

Analysis of the economic competitiveness of organic agribusiness in the case studies

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Analysis of the economic competitiveness of organic agribusiness in the case studies

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DATA	Data sets, microdata, etc.	
OTHER	Software, technical diagrams, algorithms, models, etc.	

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PU	Public, fully open, e.g. web (Deliverables flagged as public will be automatically published in CORDIS project's page).	X
SEN	Sensitive, limited under the conditions of the Grant Agreement.	

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ACRONYMS

BG Bulgaria

ES Spain

IE Ireland

LT Lithuania

LU Livestock Units

PL Poland

AWU Agricultural Work Unit

EU European Union (EU)

PESTLE Political, Economic, Social, Technological, Legal and Environmental

SWOT Strengths, Weaknesses, Opportunities and Threats

UAA Utilized Agricultural Area

EA Ecological Agriculture

OA Organic Agriculture

RA Regenerative Agriculture

PA Precision Agriculture

SDGs Sustainable Development Goals

CSR Corporate Social Responsibility

STI Sustainable Technological Innovation

CAP Common Agricultural Policy

GLAS Green, Low-Carbon, Agri-Environment Scheme

DMS Direct Marketing Strategies

PDO Protected Designation of Origin

P Phosphorus

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K Potassium

N Nitrogen

CORDIS Community Research and Development Information Service

MAPA Ministry of Agriculture, Fisheries and Food (Spain)

CSO Central Statistics Office (Ireland)

1. EXECUTIVE SUMMARY

The objective of this deliverable is to analyse the economic competitiveness of organic agribusiness in the case studies (Bulgaria, Spain, Ireland, Lithuania, and Poland) based on surveys and the external and internal environment affecting competitiveness through a PESTLE and SWOT analysis.

This analysis will allow for the strategic focus of the remaining Work Package activities, with the goal of achieving maximum competitiveness for the participating farms.

The PESTLE analysis will identify various environmental factors affecting organic agribusiness, such as political, economic, social, technological, legal, and ecological factors.

On the other hand, the SWOT analysis of the organic agribusiness situation in the different study countries will allow us to understand the internal (Weaknesses and Strengths) and external (Threats and Opportunities) situation of the organic sector.

Various reliable sources were used to produce this deliverable (state reports, specialized publications, databases, etc.). Likewise, the responses from the participating farmers and ranchers in the case studies were taken into account via a circulated survey. This survey was designed to gather their perceptions on various issues that could affect the competitiveness of their operations, such as dependence on external inputs, energy costs, land ownership, labour, or the technification of the operation, among other factors.

The strategic analysis conducted will provide a clearer diagnosis of the organic sector in each country, as well as how this diagnosis aligns with the vision of the producers participating in the project at various points. This will allow for a better focus of the project's work packages, integrating the conclusions obtained into the design of the activities. Thereby, these activities will contribute to achieving more competitive organic production, both for the farmers and ranchers participating in the project and for the other producers in each of the project's hubs.

2. INTRODUCTION

Deliverable 2.4 “Analysis of the economic competitiveness of organic agribusiness in the case studies” is part of Work Package 2, “Project set-up, needs assessment and baseline establishment to inform subsequent Work Packages”, led by Teagasc.

Deliverable 2.4, prepared by OFISET, analyses the competitiveness of agricultural holdings in Bulgaria, Spain, Ireland, Lithuania, and Poland, with special attention to organic farms. This analysis is based on European open data sources, such as Eurostat, as well as official national databases and scientific studies. It also uses the surveys designed by OFISET in Task 2.2 to gain a deeper understanding of the specific situation of the farmers participating in OH-FINE across the five target countries.

Once all the necessary information to assess competitiveness has been collected, a report is produced summarizing the results through a PESTLE analysis and a SWOT analysis. These frameworks provide a quick and comprehensive overview of the current situation of agricultural holdings in each country; they help the other project partners to focus their activities more effectively.

In addition, a set of recommendations on key areas of interest is developed based on the main constraints to competitiveness; these recommendations are intended to be considered when organizing cross-visits, workshops, and other activities related to training and improving the competitiveness of the participating farmers.

The project applies business strategy methodologies to achieve the objectives established in the proposal. This initial analysis provides a clear snapshot of the starting point in the five countries where the case studies are conducted. Thanks to this preparatory work, conclusions can be drawn to realign project activities with the aim of maximizing their impact on the competitiveness of agribusinesses.

This preliminary analysis also facilitates subsequent monitoring and evaluation, ensuring that any potential changes in the external environment can be identified in advance and addressed in a flexible and effective manner throughout the project's lifetime.

In month 32, a second analysis will be presented focusing on the competitive situation of the farms and on how the project activities are addressing this objective. This will also help identify possible areas for improvement to prevent deviations and ensure a sustainable impact. This intermediate assessment will focus particularly on farms undergoing conversion to organic production.

Finally, in month 46, a final analysis will be presented evaluating the overall impact that the project and the proposed knowledge-exchange system have had on the competitiveness of the farms. It will pay special attention to both farms in the conversion phase and those in the post-conversion phase.

3. METHODOLOGY

This section provides a detailed description of the methodology used in the preparation of this report. It explains the key elements of the questionnaire design developed by OFISET, the data collection process carried out in the field, and the complementary use of external sources and previous research.

3.1 Survey Design

The OH-FINE project includes an empirical study based on 100 agricultural holdings selected as case studies across five countries: Ireland, Lithuania, Poland, Bulgaria, and Spain (20 holdings per country).

The sample consists of farms in different situations: 50 in the process of conversion to organic production, 25 conventional and 25 already certified as organic.

With the aim of analysing the main factors affecting the competitiveness and sustainability of the farms, OFISET designed a structured questionnaire based on the PESTLE approach.

This survey covers the following areas:

- Political framework
- Economic factors
- Agronomic factors
- Legal factors
- Technological factors
- Environmental factors
- Social factors
- Territorial factors

In addition, two specific sets of questions were included: one aimed at crop farmers and mixed crop-livestock holdings, and another directed towards livestock farmers and mixed systems, allowing the instrument to be adapted to the diversity of situations covered by the study.

The first version of the OFISET survey was presented to the OH-FINE partners on April 15, 2025. After a process of collective review, suggestions, and several revised drafts, the final version was presented on July 2, 2025.

The survey, consisting of 74 questions, was administered to farmers and livestock producers through the project's partners LEUA, Teagasc, AFOA, BIOSEL, and SEAE, which were responsible for its implementation in their respective countries.

Although interviews were carried out in person whenever possible, various factors such as animal health and safety issues in countries like Bulgaria, wildfires affecting several project countries, and the limited availability of

producers, made it necessary to also rely on remote communication methods, including phone calls and email correspondence.

The content of the questionnaire provides a comprehensive view of the factors influencing the viability of organic farms from the perspective of farmers and livestock producers. This information was complemented by the analysis of secondary sources (official statistics, sectoral reports, and technical studies) in order to validate and cross-check the perceptions gathered through the surveys.

This approach enables a holistic understanding of the agricultural context and allows for robust comparisons across different countries and production systems.

3.2 Sample Characterization

The structural characterization of the participating farms was carried out by Teagasc. This analysis includes key variables such as farm size, type of production system, annual work units (AWU), and gender distribution. The most relevant data by country are presented below:

Bulgaria (n=21): average size 133.76 ha; dominant livestock system (90.5%); average AWU 1.24; women 33.3%.

Spain (n=20): average size 149.85 ha; dominant mixed system (65.0%); AWU 1.3; women 20.0%.

Ireland (n=20): average size 61.90 ha; dominant livestock system (80.0%); AWU 1.3; women 35.0%.

Lithuania (n=20): average size 72.75 ha; diverse systems (mixed 45%, crop 40%, livestock 15%); AWU 1.1; women 30.0%.

Poland (n=22): average size 24.85 ha; dominant mixed system (86.4%); AWU 1.5; women 22.7%.

Overall, there is a predominance of family farms, managed on average by 1.3 annual work units. Cereals and protein crops are the main crops in all countries, while cattle systems account for most of the livestock production in Ireland and Bulgaria. Spain, Poland, and Lithuania show a greater diversity of crops and production systems.

4. ANALYSIS OF THE AGRICULTURAL SECTOR IN BULGARIA, SPAIN, IRELAND, LITHUANIA AND POLAND

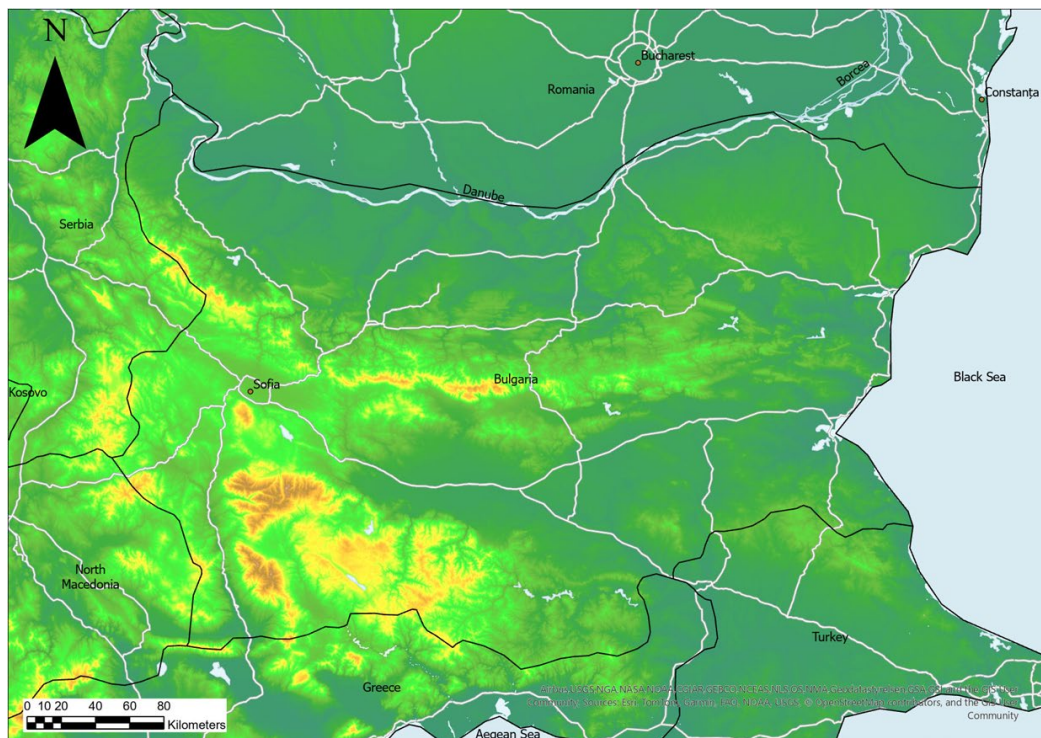
4.1 Geographical and Climatic Overview

4.1.1 Bulgaria

Bulgaria, located in southeastern Europe, borders Romania to the north (separated by the Danube River), Serbia and North Macedonia to the west, Greece and Turkey to the south, and the Black Sea to the east.

Covering an area of 110,879 km², the country has remarkable geographical and climatic diversity, which profoundly shapes its agricultural and livestock systems.

The country's relief is predominantly hilly (40.9%), forming transition zones between the Balkan Range (Stara Planina) and the Rhodope Mountains in the south, relative to the Danubian Plain, the Upper Thracian Plain (Trakiyska Nizina), and the Sofia Valley.



Map 1. Physical Map of Bulgaria. Source: Author's own elaboration based on data processed in ArcGIS.

The Balkan Mountains (Stara Planina) stretch across central Bulgaria from east to west, separating the Danubian lowlands to the north from the Thracian lowlands to the south. This creates strong thermal and rainfall contrasts that determine both the dominant crop patterns and livestock species in each region.

The Rhodope mountain system, the largest in Bulgaria, forms a major geographical feature in the country's south. Comprising the Rhodope, Rila, and Pirin ranges (the latter including Mount Musala, 2,925 m a.s.l., the country's highest peak), the area is characterized by predominantly karstic terrain, with deep canyons, rivers, and numerous caves.

Bulgaria can be divided into five main climatic zones:

- a continental zone in the Danubian Plain (Dfb), with cold winters and hot summers;
- a transitional zone in the country's central areas (Dfa/Dfb to Cfa), where continental and Mediterranean influences meet;
- a continental-Mediterranean zone in the Struma and Mesta valleys (Csa/Vsb), with dry summers and mild winters;
- a coastal zone along the Black Sea (Cfa), where temperature extremes are moderated; and
- an alpine zone in the Rila, Pirin, and Rhodope massifs (Dfc/H), characterized by a cold and humid climate.

The Balkan Range acts as a natural barrier separating the more continental north from the Mediterranean-influenced south, while the Black Sea moderates temperatures in the east.

These climatic features have led to a strongly regionalized agriculture. In the north, particularly in the Danubian Plain, large-scale extensive crops such as wheat, maize, sunflower, and rapeseed dominate, taking advantage of fertile chernozem soils and moderate rainfall. This area forms the grain and oilseed production core of the country and its main export region.

In contrast, the Upper Thracian Valley, irrigated by the Maritsa River, supports a more intensive and diversified agriculture, producing vegetables, fruit trees, and rice, as well as industrial crops such as tobacco and cotton, which have seen renewed promotion in recent years.

The Valley of Roses, located between the Balkans and Sredna Gora, is renowned for its traditional cultivation of oil-bearing roses (*Rosa damascena*) used in essential oil production, a hallmark of Bulgarian agriculture. In the south and southeast (the Struma, Sakar, and Strandzha regions) warmer climates allow the development of vineyards and Mediterranean crops, shaping Bulgaria's two main wine-growing regions: the Danubian Plain and the Thracian Lowlands.

In terms of livestock production, Bulgaria maintains a mixed structure combining intensive and traditional systems. Sheep farming is concentrated in the south, especially in the South-Central Region (Rhodope and Thrace), which accounts for more than one quarter of the national flock. Goat farming is also predominant in the southwest and southern mountain areas, adapted to rough pastures.

Industrial pig farming is mainly located in the north and northeast, near Ruse and Dobrich, where modern facilities are linked to the meat processing industry.

Dairy production relies primarily on cattle, concentrated in foothill and mountain areas, where climatic conditions favor natural pastures.

Prolonged droughts and severe heatwaves have been among the main challenges affecting maize yields and other summer crops in recent years. Oilseed crops (sunflower and rapeseed) have gained importance due to the expansion of cultivated areas and technological modernization in the sector.

At the same time, livestock production shows a trend toward the consolidation of larger, better-managed farms, improving productivity and animal product quality.

Bulgarian agriculture and livestock farming reflect a long-standing adaptation to relief and climate, combining traditional practices with progressive modernization. This territorial diversity (from the large cereal-producing farms of the north to the specialized productions of the south and east) forms one of the pillars of the rural economy and a key starting point for the analysis developed in the following sections of this report.

