transported long distances, leading to increased carbon emissions.

Additionally, food traceability systems offer consumers details on the ethical practices of food producers. They have the ability to determine if the food is from fair-trade certified organizations and if workers in the farms and production facilities are given fair wages, safe working conditions, and other perks. This enables customers to select options that reflect their beliefs and support equitable treatment of employees.

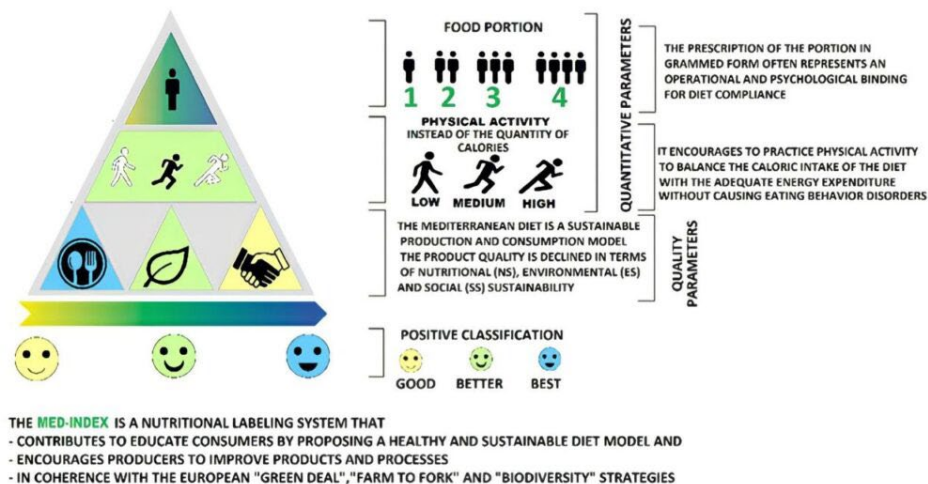


Figure 5: Med Index Labelling System, Source: <https://www.lindipendente.online/2023/06/20/med-index-letichetta-alimentare-per-tutelare-ambiente-salute-e-dieta-mediterranea/>

3.3 Participatory Guarantee Systems (PGS) for Certification in Spain

Participatory Guarantee Systems (PGS) for certification in Spain

Participatory Guarantee Systems (PGS) represent an alternative model of certification for organic products, particularly suited to small-scale farmers and local markets. Unlike third-party certification systems, PGS is built on principles of participation, transparency, trust, and direct engagement between producers, consumers, and other stakeholders. It is a decentralized, community-based approach that allows producers to ensure compliance with organic standards through mutual evaluation and cooperation.

The context in Spain

In Spain, the demand for organic products has been steadily growing, driven by increased consumer awareness about health, environmental sustainability, and the desire for locally sourced food. However, small and medium-sized organic producers often find it challenging to meet the stringent and costly requirements of third-party certification systems, which are typically administered by external agencies. PGS provides a solution to this, particularly in rural and localized settings where producers and consumers can engage directly.

How PGS works

PGS is a collaborative and inclusive approach where all stakeholders—farmers, consumers, agricultural technicians, and sometimes even representatives of local authorities—participate in the certification process. In Spain, as in other countries where PGS is implemented, the system operates on a foundation of trust and mutual learning. Farmers are evaluated not by external auditors but by their peers and the consumers who directly buy their products. This process ensures that organic practices are upheld and allows producers to improve through feedback from the community. Farmers within a PGS network typically visit each other's farms to inspect compliance with organic standards. This hands-on approach ensures a deep understanding of organic practices and provides immediate opportunities for education and improvement. The inspections are documented, and decisions regarding certification are made collectively within the group. The transparent nature of PGS is key to its success, as everyone involved has access to the process, fostering a shared responsibility for maintaining standards.

Legal framework in Spain

Spain is part of the European Union (EU), which regulates organic farming through strict legislation, including requirements for certification. While the EU primarily recognizes third-party certification systems, there is growing interest in promoting more accessible certification models like PGS. However, PGS does not yet hold the same legal recognition as third-party certification for export or labelling under EU law. Nevertheless, some regions in Spain, particularly those with strong traditions of organic agriculture and community-based food networks, have embraced PGS as a viable system for the local market.

PGS and local markets

PGS in Spain plays a crucial role in supporting the development of local, sustainable food systems. It strengthens the relationship between producers and consumers by allowing consumers to actively participate in the certification process and to know the farmers personally. This system encourages local consumption and shortens the supply chain, making it easier for small-scale farmers to sell their products directly to consumers through farmers' markets, local cooperatives, and community-supported agriculture (CSA) programs.

In regions like Catalonia, Andalusia, and Valencia, where local organic movements are particularly vibrant, PGS has found fertile ground. Here, networks of small producers and consumers collaborate not only to certify organic products but also to create a sense of community around sustainable agriculture. In these areas, PGS has also been a tool for social innovation, fostering cooperative models that go beyond certification to include shared ownership of land or resources, collective marketing efforts, and mutual support during crises.

Challenges and opportunities

One of the main challenges PGS faces in Spain is the lack of formal recognition at the national level within the broader framework of organic certification. For products to be labelled as organic in accordance with EU law, they must undergo third-party certification, which limits the use of PGS-certified products in larger retail channels and for export. However, PGS is highly effective in smaller, more localized markets where trust and direct relationships are prioritized.

The opportunity for PGS lies in the growing movement towards more localized food systems and increased consumer demand for transparency in how food is produced. By providing an affordable, accessible, and community-driven certification model, PGS supports small producers in maintaining organic practices while also fostering a strong sense of connection between producers and consumers.

In conclusion, while PGS is still a niche certification model in Spain, it holds significant potential for promoting organic agriculture at a local level. It offers a grassroots, cooperative alternative to the more formalised third-party certification systems and aligns closely with the values of transparency, sustainability, and community that are increasingly valued by both producers and consumers in Spain's organic food landscape.

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- Participatory Guarantee Systems in Spain: Motivations, Achievements, Challenges and Opportunities for Improvement Based on Three Case Studies - This paper provides insights into PGS initiatives in Spain, highlighting their benefits and the challenges faced, such as the lack of official recognition at the national level. It also discusses the potential of PGS in supporting local, sustainable food systems in regions like Valencia, Murcia, and Granada. You can read more [here](#).
- Wu, H.-C., Cheng, C.-C., Chen, Y.-C. and Hong, W. (2018), "Towards green experiential loyalty: Driving from experiential quality, green relationship quality, environmental friendliness, green support and green desire", *International Journal of Contemporary Hospitality Management*, Vol. 30 No. 3, pp. 1374-1397. <https://doi.org/10.1108/IJCHM-10-2016-0596>

Internet resources:

- Environmental labels - <https://www.iso.org/publication/PUB100323.html>
- ETF communication material on the future of work and sustainability: available online at <https://youtu.be/pvSXVZO62W4>
- European Commission, Legislative framework for sustainable food systems - https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy/legislative-framework_en
- European Green Deal - https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
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- Questions and Answers: Farm to Fork Strategy - building a healthy and fully sustainable food system - https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_885
- SDG Resource Document. Targets Overview - https://sdgs.un.org/sites/default/files/2020-09/SDG%20Resource%20Document_Targets%20Overview.pdf

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