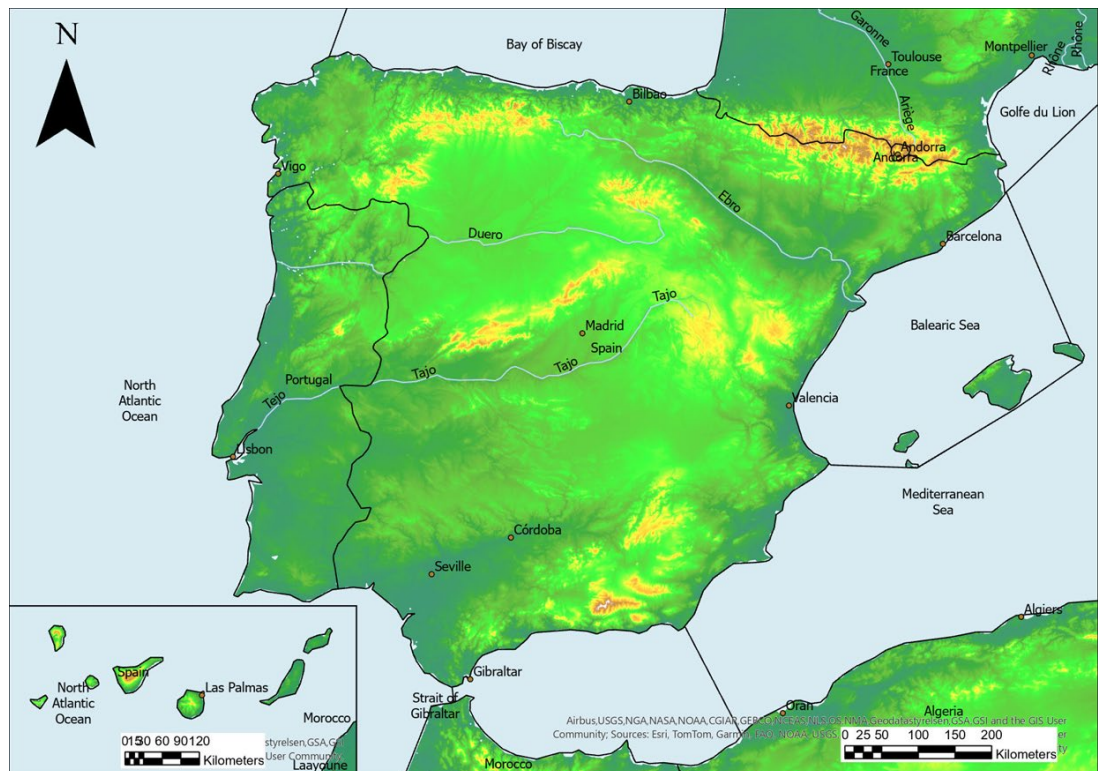
4.1.2 Spain

Spain is a country located primarily in southwestern Europe, on the Iberian Peninsula, although it also has territories in Africa. Spain borders France and Andorra to the north, Portugal to the west, and Gibraltar (United Kingdom) to the south, as well as Morocco through its autonomous cities of Ceuta and Melilla.

It occupies most of the Iberian Peninsula, the Balearic Islands in the Mediterranean Sea, the Canary Islands in the Atlantic Ocean, and the autonomous cities of Ceuta and Melilla in North Africa.

With a total area of approximately 505,978 km², Spain is one of the largest countries in the European Union and displays great geographical diversity, with highly varied topography and climates.

This heterogeneity stems from its strategic geographic position (a meeting point between the Atlantic Ocean and the Mediterranean Sea) and its strongly contrasted relief, which influences winds, water availability, and the distribution of agricultural land uses.



Map 2. Physical Map of Spain. Source: Author's own elaboration based on data processed in ArcGIS .

Spain's relief is organized around the Central Plateau (Meseta Central), which occupies most of the interior of the Iberian Peninsula, with average altitudes ranging between 600 and 700 meters. The plateau is divided into the northern and southern sub-mesetas, separated by the Central System (Sistema Central), which stretches from Portugal to eastern Spain, reaching its highest point at Pico Almanzor (2,592 m a.s.l.).

The Central Plateau is bordered by several peripheral mountain ranges. To the northwest, the Cantabrian Mountains (Cordillera Cantábrica) act as a barrier against the humid air masses from the Atlantic Ocean. To the northeast and east, the Iberian System (Sistema Ibérico) encloses the plateau and separates it from the Ebro Depression.

In northeastern Spain, the Pyrenees rise above 3,000 meters (with Aneto Peak, 3,404 m a.s.l., as the highest point), forming both a natural and climatic boundary with France. To the southeast, the Baetic System (Sistema Bético) culminates at Mulhacén (3,479 m a.s.l.), in Sierra Nevada.

Between these mountain ranges lie the major depressions of the Ebro and Guadalquivir Rivers, which serve as true agricultural and climatic corridors, alongside various coastal plains such as Valencia, Murcia, the lower Guadalquivir, and the Andalusian coast, that host the country's most productive irrigated agriculture.

These geographical conditions give rise to a great variety of climatic types across Spain. In the north and northwest, an Atlantic climate (Cfb)

predominates, characterized by mild temperatures and regular rainfall exceeding 1,000 mm per year. In this coastal strip (extending from Galicia to the Basque Country) high humidity and acidic soils favor forage production and the development of dairy and beef cattle farming, along with conifer and eucalyptus forests.

In the central part of the peninsula, including the Meseta and its surrounding ranges, a continentalized Mediterranean climate (Csa/Csb transitioning to Dsb in higher areas) dominates, marked by a strong annual thermal range, cold winters, very hot summers, and low precipitation (350-600 mm). These conditions support extensive dryland farming based on winter cereals, sunflower, and legumes, with sheep farming as the main livestock activity.

In the southern Meseta, particularly in Castilla-La Mancha and Extremadura, the lower and drier relief (Csa areas) favors the expansion of olive groves, vineyards, and Iberian pig farming, forming the characteristic landscape of the dehesas.

In the Guadalquivir Depression, with its warm Mediterranean climate (Csa areas) and flat relief, intensive irrigated crops and industrial crops are concentrated. The province of Jaén represents the global center of olive cultivation, while Córdoba and Seville combine olive growing with cotton, sugar beet, and sunflower.

In the northeast, the Ebro Depression (covering Aragón, Navarra, and La Rioja) shows marked continentality and localized semiaridity (BSk), with rainfall below 400 mm. Modern irrigation systems (such as the Aragón and Catalonia Canal) support the production of maize, alfalfa, fruit trees, and high-quality vineyards, as well as a highly developed intensive pig industry, which has made Spain one of the world's leading pork exporters.

The Mediterranean coast, stretching from Catalonia to Almería, has a mild climate (Csa/Csb depending on latitude and altitude) with dry, warm summers and constitutes the main area of intensive irrigated agriculture. In the regions of Valencia, Murcia, and Almería, the availability of groundwater and the development of drip irrigation infrastructure have enabled the expansion of greenhouse horticulture, citrus orchards, and early fruit crops, which sustain a large share of Spain's agricultural exports.

In the driest belt of the southeast (Almería, Murcia, and southern Alicante), a semi-arid Mediterranean climate (BSh/BWh) predominates, with annual rainfall below 300 mm, partially mitigated through technological irrigation systems.

The mountain areas Pyrenees, Cantabrian Range, Central, Iberian, and Baetic Systems feature a mountain (alpine, Dfc/H) climate, with average annual temperatures below 8 °C, abundant precipitation, and a prolonged snow regime. These zones are mainly used for extensive livestock grazing, summer pastures, and forestry activities.

In the Canary Islands archipelago, the volcanic relief and arid subtropical climate (BWh/BSh climate, with average annual temperature 18-24 °C, precipitation < 250 mm) determine an agriculture based on irrigated export crops—banana, tomato, avocado, papaya, and mango—and dairy goat farming, whose production is used for traditional island cheeses.

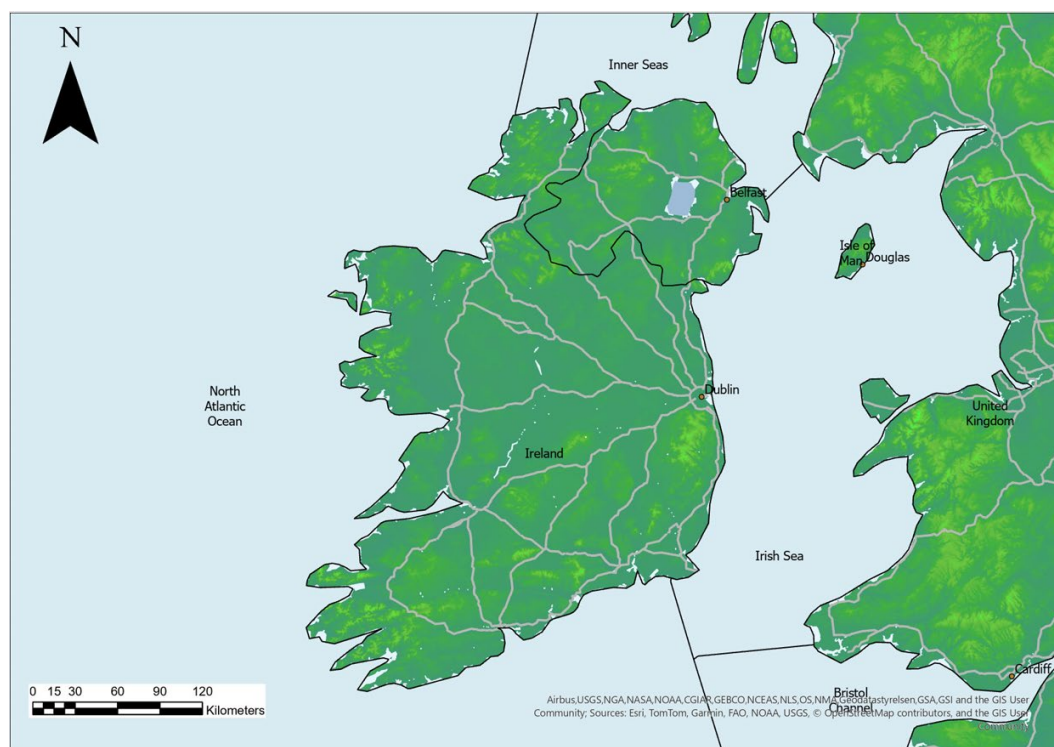
Spain's climatic diversity reflects strong gradients: from north to south, a transition from humid to arid climates; and from west to east, an increase in continentality and rainfall irregularity. These variations explain the coexistence of very different agricultural systems—from the intensive, high-tech smallholdings of the Mediterranean coast, to the large cereal and livestock estates of the central plateau, as well as the Atlantic mixed farms and the olive grove and dehesa estates of the south.

Overall, the Spanish territory combines traditional dryland landscapes with highly technological and export-oriented agricultural hubs.

4.1.3 Ireland

Ireland is an island nation in northwestern Europe, sharing a border to the north with Northern Ireland (United Kingdom), while the rest of the country is surrounded by the Atlantic Ocean.

Ireland covers around 70,280 km², with a relief dominated by a low-lying central plain (Central Plain) surrounded by peripheral mountain systems and extensive peatlands and lakes (the Shannon River stands out as the country's main hydrological axis).



Map 3. Physical Map of Ireland. Source: Author's own elaboration based on data processed in ArcGIS .

The highest point is Carrauntoohil (1,038.6 m), in the MacGillycuddy's Reeks (southwest), which, together with other coastal ranges in the west and northwest, defines the limits of the central plain and influences winds, precipitation, and land use.

The country has a temperate oceanic climate (Cfb), with mild winters and cool summers, high humidity, and low continentality. The average annual temperature is around 9.8 °C, with a moderate gradient tempered by the North Atlantic Current.

Atlantic winds create a marked west-east precipitation gradient (Cfb transitioning to Cfc in uplands and coastal ranges), with average rainfall in the west of 1,000-1,400 mm/year, compared to 750-1,000 mm/year in the east. In mountainous areas (Cfc/H), rainfall exceeds 2,000 mm/year, shaping highly differentiated agronomic uses and grazing calendars.

Ireland's agricultural structure is predominantly livestock-based, characterized by extensive grasslands that support extensive grazing systems. More than 80% of the Utilized Agricultural Area (UAA) corresponds to pastures for silage, hay, or grazing, with the largest expanses located in the West and South-West.

Cereal area covers around 270,000 ha, highly concentrated in the South-East and Mid-East, which together account for 58% of the national cereal area. This spatial pattern reflects heavier soils and wetter conditions in the west (livestock-oriented) versus loam soils and milder climates in the east and southeast (suitable for barley, wheat, oats, potatoes, and horticulture).

Livestock specialization is based on grassland systems, with high-intensity pasture-based dairying concentrated in the South, where most of the country's dairy farms are located.

Beef (suckler) and sheep farming are more prevalent in the west and northwest, including mountainous and peatland landscapes with soil and drainage limitations. In 2024, the national livestock census recorded 6.31 million cattle in December (-3.3% year-on-year), 1.47 million pigs (+4.7%), and 5.18 million sheep in June (-8.8%), illustrating the sector's sensitivity to prices, climate, and policy, as well as growing regional diversification.

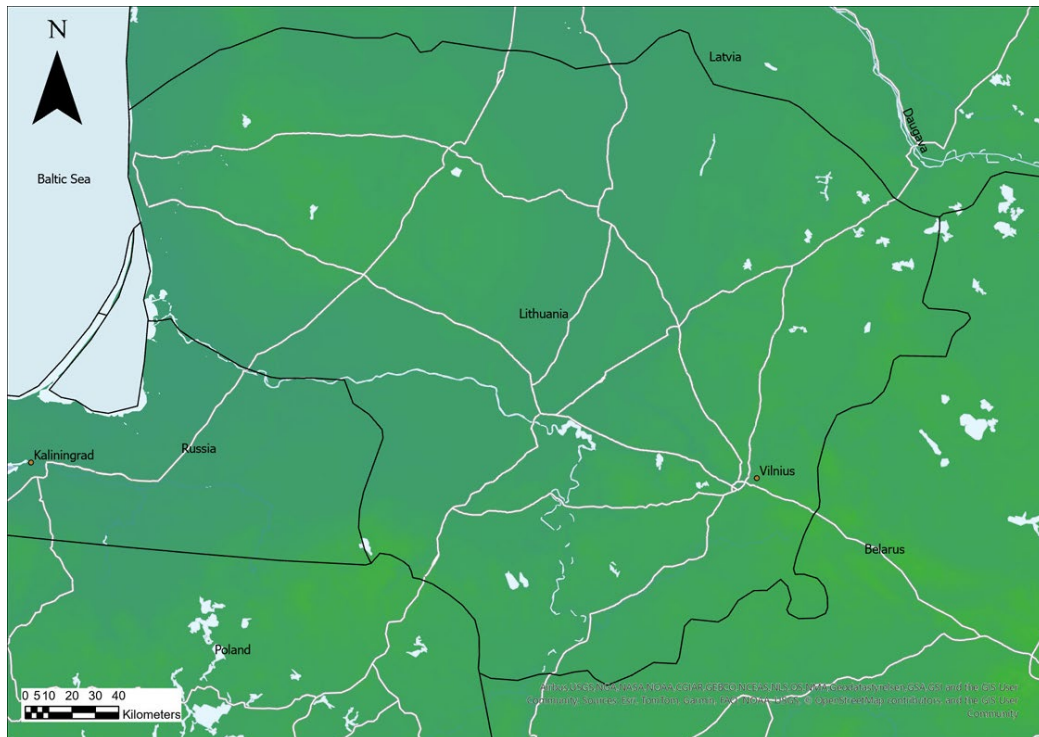
In summary, Ireland combines a humid central plain and Atlantic mountain chains that structure a diverse agro-climatic mosaic:

- the west and southwest, dominated by ruminant livestock grazing on permanent pastures and rolling topography;
- the east and southeast, with arable and horticultural land on well-drained soils and more stable sowing periods; and
- the uplands, where sheep and extensive cattle farming make use of high-altitude pastures.

4.1.4 Lithuania

Lithuania is a northeastern European country with a surface area of 65,300 km², bordered by Latvia to the north, Belarus to the east and south, Poland to the southwest, and Russia (Kaliningrad Oblast) and the Baltic Sea to the west. It has a coastline of about 262 km and a very low-relief landscape, with its highest point being Aukštojas (294 m a.s.l.), located in the Medininkai Highlands, southeast of Vilnius.

From an orographic perspective, the country is organized around a low-lying central plain (Central Lowland) surrounded by glaciogenic uplands and a low coastal belt. To the west, the Samogitian Upland (Žemaitija), an undulating moraine system acts as a watershed divide, to the east and southeast lie the Eastern Highlands (Aukštaitija/Medininkai) and along the Baltic coast stretches a 30-40 km wide coastal plain (the Klaipėda coast and Curonian Lagoon).



Map 4. Physical Map of Lithuania. Source: Author's own elaboration based on data processed in ArcGIS .

This alternation of low plains and moraine uplands, with loamy soils and interspersed peatlands, explains both the high agricultural suitability of the central depression and the livestock orientation of the wetter western uplands.

Climatically, Lithuania presents a humid temperate regime with a maritime-continental transition (Cfb along the coast, Dfb inland), characterized by cold winters, mild summers, and a marked west-east gradient: the coast shows stronger maritime influence, while the interior experiences greater thermal continentality.

Average annual precipitation is around 695 mm, with July as the wettest month (84 mm) and April as the driest (37 mm). The mean annual temperature ranges between 7- 8 °C, with cool, rainy summers and long, cold winters.

These climatic conditions shape the structure of Lithuania's agricultural and livestock systems. In the central plain, spring and autumn cereals (wheat, barley, oats) and oilseeds (rapeseed) dominate, taking advantage of deep, loamy soils. In the eastern and Suvalkian (southern) regions, the mosaic of morainic ridges and glacial sands favors cereal-potato-forage rotations and sugar beet cultivation in high-productivity areas. The Samogitian west combines

permanent pastures and forage crops in a more undulating and humid landscape. Along the Baltic coast (Klaipėda and its hinterland), the mild climate and sandy soils limit intensification except in selected areas.

In terms of livestock, Lithuania is a predominantly dairy-oriented country, with a well-established export industry that has undergone intensification and consolidation processes (fewer farms, larger herds), relying on pastures and silage as the main feed base.

Livestock production is concentrated mainly in the western regions, which are more humid (Samogitia and its surroundings), while arable cereal and rapeseed cultivation dominate in the central and eastern areas.

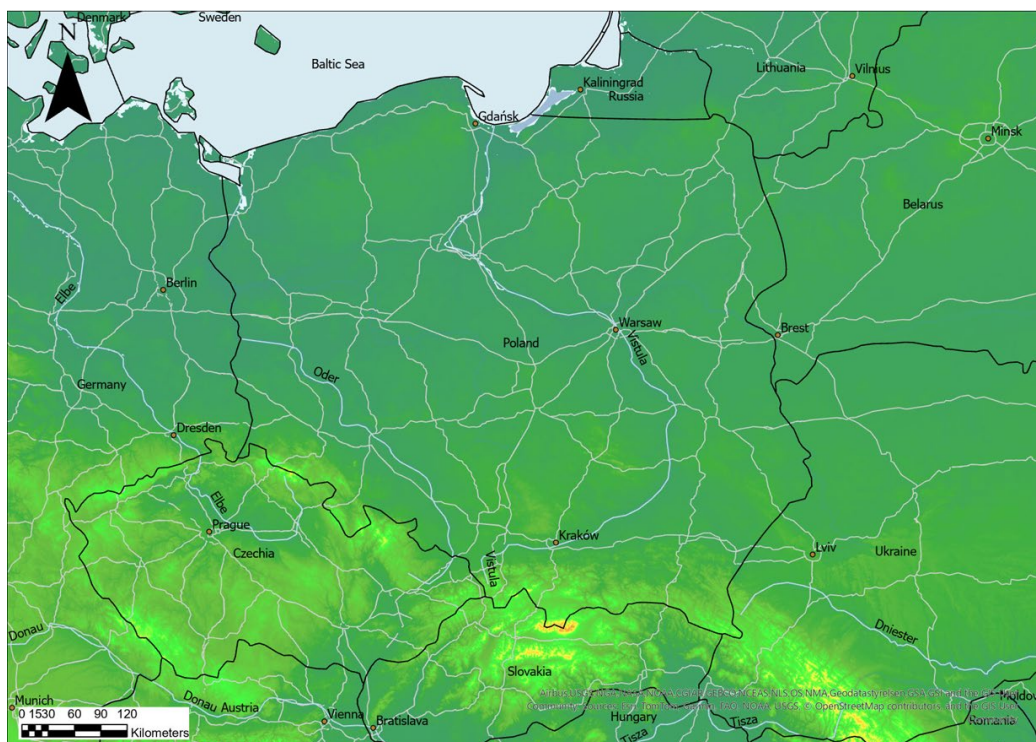
Pig farming and poultry production complete the zootechnical landscape, typically located near industrial hubs and cereal-producing zones.

In summary, the fertile central plain, the peripheral glacial uplands, and the mild coastal belt form an agro-climatic mosaic where the central-east prioritizes cereals, rapeseed, and potatoes; the west stands out for pastures and dairy cattle; and the south and southeast combine mixed crop rotations, depending on soil texture and water availability.

4.1.5 Poland

Poland is a Central European country with access to the Baltic Sea in the north and borders with Germany to the west, the Czech Republic and Slovakia to the south, Ukraine and Belarus to the east, Lithuania to the northeast, and the Russian exclave of Kaliningrad and the Baltic Sea to the north.

Its territory covers 312,696 km² and is organized around the North European Plain, which dominates the central and northern regions. The country features a sandy coastline with lagoons and coastal barriers, an interior shaped by glaciation with moraine hills and numerous lakes, and a mountainous southern edge formed by the Sudetes and Carpathians, with peaks exceeding 2,400 m a.s.l. in the Tatras. These orographic units act as both climatic corridors and barriers, influencing the distribution of soils, wetlands, and agricultural uses in the intra-mountainous depressions of the south and the lake districts of the north.



Map 5. Physical Map of Poland. Source: Author's own elaboration based on data processed in ArcGIS.

Poland's climate is temperate (Cfb/Dfb), representing a transition between the oceanic regime of Western Europe and the continental regime of Eastern Europe. A clear west-east gradient is observed, from maritime to continental conditions, with cold winters, mild to warm summers, and marked interannual variability.

The average annual precipitation ranges from 600-800 mm along the Baltic coast and in the northwestern and northeastern lake districts (Cfb/Cfc; Pomerania and Masuria), to 500-600 mm across the central and eastern plains (Dfb). In the southern mountain areas (Sudetes and Carpathians), precipitation often exceeds 1,000 mm, with a prolonged snow regime (Dfc/H).

Based on these geographical and climatic features, Polish agriculture combines arable land in the central and eastern regions (adapted to the more continental climate and the fertile loess plains) with livestock systems based on permanent pastures in the humid north and northeast, particularly in the regions of Pomerania, Warmia-Masuria, and Podlaskie.

Wheat is the main cereal crop and is widely cultivated throughout the country. Rapeseed is also one of the most important crops, covering approximately 1 million hectares, with broad distribution across the northwestern, western, and central voivodeships of Poland. In total, 2024 cereal production reached around 35 million tonnes, according to national statistical summaries. These figures align with the agro-climatic pattern of loamy and loess soils across the Wielkopolska-Kujawy-Mazovia belt, where maize and forage crops for silage are expanding, alongside winter wheat cultivation in the west and southwest.

Temperate fruit growing has a particularly emblematic area in the Grójec-Warka arc, south of Warsaw, where vast apple orchards position Poland as one of Europe's leading apple producers and exporters.

Regarding livestock, Poland is among the largest dairy producers in the European Union. Dairy herds are concentrated in the northeast and central-east (voivodeships of Podlaskie, Mazowieckie, and, to a lesser extent, Warmińsko-Mazurskie and Wielkopolskie), where rainfall, heavy soils, and permanent pastures support forage-based systems.

Pig farming is concentrated in the west-central regions, with Wielkopolskie as the leading voivodeship by herd size, followed by Mazowieckie. Animal health risks, such as African Swine Fever, remain significant, with outbreaks reported by the Ministry in several regions during 2024.

The agricultural structure of Poland is completed by regional crop specializations, notably sugar beet cultivation in the eastern and southeastern parts of the country, particularly in the Lubelskie, Mazowieckie, and Świętokrzyskie voivodeships, where fertile soils and a well-established processing industry network coincide.

In summary, the Baltic Plain, with its glacial belts, together with the southern mountain systems, explain Poland's agro-climatic mosaic:

- arable lands (cereals and rapeseed) dominate in the central, western, and southwestern regions;
- dairy cattle farming prevails in the humid northeast and north;
- pig production is concentrated along the Wielkopolska-Mazovia corridor; and
- temperate fruit cultivation, especially apples, represents a hallmark of the Grójec area.

4.2 Conventional and Organic Production Structure

This section aims to characterize the production structure of Bulgaria, Spain, Ireland, Lithuania, and Poland, considering both conventional and organic systems.

To gain a deeper understanding of the most relevant agricultural sectors in each country, Figures 1, 2, 3, 4, and 5 show the percentage value of the main agricultural production features.

In **Bulgaria**, with an "Agriculture Industry" value of €4,969.24 million in 2024, the sector shows a strong bias toward crop production, which accounts for over 60% of the total value.

The dominant crop group is cereals, amounting to €1,737.88 million (34.97%), followed by industrial crops (mainly sunflower and rapeseed), contributing €908.07 million (18.27%). These figures confirm Bulgaria's specialization in extensive crops oriented toward export markets, particularly European and Asian destinations.

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The livestock sector, by contrast, plays a less prominent role: milk represents €366.65 million (7.38%), and pork meat accounts for €241.46 million (4.86%). Fruit and vegetable production and other high-value products are relatively marginal.

Overall, Bulgaria maintains an extensive, cereal-based agricultural model, characterized by low agro-industrial integration and a high dependence on climatic conditions and international price fluctuations.

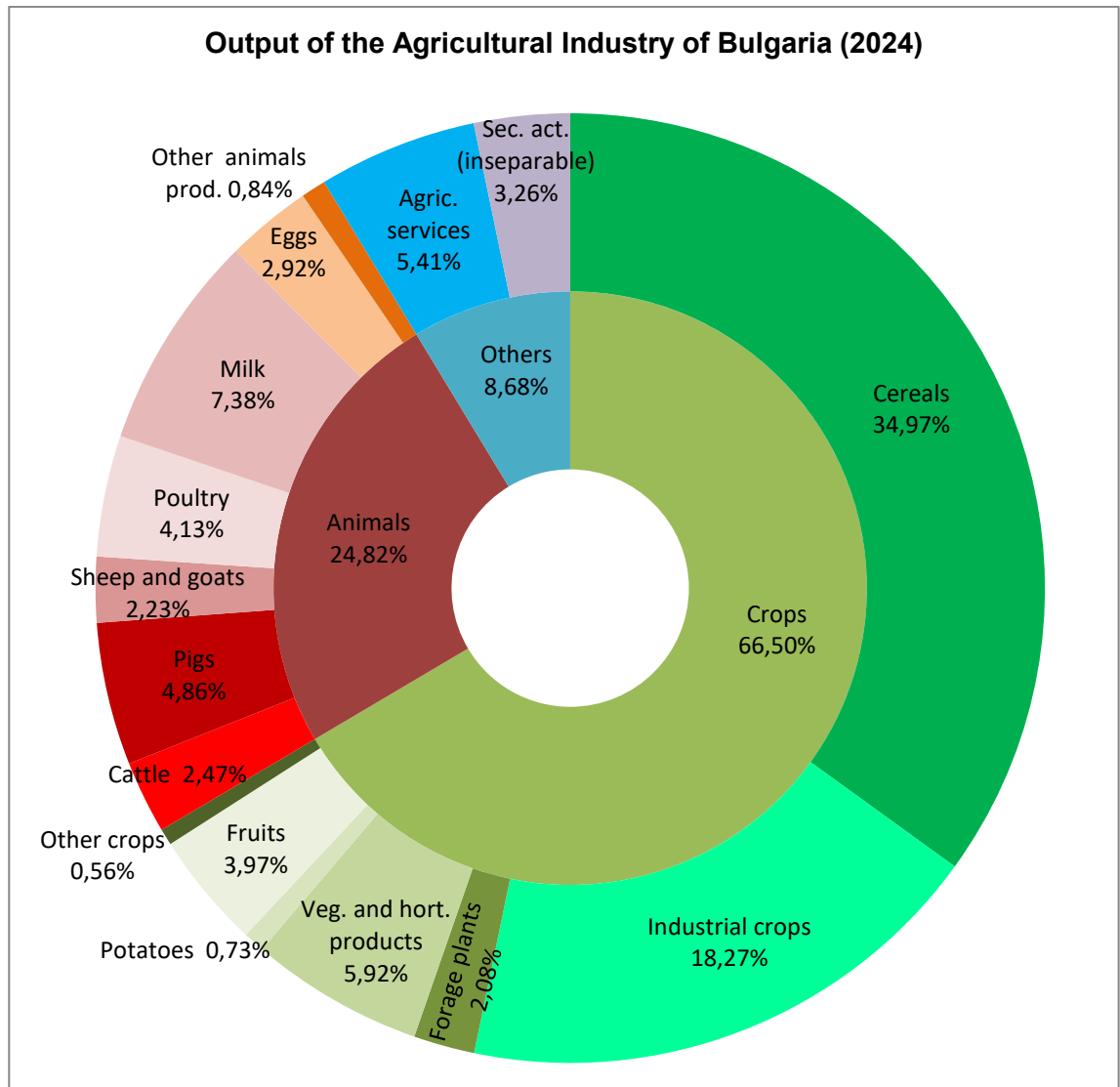


Figure 1. Output of the Agricultural Industry of Bulgaria (2024). Source: Own elaboration based on Eurostat data (2024).

Spain, with an Agricultural Industry value of €67,483.35 million in 2024, has one of the most balanced and diversified production structures in the European Union, combining a strong crop sector with a modern and technologically advanced livestock sector.

The agricultural sector accounts for slightly more than half of the total (55.91%). Fruit and vegetable products stand out, reaching €11,649.86 million (17.26%) and €12,182.12 million (18.05%) respectively, followed by olive oil (€3,695.74 million; 5.48%) and wine (€1,353.87 million; 2.01%), both pillars of the Mediterranean export oriented model.

In the case of olive oil, Spain is the world's largest producer and exporter, while in the case of wine, it has the largest vineyard area for wine grapes globally but ranks third in production volume, with average export prices per litre significantly lower than those of France and Italy.

The livestock sector represents around 41.85% of the total value. Within this sector, pig farming (€11,129.62 million; 16.49%) and milk production (€4,909.90 million; 7.28%) are the main subsectors, followed by poultry (€3,818.59 million; 5.66%).

Although sheep and goat farming accounts for only 1.82% of total value, Spain is one of the EU countries with the largest herds of these species and achieves high value-added products, particularly through cheeses made from sheep and goat milk.

Spain thus combines intensive and high value-added productions (fruit and vegetables, wine, olive oil, pork) with a robust processing and export industry, making it one of Europe's leading agri-food powers.

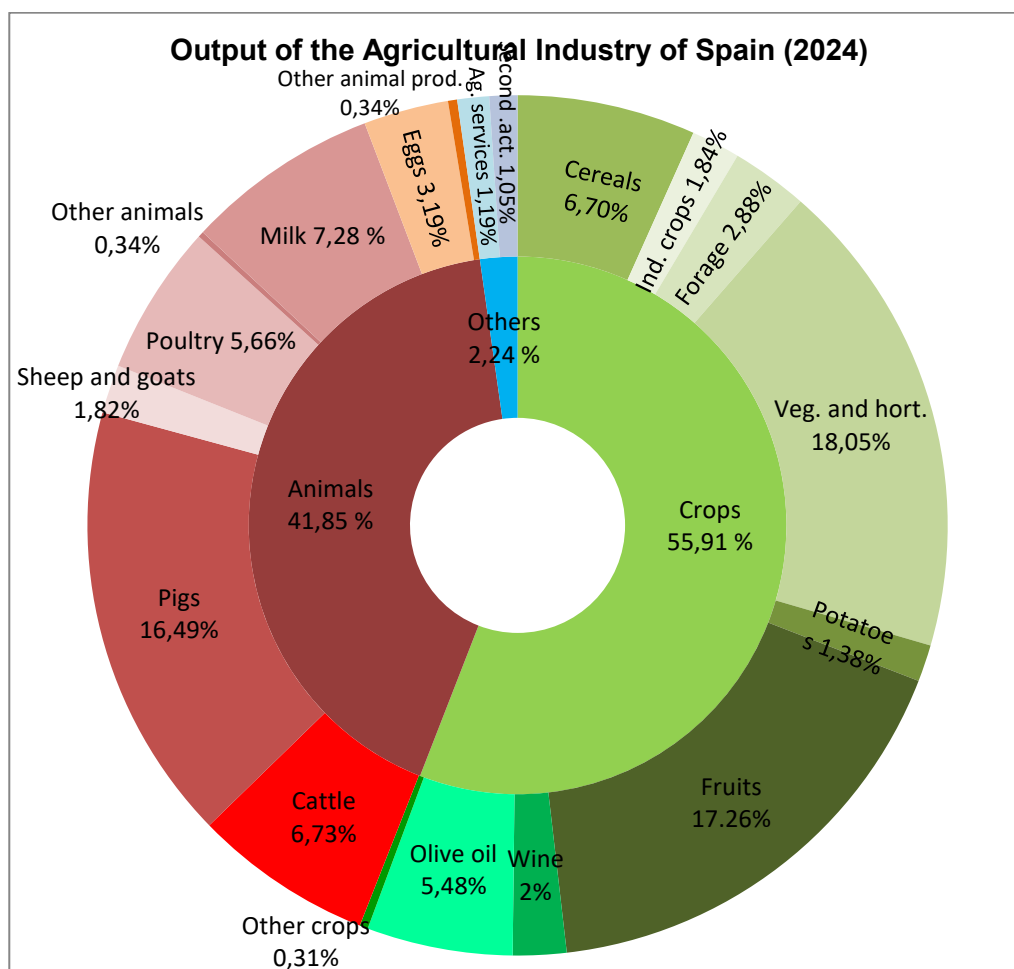


Figure 2. Output of the Agricultural Industry of Spain (2024). Source: Own elaboration based on Eurostat data (2024).

Ireland, with an “Agriculture Industry” value of €12,227.57 million in 2024, is a paradigmatic case of livestock specialisation within the European Union. The animal sector represents 73.57% of its total agricultural value, reflecting a model based on pasture-based production and the export of animal-origin products.

The main economic driver is milk, accounting for €4,064.27 million (33.2%), followed by beef, which contributes €3,119.45 million (25.5%).

Pig farming (€702.57 million; 5.7%) and sheep farming (€431.19 million; 3.5%) complement the livestock system.

Crop production, on the other hand, has little weight: cereals barely reach 3.5%, vegetables and potatoes account for 5.3%, and fruit for around 0.5%.

The Irish model is therefore highly specialised and efficient in dairy and meat production, with professionalised farms and an agri-food industry that is strongly export-oriented, as over 90% of dairy output is destined for foreign markets.

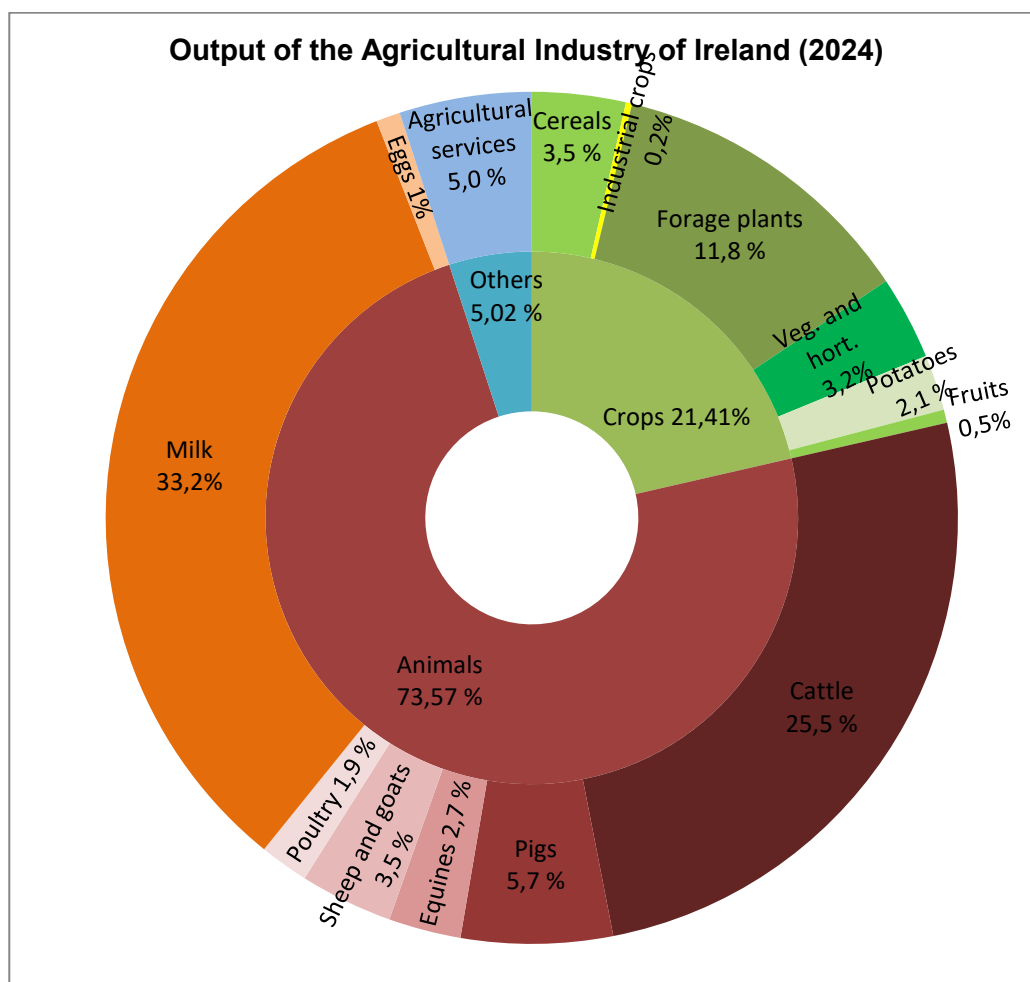


Figure 3. Output of the Agricultural Industry of Ireland. Source: Own elaboration based on Eurostat data (2024).

Lithuania, with an Agricultural Industry value of €4,395.22 million in 2024, presents a predominantly crop-based structure, with the agricultural sector accounting for around 58.05%, compared to 30.97% for the livestock sector. Secondary activities inseparable from primary production account for 10.98%, the highest share among the countries analysed. Agricultural services represent 1.32% of the total, a figure similar to that of Spain, but well below Ireland and Bulgaria, where such services reach around 5.41%.

Cereals (€1,252.56 million; 28.50%) and industrial crops (€670.46 million; 15.25%) form the core of Lithuania's crop production, which is oriented toward both domestic markets and exports, especially grain and rapeseed.

Within the livestock sector, milk stands out as the main product, generating €619.12 million (14.09%), while pork (€185.46 million; 4.22%) and poultry (€201.28 million; 4.58%) hold moderate importance.

Lithuania's production structure reflects a gradual transition toward diversification, marked by the development of the dairy processing industry and the modernization of the cereal sector, both supported by CAP funds.

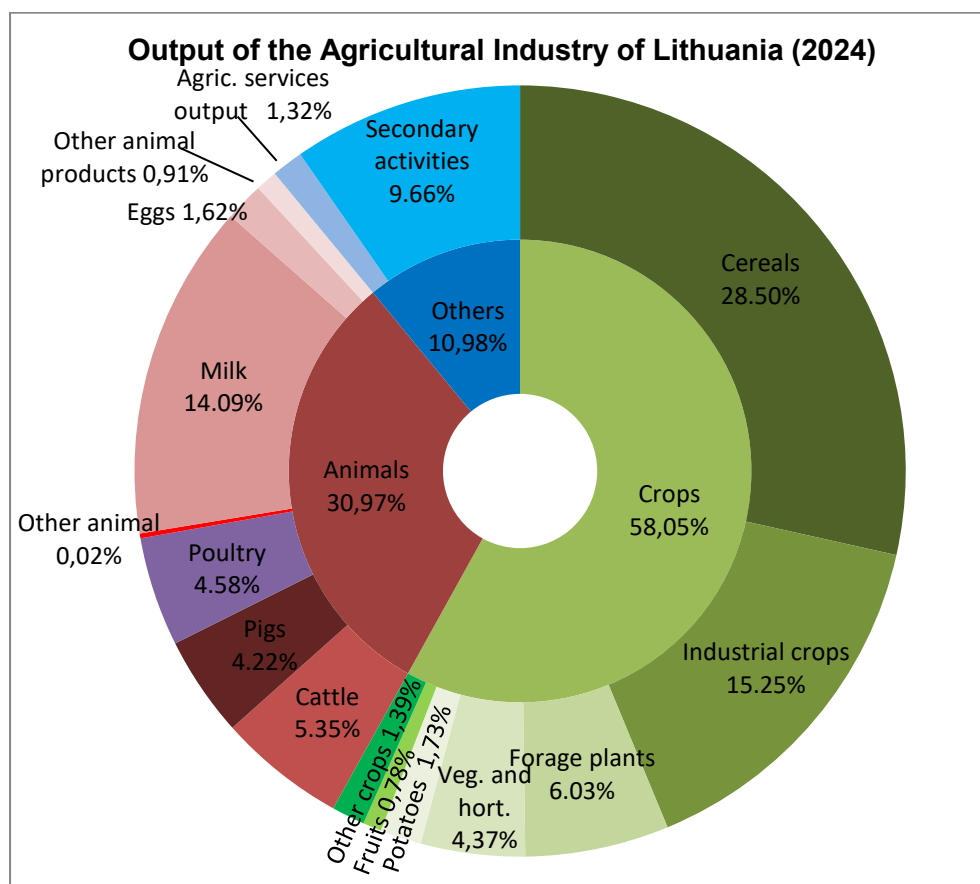


Figure 4. Output of the Agricultural Industry of Lithuania (2024). Source: Own elaboration based on Eurostat data (2024).

Poland, with an Agricultural Industry value of €37,812.32 million in 2024, has a well-balanced agrarian structure, with the livestock sector representing 50.54% and the crop sector accounting for 45.96%. Agricultural services make up 2.49%, while secondary activities inseparable from primary production represent only 0.49%.

Within the livestock sector, milk production stands out, accounting for 18.41% of the total value (€6,962.01 million), making Poland one of the largest dairy producers in the EU. Poultry farming is also highly developed, in fact Poland is the leading producer of chicken meat in the European Union, contributing 22% of total EU production and representing 12.83% of the country's Agricultural Industry (€4,852.55 million).

Pig, beef, and egg production complete the Polish livestock sector, each contributing around 6-7% of the total value.

In the crop sector, cereals are the most important category (15.92%; €6,020.97 million), with rye, barley, and maize as the leading crops. Horticultural production also holds significant weight (10.96%), along with industrial crops (notably oilseeds and sugar beet) which represent 7.82%.

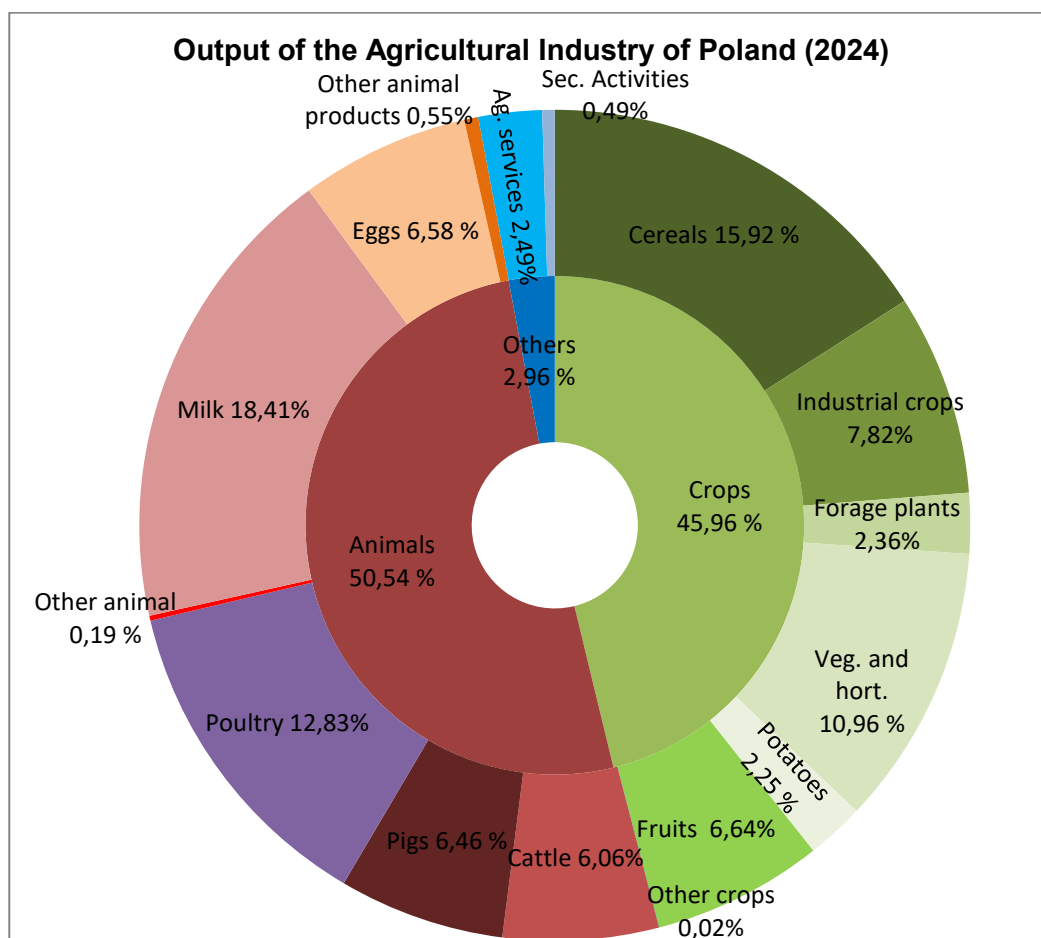


Figure 5. Output of the Agricultural Industry of Poland (2024). Source: Own elaboration based on Eurostat data (2024).

The structural analysis of the five countries studied (BG, ES, IE, LT, PL) reveals common patterns of declining farm numbers and land concentration in larger-size holdings, although with notable differences in internal distribution and in the adoption of organic production.

Regarding the **number of agricultural holdings**, Poland is the country with the highest number of farms among those analysed (and the second in the EU-27 after Romania), with 1,232,600 holdings in 2024 (Statistics Poland, 2025: p. 89).

Spain follows with 802,480 agricultural holdings (Eurostat, 2025), ranking fourth in the EU, after Romania, Poland and Italy.

In third place is Ireland, with 130,220 holdings in 2020, followed by Lithuania, with 119,620 agricultural holdings in 2023, and finally Bulgaria, with 107,630 holdings also in 2023 (Eurostat, 2025).

Figure 6 shows the evolution of the number of agricultural holdings in the five countries under study.

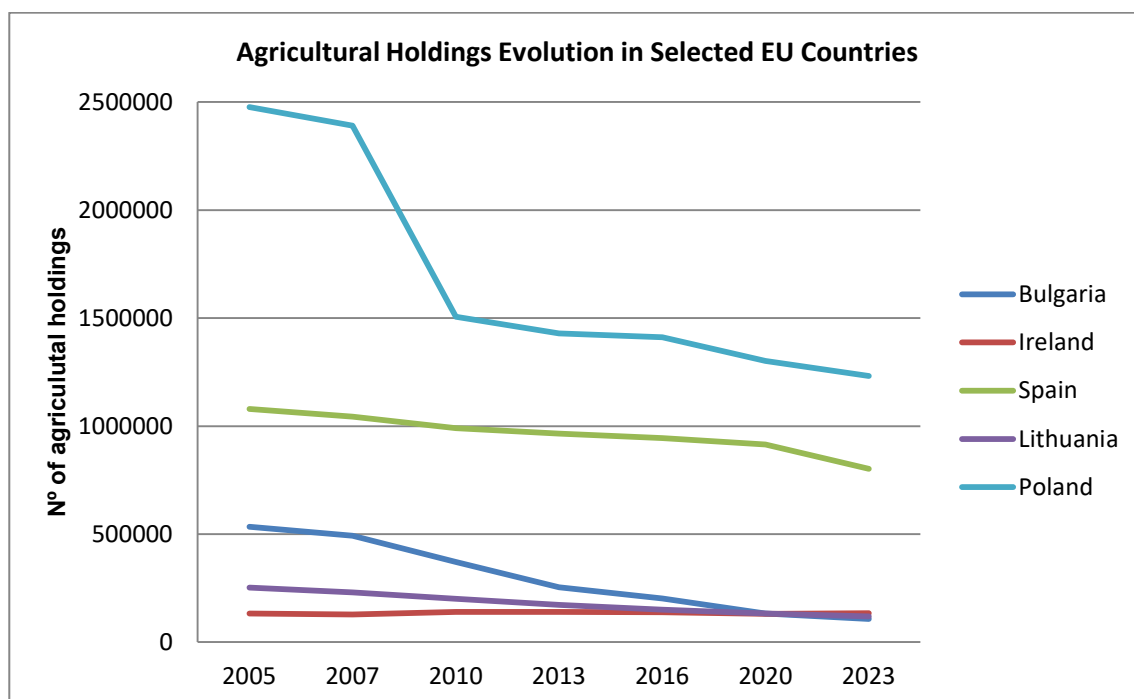


Figure 6. Evolution of Agricultural Holdings numbers in Selected EU Countries. Source: Own elaboration based on Eurostat (2025), Statistics Poland (2025) and Central Statistics Office (2024).

As shown in Figure 6, the trend in all countries studied—except Ireland—is a decline in the number of agricultural holdings. In the case of Poland, there has been a 50.23% reduction in the number of farms over 18 years, with the sharpest drop occurring between 2007 and 2010.

In Bulgaria, the decrease reaches 79.89% and appears to be continuing along the same negative slope. In Lithuania, the reduction is 52.71%; and in Spain, 25.66%.

Ireland is the only country among those analysed that has maintained a relatively stable number of farms over time.

Regarding the average farm size, all countries show a shift away from small farms in favor of larger holdings. The distribution of the number of holdings by size category can be seen in Figure 7.

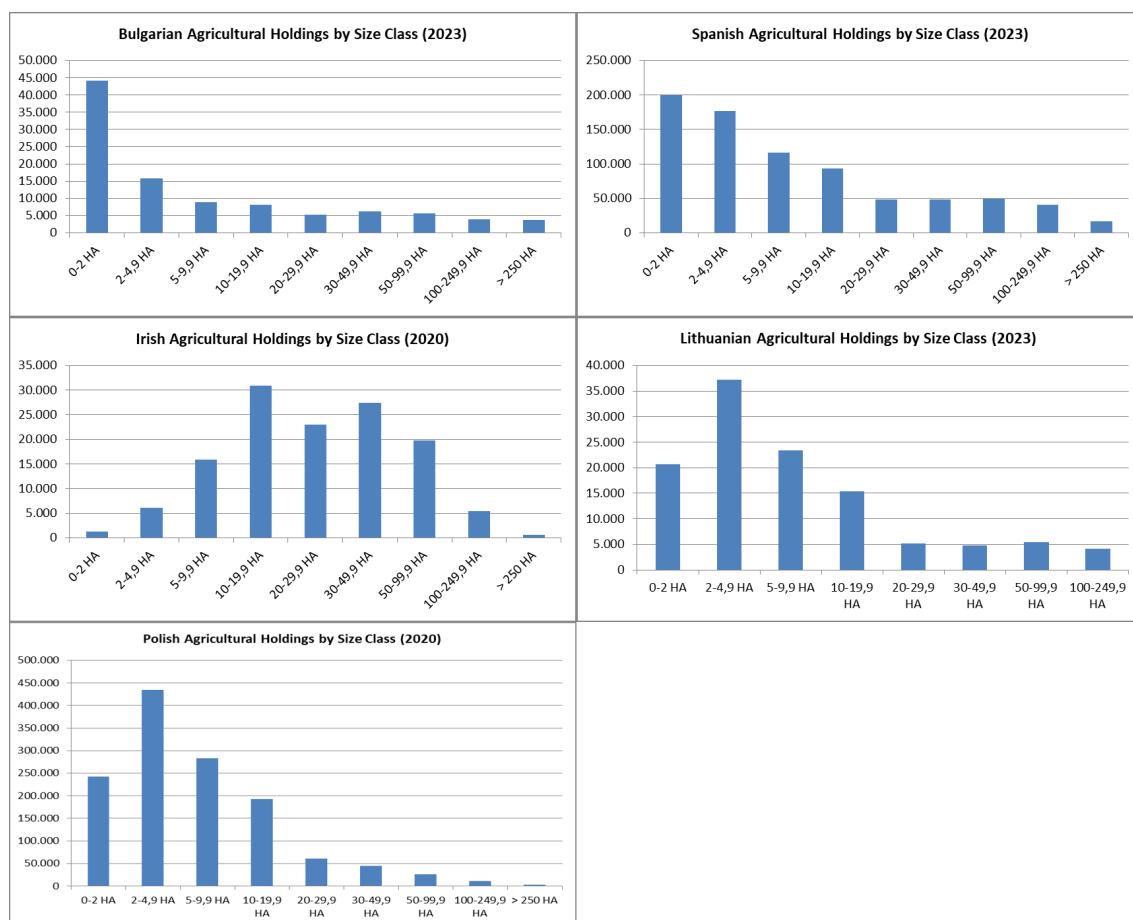


Figure 7. Distribution of agricultural holdings by size in the five countries under study. Own elaboration based on Eurostat data (2025).

As shown in Figure 7, in Bulgaria and Spain, farms of 0-2 ha predominate, while in Poland and Lithuania, the most frequent size group is 2-4.9 ha. In these four countries, small holdings continue to dominate, whereas in Ireland, the most common farm size is 20-29.9 ha, followed by 50-99.9 ha.

Despite the predominance of small-scale farms, the growth trend of larger holdings is positive, as evidenced by the tables showing the evolution of the proportion of agricultural holdings by size in Annex 7.2.

The tables of the Annex 7.2. reveal a steady increase in medium and large size classes across all countries, with particularly strong growth in Bulgaria (≥ 10 ha $\approx 30.4\%$ in 2023) and Spain (≥ 50 ha = 13.2% in 2023).

Regarding the Utilized Agricultural Area (UAA), it appears to have remained relatively stable in most countries despite the reduction in the number of agricultural holdings. Figure 8 shows the evolution of the UAA in each country.

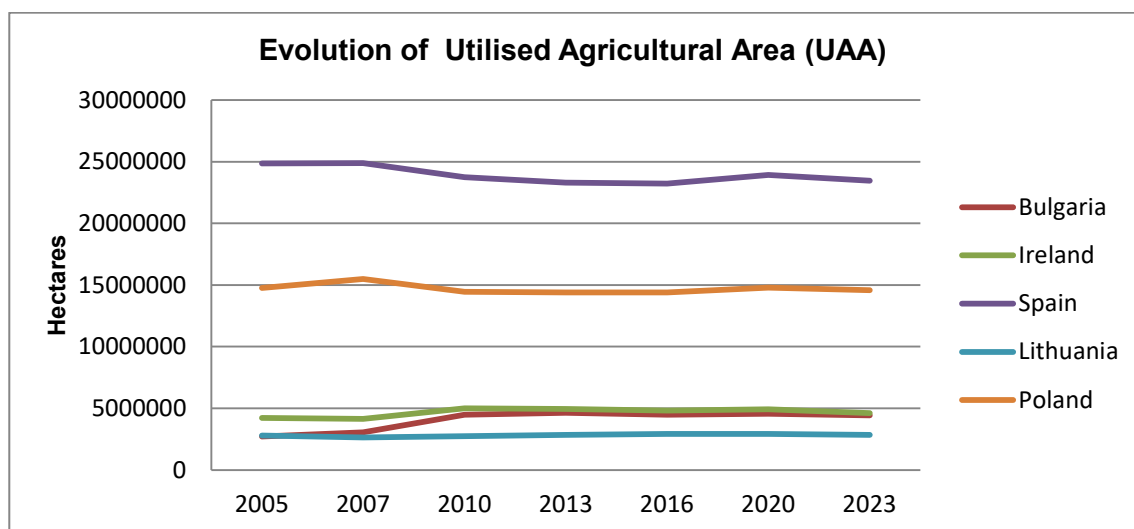


Figure 8. Evolution of Utilised Agricultural Area (UAA). Source: Own elaboration based on Eurostat (2025) and Statistics Poland (2025).

Land use patterns vary significantly across countries.

In **Bulgaria**, forest area accounted for 33.26% of the total territory in 2024, while agricultural land represented 54.50% (National Statistical Institute, 2025).

As shown in Figures 9 and 10, arable land largely exceeds permanent grassland (67% vs. 26%), and this distribution has remained relatively stable in recent years.

Agricultural Land Use Distribution in Bulgaria (2023)

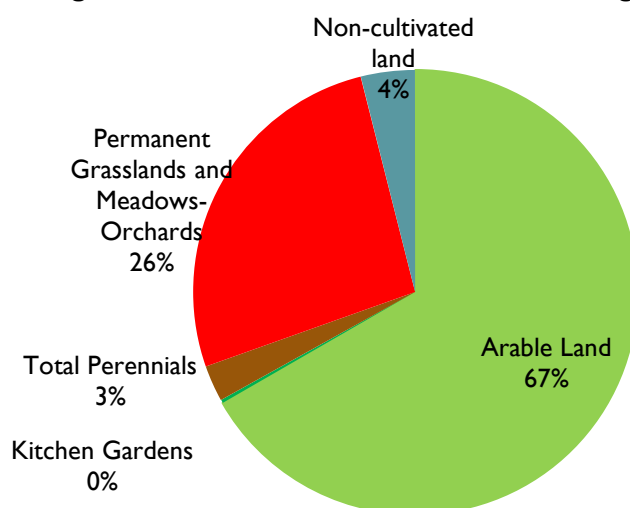


Figure 9. Land Use Distribution in Bulgaria (2023). Own elaboration based on the Ministry of Agriculture and Food, Annual report on the state and development of agriculture 2024.

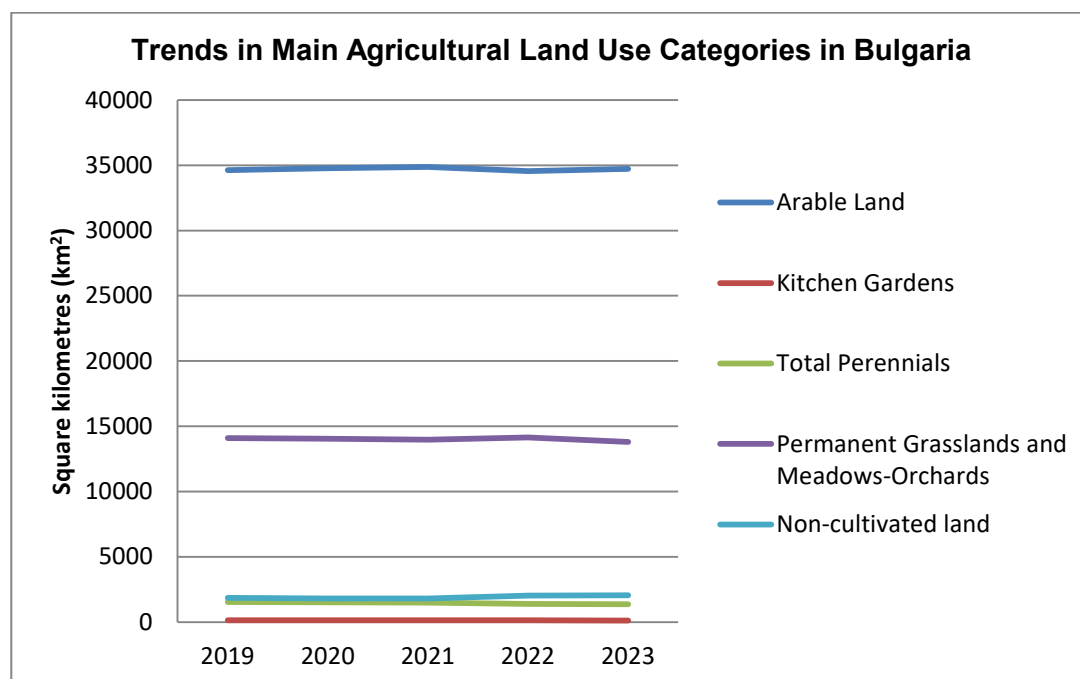


Figure 10. Trends in Main Agricultural Land Use Categories in Bulgaria (2023). Own elaboration based on the Ministry of Agriculture and Food of Bulgaria, Annual report on the state and development of agriculture 2024.

In **Spain**, forest area accounted for 38.8% of the total territory in 2022, making it one of the EU-27 countries with the largest forested area.

Land used for agriculture (herbaceous crops, woody crops, and fallow land) represented 32.8%, while livestock-related areas (natural pastures, grasslands, and rough grazing) accounted for 19.5% (see Figure 11).

The area under fallow and rough land have been gradually decreasing, whereas pasture areas have steadily expanded since 2014 (see Figure 12).

Land Use Distribution in Spain (2022)

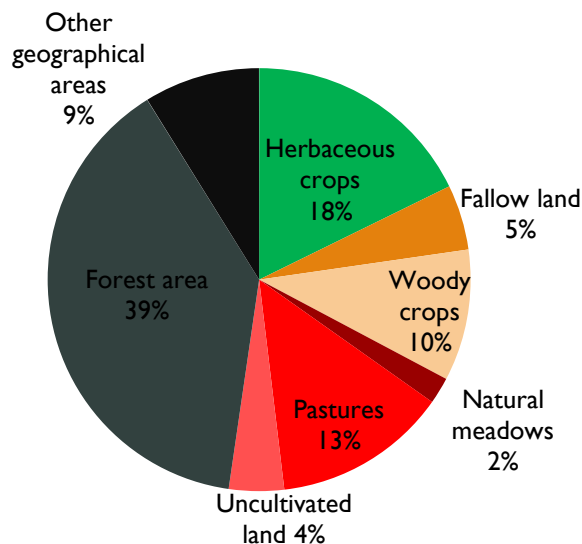


Figure 11. Land Use Distribution in Spain (2022). Own elaboration based on Anuario estadística 2023 (MAPA, 2024).

Trends in main land use categories in Spain

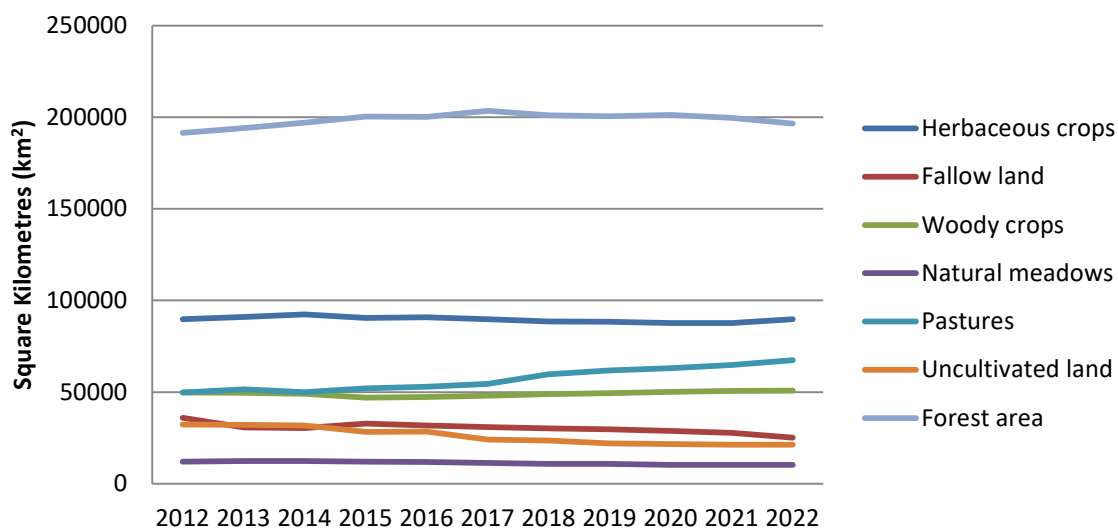


Figure 12. Trends in main land use categories in Spain Own elaboration based on Anuario estadística 2023 (MAPA, 2024).

In the case of **Ireland**, forest area represented 11.6% of the country's total surface area in 2022. Although this figure is well below the EU-27 average of 39%, it marks a historic maximum for Ireland, whose forest cover has steadily increased since 1950, when it accounted for only 1.4% of the national territory (*Forest Statistics Ireland 2022*, 2022).

As shown in Figures 13 and 14, 92% of Ireland's Utilized Agricultural Area (UAA) is devoted to pasture, and this share has been increasing in recent years, reflecting the strong livestock orientation of the Irish agricultural sector.

Agricultural Land Use Distribution in Ireland (2023)

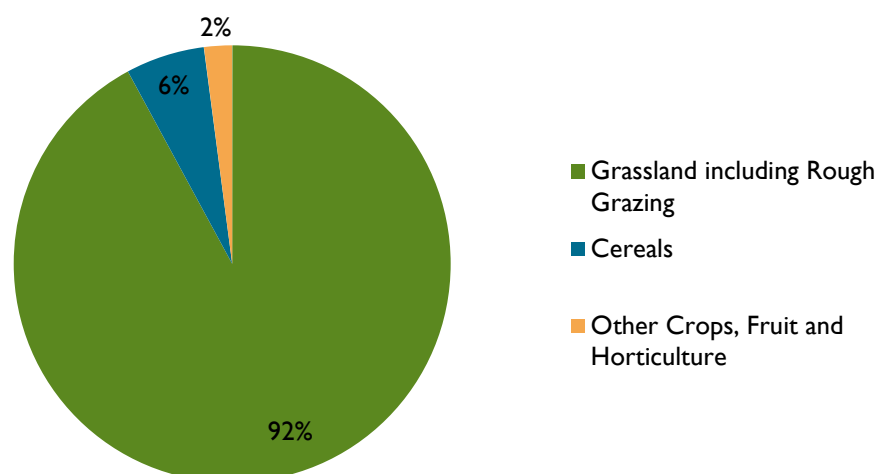


Figure 13. Agricultural Land Use Distribution in Ireland (2023). Own elaboration based on Farm Structure Survey 2023: Land Utilisation. Central Statistics Office (CSO), 2024.

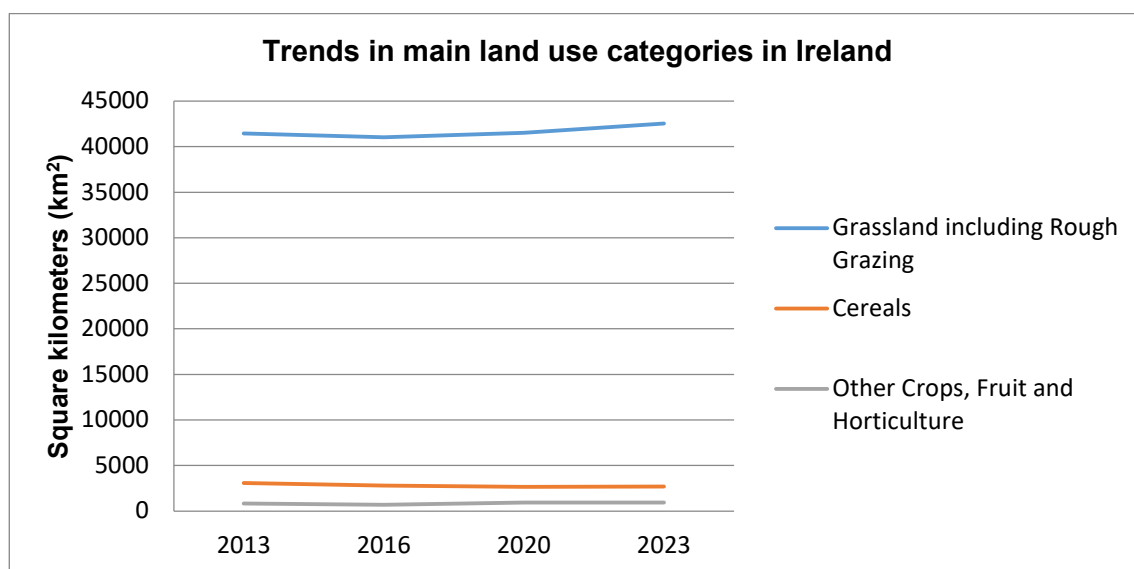


Figure 14. Trends in main land use categories in Ireland. Own elaboration based on Farm Structure Survey 2023: Land Utilisation. (CSO, 2024).

In **Lithuania**, forest area accounted for 32.87% of the country's total surface in 2024, while agricultural land represented 51.55%, primarily composed of arable land, which makes up 46.18% of the total area, compared to 5.11% for permanent pastures and meadows and 0.27% for orchards.

Figure 15 provides a more detailed view of land use in Lithuania, illustrating the predominantly agricultural character of the country's farming sector.

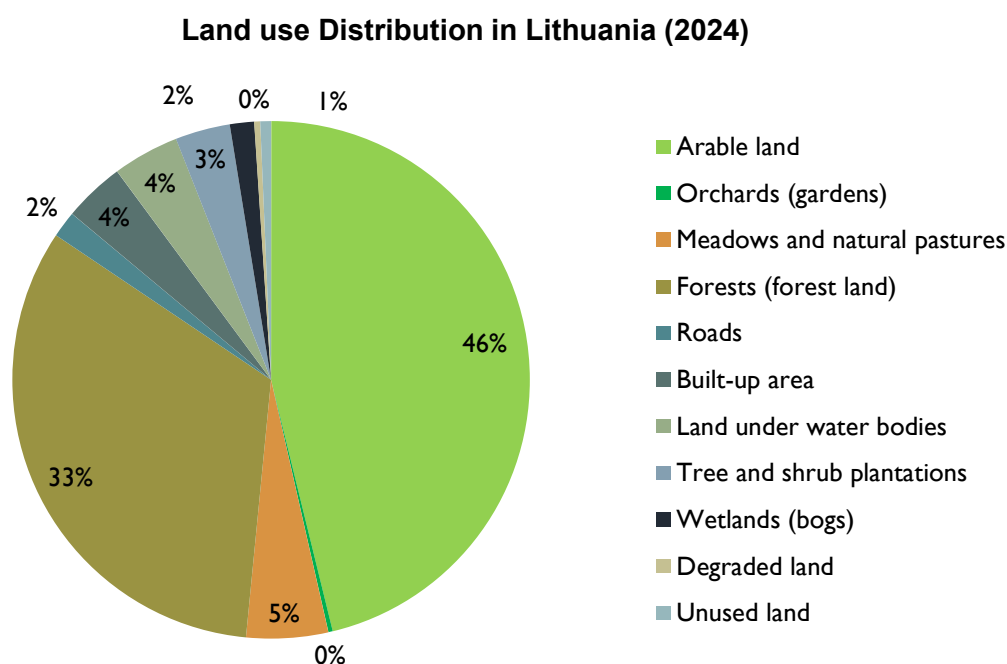


Figure 15. Land use Distribution in Lithuania (2024). Own elaboration based on Nacionalinė žemės tarnyba prie Žemės ūkio ministerijos (NŽT), 2025.

In **Poland**, forest area represents 30.3% of the country's total surface and has remained relatively stable over the past 15 years, as shown in Figures 16 and 17.

Agricultural land accounts for 59.5% of the total, with arable land dominating at 42.94%, compared to permanent meadows (7.03%) and permanent pastures (4.91%).

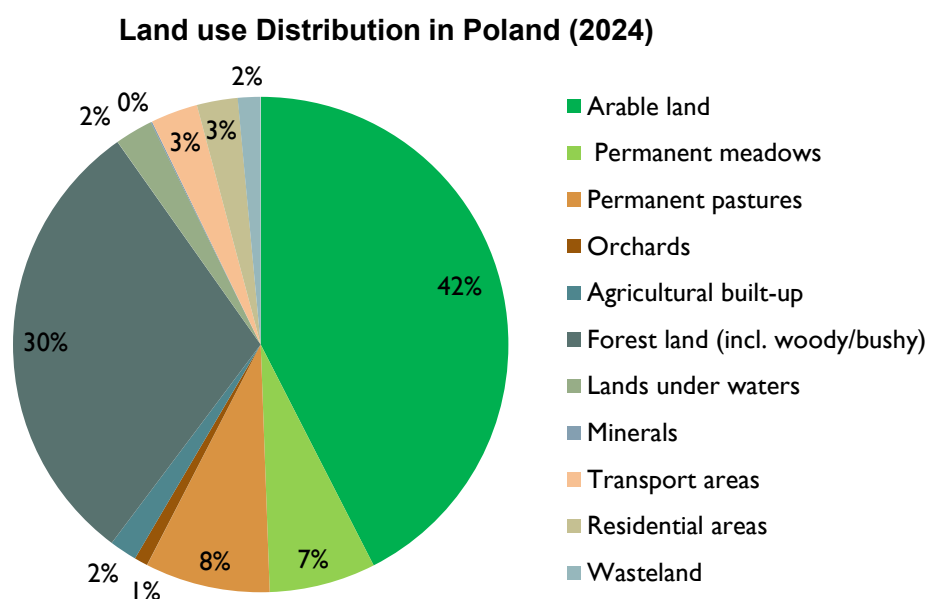


Figure 16. Land use Distribution in Poland (2024). Own elaboration based on Statistics Poland (2025).

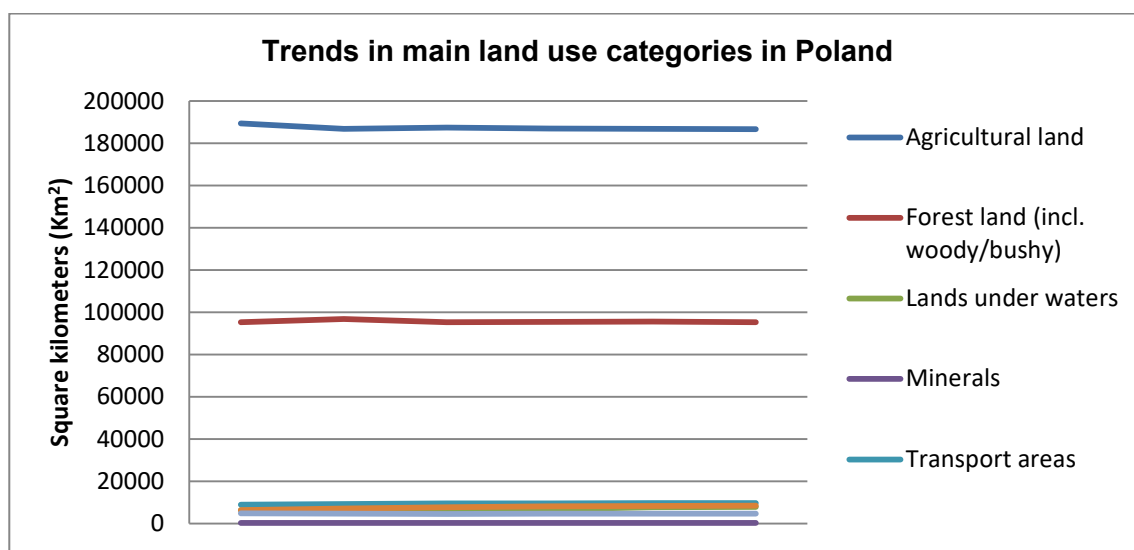


Figure 17. Trends in main land use categories in Poland. Own elaboration based on Statistics Poland (2025).

Organic production:

The organic farming area in the five European countries under study shows a positive trend over the years, although with significant differences among them.

Figure 18 illustrates the evolution of organic areas, including both certified and in-conversion land.

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Spain, with 2.99 million hectares under organic management, is the EU-27 leader in total organic farming area.

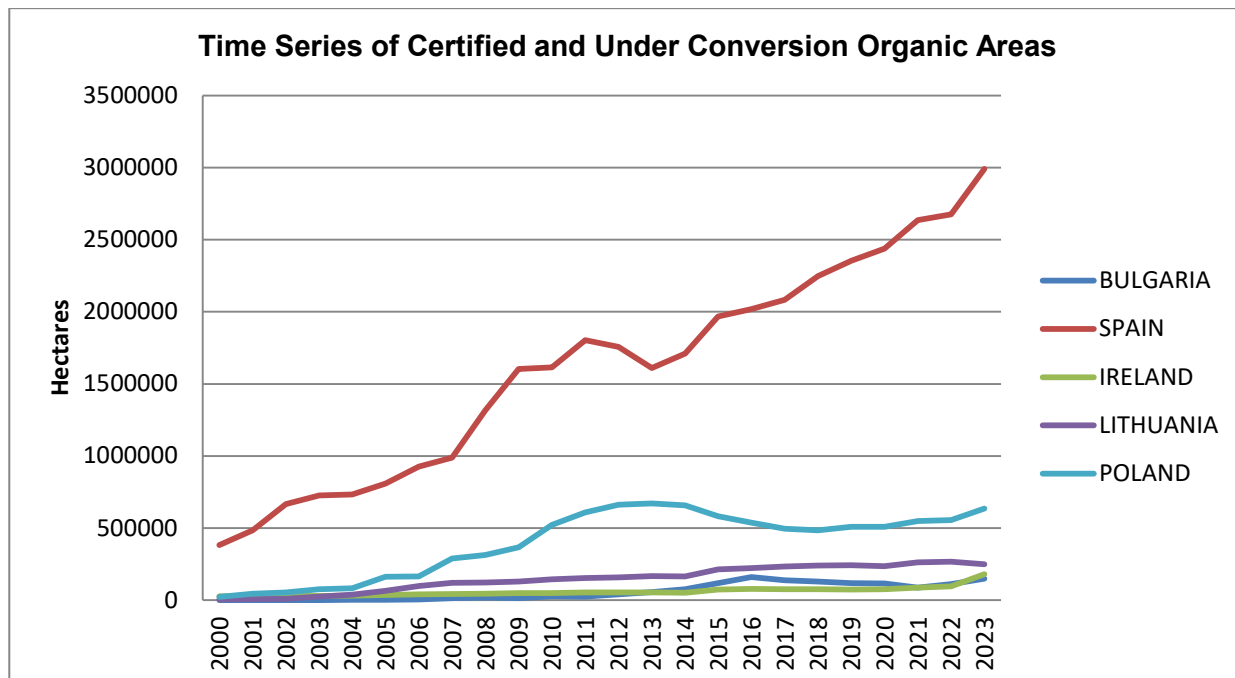


Figure 18. Time Series of Certified and Under Conversion Organic Areas. Own elaboration based on Research Institute of Organic Agriculture (FiBL), 2023.

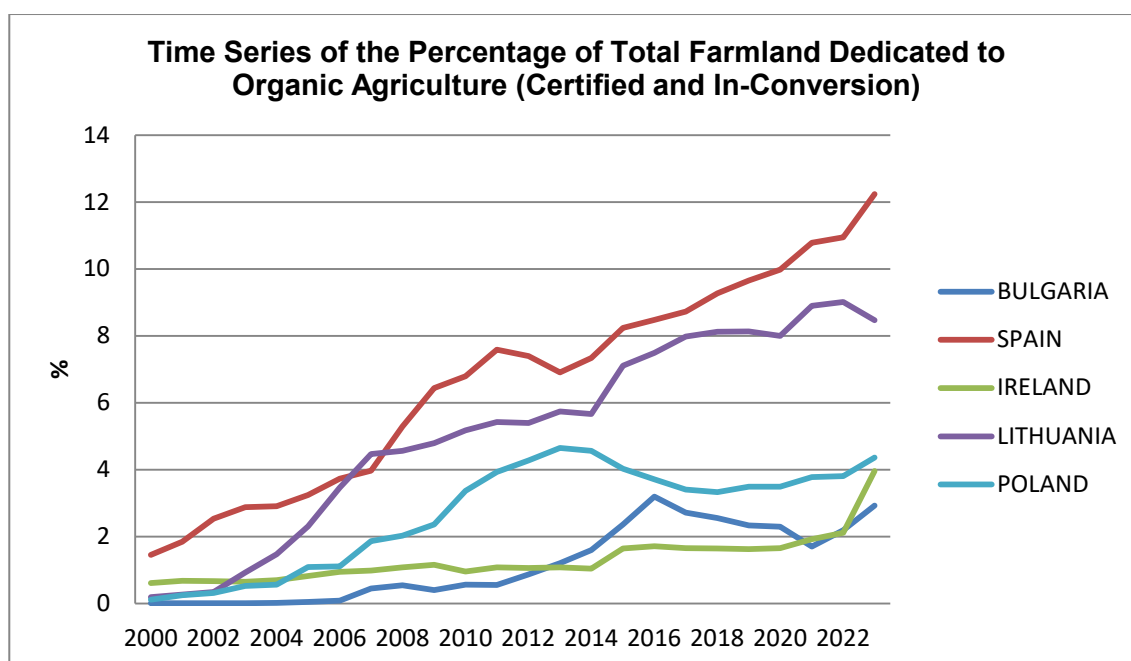


Figure 19. Time Series of the Percentage of Total Farmland Dedicated to Organic Agriculture (Certified and In-Conversion). Own elaboration based on Research Institute of Organic Agriculture (FiBL-CH), 2023.

As shown in Figure 19, the evolution of organic farming has experienced notable fluctuations since 2000. In the case of Poland, there was a sharp decline in organic area from 2014 to 2018, after which the trend turned positive again. A similar pattern can be observed in Bulgaria, where the organic area contracted significantly between 2017 and 2021, before reaching a turning point and resuming growth.

These changes in the evolution of organic areas are mirrored in the number of operators, as shown in Figure 20.

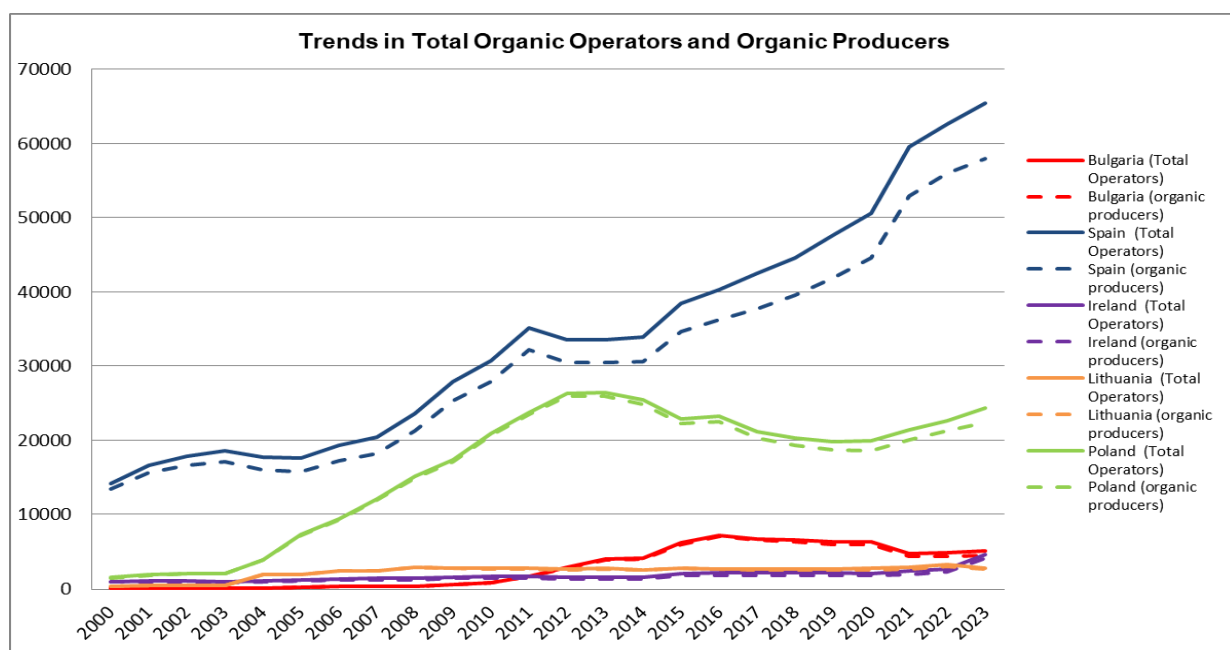


Figure 20. Trends in Total Organic Operators and Organic Producers. Source: Own elaboration based on Research Institute of Organic Agriculture (FiBL-CH), 2023.

The variations in the number of organic operators observed in Poland and Bulgaria are particularly striking.

The decline in operator numbers from 2014 and the negative trend until 2020 were likely the result of a combination of economic and market factors.

According to the European Commission's report Organic Farming in the EU (2023), in the case of Poland, the main reasons for this downturn include the low profitability perceived by producers, as the prices of organic products such as wheat barely exceed those of conventional ones, while in the case of milk, even negative price premiums have been recorded.

This situation is further aggravated by very limited domestic consumption (with per capita spending on organic food below €10 per year) reflecting a still incipient domestic demand.

The report also highlights the crucial role of the Common Agricultural Policy (CAP), which subsidises around 80% of the area devoted to organic farming. This creates a high level of dependency on public support, making the

development of organic farming in Poland heavily reliant on the amount and continuity of subsidies, and thus exposed to the risk of setbacks in the medium and long term.

In the survey conducted among Bulgarian farmers, the main reason they cited (at 40%) for abandoning organic farming was that there was barely any price difference between organic and conventional products. The other two main reasons were precisely the end of incentives and the decrease in agricultural yields.

Regarding the development of organic farming in Bulgaria, it can be observed that it began later than in the other countries analysed, particularly around 2007, coinciding with Bulgaria's accession to the EU.

Until 2016, organic farming experienced rapid growth, reaching 160,620 ha, a level that has not been reached again since.

According to Arabska et al. (2024), this initial expansion may have been driven by the interest of large-scale producers of extensive crops, such as sunflower and cereals, in accessing subsidies. These low value-added crops could benefit from support without requiring major changes in farming practices.

Between 2016 and 2021, there was a significant decline in both organic area and number of operators, which has been attributed to an excessive dependence on subsidies and the unpredictability and uncertainty of those payments (Arabska et al., 2024).

As Arndt & Apostolov (2023) note, the inability to guarantee area-based payments led to a decrease in organic farmland from 2018 onward.

These interpretations are consistent with the OFISET survey results among Bulgarian producers: among respondents who either had abandoned organic farming or knew someone who had, 80% stated that the reason was the termination of financial incentives.

It is also noteworthy that 72.2% of Bulgarian surveyed farmers did not know anyone who had reverted from organic to conventional farming, indicating that, at least within our sample, reconversion remains relatively uncommon.

Figure 21 shows the evolution of retail sales of organic products (in million euros), while Figure 22 illustrates the organic market share.

As can be seen, Spain has experienced continuous and rapid growth since 2006, reaching €2747.8 million in 2023.

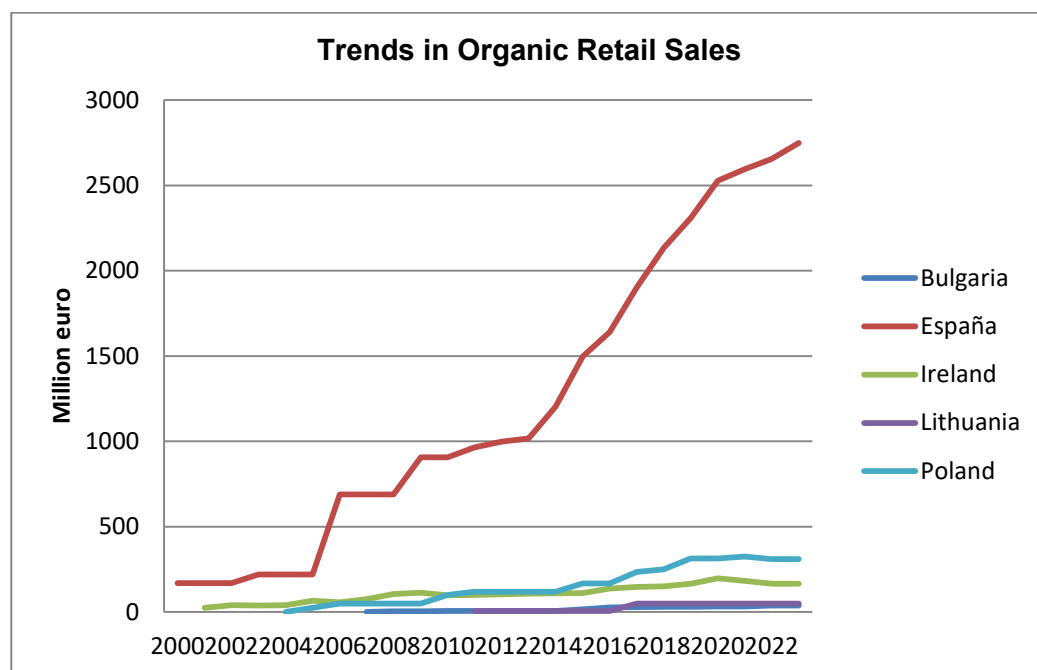


Figure 21. Trends in Organic Retail Sales. Source: Own elaboration based on Research Institute of Organic Agriculture (FiBL-CH), 2023.

Although the size of Spain's organic market is much larger than that of the other countries analysed, in terms of relative market share, Ireland leads among the countries studied with 2.73%, followed by Spain with 2.53%. Bulgaria and Lithuania both hold a 1.0% share, while Poland records the lowest with 0.57%. Those data are shown in Figure 22.

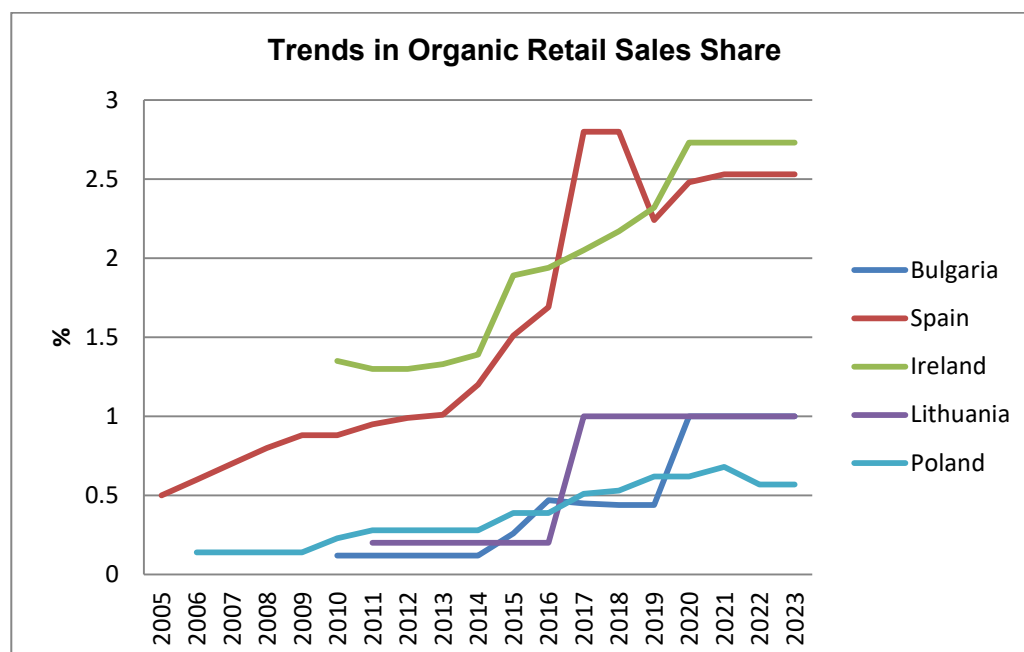


Figure 22. Trends in Organic Retail Sales Share. Source: Own elaboration based on Research Institute of Organic Agriculture (FiBL-CH), 2023.

Since 2020, there appears to be a certain stagnation in the organic market share across all the countries studied.

This stagnation is also reflected in domestic consumption of organic products in all the countries analysed, except in Spain, where domestic consumption continues to grow, driven by an increase in per capita consumption of food products.

This trend can be observed in Figure 23.

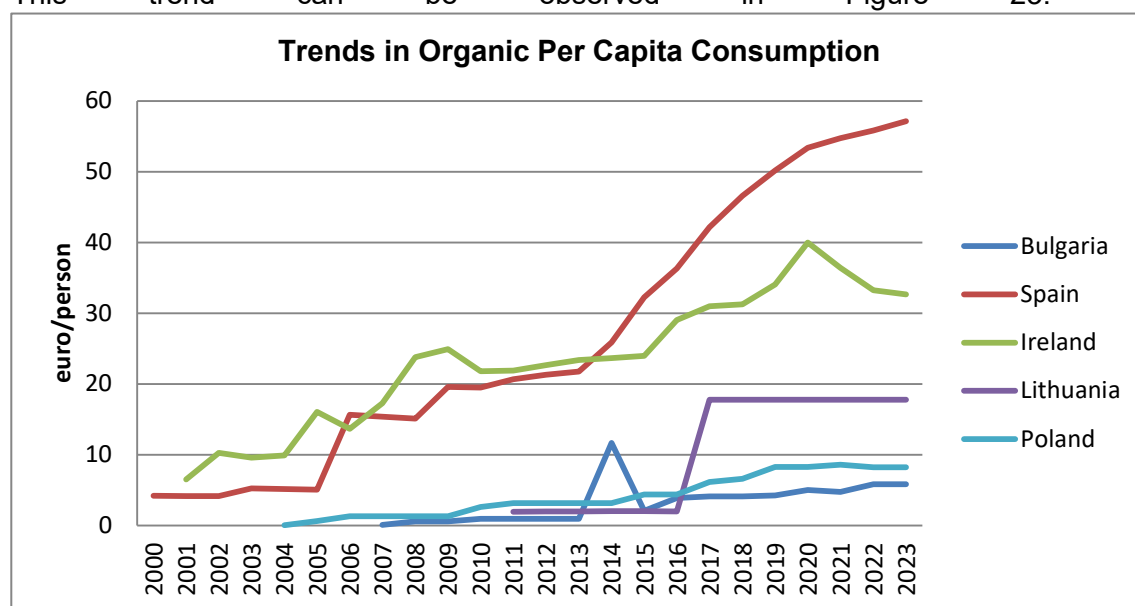


Figure 23. Trends in Organic Per Capita Consumption. Source: Own elaboration based on Research Institute of Organic Agriculture (FiBL-CH), 2023.

The stagnation, or even decline in the case of Ireland, in organic product consumption, according to the USDA Foreign Agricultural Service (2025), may be attributed to the impact of high inflation and lower disposable income, although a slow recovery appears to have begun in 2023.

This trend, however, does not apply to Spain, where according to Ecovalia (2024), inflation affected conventional food products more strongly than organic ones in Spain, with the conventional basket recording higher annual price increases than the organic basket. This difference may help explain Spain's continued growth in organic consumption, in contrast to the trends observed in the other countries studied.

4.3 Analysis of Productive Value: Composition and Trends

This section provides a comprehensive overview of the evolution of agricultural, crop, and livestock production, as well as income and price dynamics related to the primary sector in the five countries under study: Bulgaria, Ireland, Spain, Lithuania, and Poland.

The period considered spans 2000 to 2025, allowing for the identification of both long-term structural trends and recent cyclical effects, such as the COVID-19 pandemic, tensions in international food and energy markets, and the post-2021 inflationary surge.

Overall, a pattern of sustained agricultural growth can be observed, particularly in Spain and Poland, accompanied by an improvement in agricultural income and a rise in consumer prices (HICP), reflecting supply-side inflationary pressures.

The following sections present specific conclusions by indicator type.

The evolution of "Agricultural Industry Output", shown in Figure 24, which includes the combined value of crop and livestock production, as well as agricultural services and secondary activities inseparable from primary production, displays a positive trend across all five countries studied.

Over the past 25 years, all countries have increased their total output value, with particularly strong growth in Lithuania (280.9%) and Poland (203.1%). Ireland and Spain also recorded significant increases of 104.3% and 86.0%, respectively, while Bulgaria showed the most modest growth at 46.3%.

This steady upward trend was temporarily disrupted in 2022 in all countries except Spain, as Lithuania and Bulgaria appear to have struggled to recover from the sharp downturn.

This slight recession is largely linked to the surge in energy costs resulting from the Russia-Ukraine war.

In contrast, Spain's diversified energy mix and broader gas supply sources (including interconnections with North Africa and an extensive regasification network) mitigated the energy-related cost pressures that affected other countries more severely.

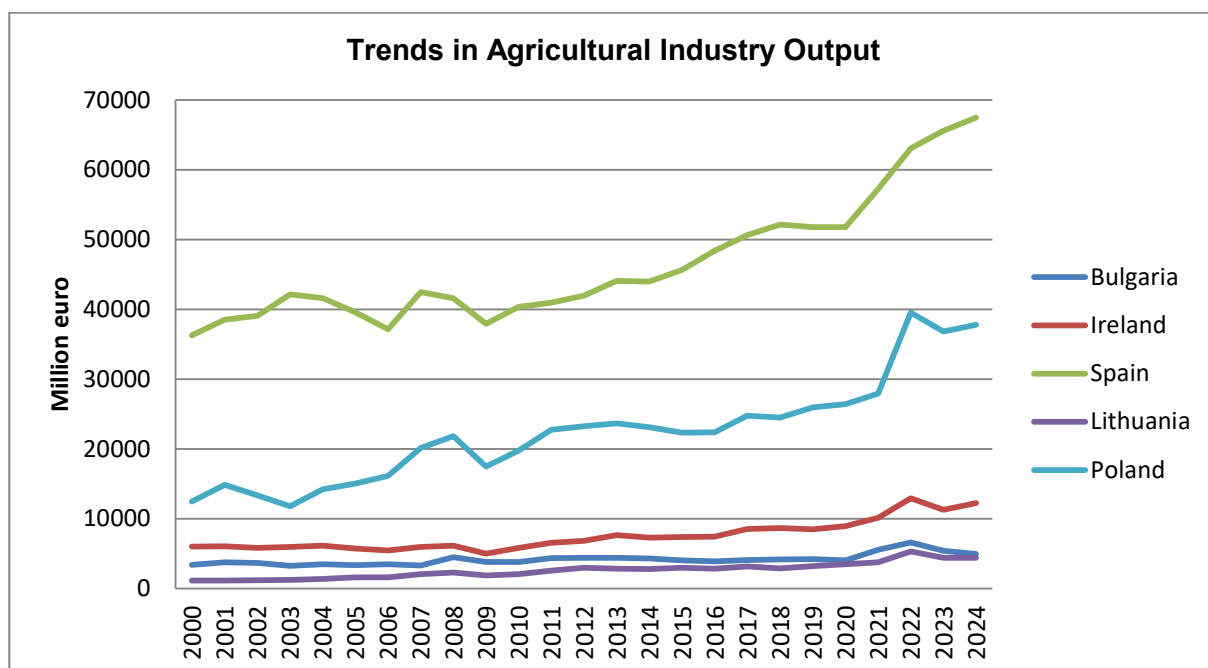


Figure 24. Trends in the Agricultural Industry. Source: Own elaboration based on Eurostat (2025).

The disaggregated analysis of production components provides a clearer understanding of these trends.

On one hand, the Crop Output, the value derived from agricultural production (Figure 25), shows a clearly upward trend in all countries, although with a notable decline in 2022, from which only Spain appears to have recovered.

In Spain's case, the combination of intensive, technology-driven agriculture and geographical diversification likely explains the stability of its growth. It is particularly noteworthy that in 2022, it was Animal Output that sustained the growth of the Spanish agricultural sector, while in 2023, Crop Output became the main driver.

Poland, meanwhile, has experienced remarkable progress since its accession to the European Union, driven by the modernization of farms and the use of structural funds. A similar pattern can be observed in Bulgaria (EU member since 2007) and Lithuania (since 2004), both of which have shown steady agricultural growth up until 2022.

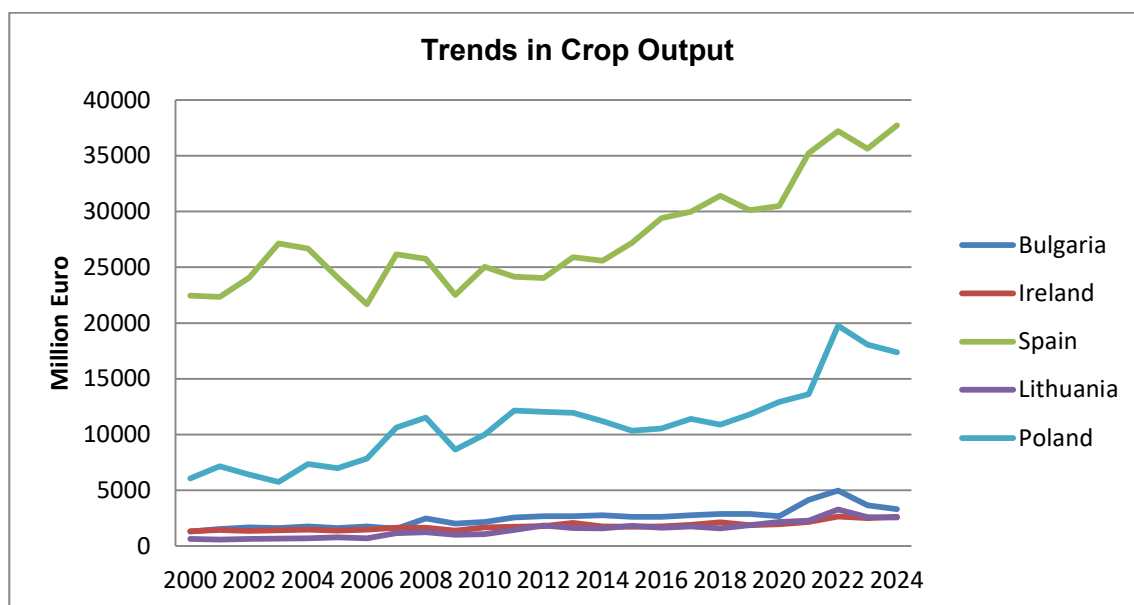


Figure 25. Trends in Crop Output. Source: Own elaboration based on Eurostat (2025).

On the other hand, Animal Output (the value of livestock production) also shows a steady increase and appears to demonstrate greater resilience to energy price shocks, as illustrated in Figure 26 which shows that most of the countries studied were able to pass on higher costs to the final consumer in 2022, and despite slight declines in 2023, they managed to recover during 2024.

Spain, Poland, and Ireland stand out, with 2024 market values of €28,241.3 million, €19,315.85 million, and €8,996.27 million, respectively. This performance is mainly due to the consolidation of strong meat and dairy industries with a clear export orientation. In Ireland, the livestock sector relies on high-quality products and a cooperative structure within the dairy industry.

Lithuania and Bulgaria exhibit greater fluctuations in their evolution. While Lithuania maintains a positive trend, Bulgaria shows the most negative outcome among the five countries: its Animal Output declined from €1,530.53 million in 2021 to €1,233.56 million in 2024. The positive effects of EU accession observed in Bulgarian agriculture did not extend to livestock and other animal-based products.

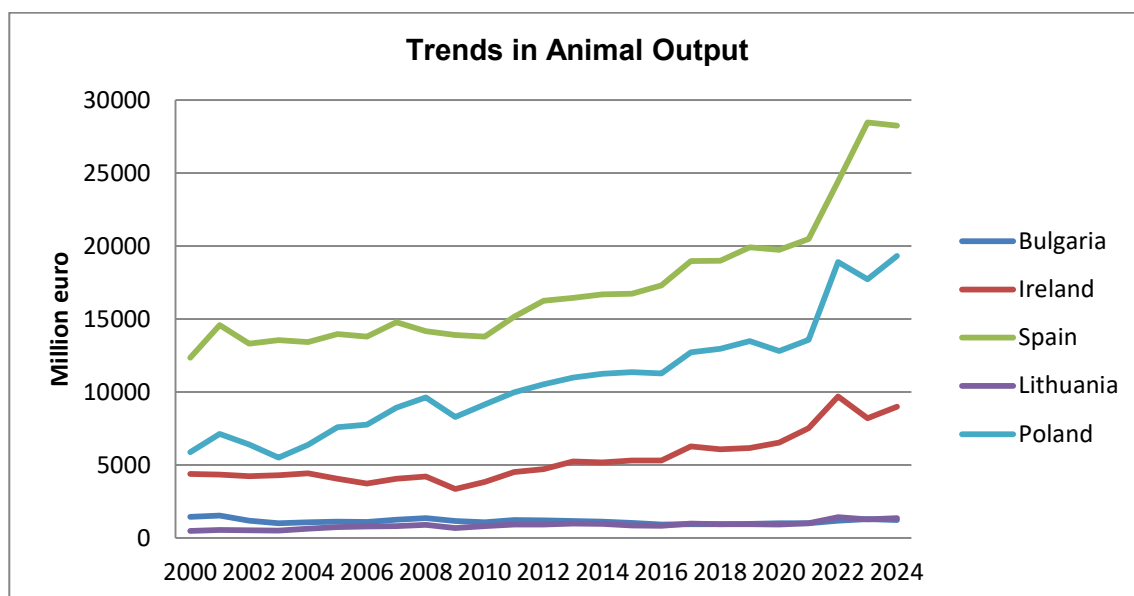


Figure 26. Trends in Animal Output. Source: Own elaboration based on Eurostat (2025).

Taken together, both subsectors explain the overall expansion of Agricultural Industry Output in the long term, reflecting a process of structural modernization and an increasing orientation toward European and international markets.

However, the growth in total value also includes price effects, which are analysed in detail in the following sections.

4.4 Evolution of Annual Work Units (AWU) and Sector Demographics

Annual Work Units (AWU) have been steadily declining across all the countries under study, although there are notable differences between them.

As shown in Figure 27, Bulgaria and Poland experienced the sharpest reductions in AWU over the past 25 years, with decreases of 83.13% and 45.44%, respectively. In Lithuania, the transformation has also been significant, with a 36.79% reduction.

In the case of Spain, most of this adjustment took place during the 1970s and 1980s, with the trend continuing until around 2015, after which AWU figures appear to have stabilized. In Ireland, AWU dropped by 47.78% between 1990 and 2001, and have remained relatively stable since then.

This suggests that all five countries have undergone a substantial reduction in labour input, accompanied by a decline in the number of farms, greater efficiency, and increasing land concentration. The timing and intensity of these transformations, however, vary depending on each country's historical and economic context.

For Spain and Ireland, the adjustment phase seems to have concluded, while in Lithuania it may have stabilized since 2021, though further observation is needed to confirm this. In Poland and Bulgaria, by contrast, the process

appears to be ongoing. The fact that AWU figures have ceased to decline in Spain and Ireland in recent years suggests that efficiency may have plateaued or is now occurring at a slower pace.

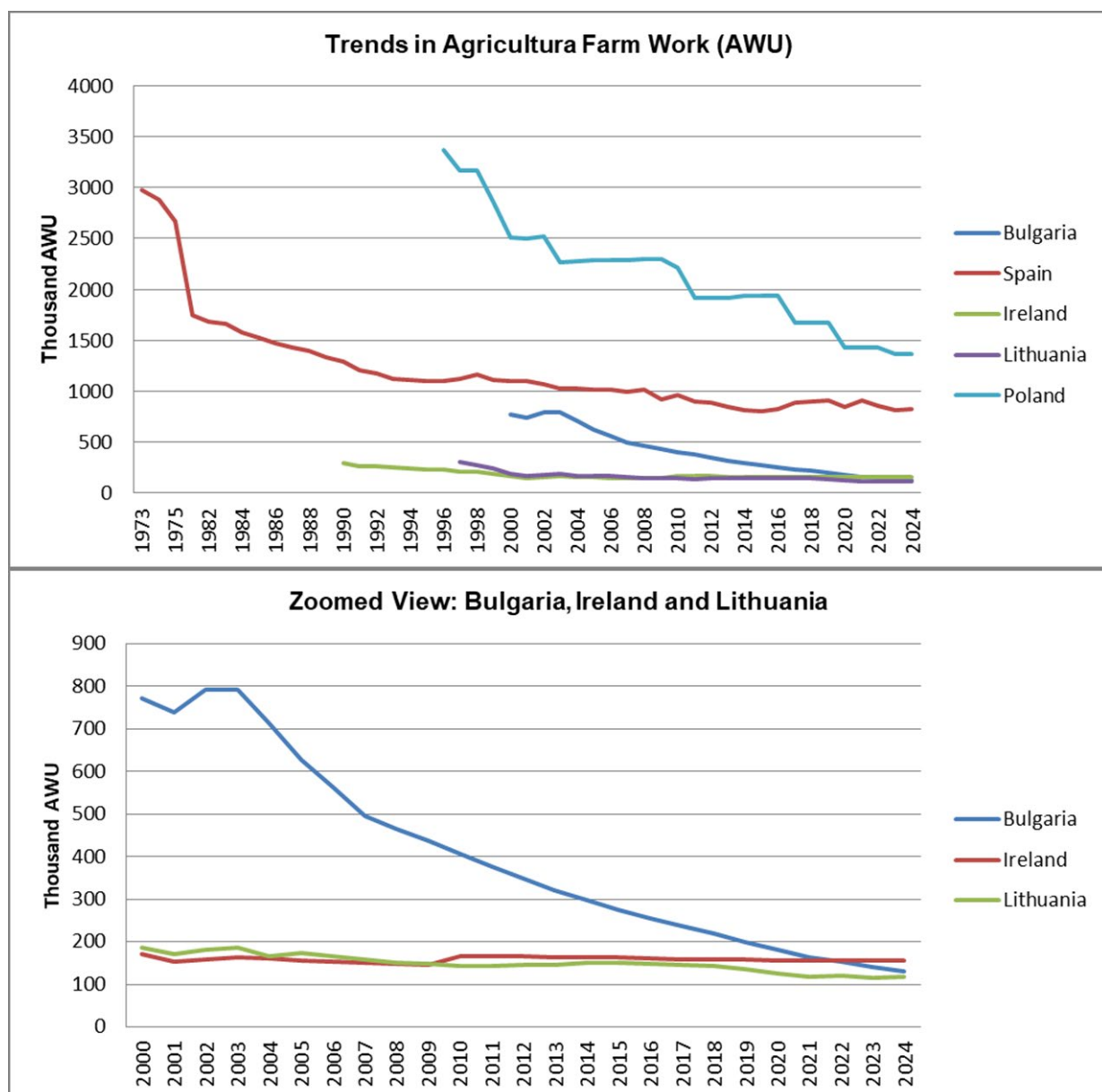


Figure 27. Trends in Annual Work Units. . Source: Own elaboration based on DBnomics / Eurostat, 2025.

The decline in Annual Work Units (AWU) is closely linked to one of the main challenges facing farmers and livestock producers across Europe -the lack of generational renewal- as reflected both in EU policy priorities and in the OH-FINE farmer surveys.

As shown in Figure 28, the distribution of agricultural holdings by age group and gender in 2020 for Bulgaria, Spain, Ireland, Lithuania, and Poland reveals a clear ageing trend among the active population in the agricultural sector.

Across all countries, farms managed by people aged 65 or older represent, by far, the largest group, meaning that a significant proportion of holdings are run by individuals close to retirement age. In contrast, the younger age groups are markedly underrepresented: the brackets “Under 25 years” and “25-34 years” are consistently the smallest categories, confirming the severe difficulty in attracting young people into farming.

While the issue is serious in all countries studied, the situation is not uniform. Spain shows the most critical profile, with 41.31% of its farms managed by people over 65 years old, compared to 32.15% in Lithuania, 31.05% in Ireland, 23.8% in Bulgaria, and 13.71% in Poland.

Farms managed by people under 34 years old account for just 3.94% in Spain, 6.72% in Lithuania, 7.30% in Ireland, 9.00% in Bulgaria, and 11.04% in Poland.

The perceived seriousness of the ageing workforce among surveyed farmers aligns closely with these figures. When asked whether generational renewal was adequate, Spanish farmers rated it 1.15 out of 5, Bulgarian farmers 1.7 out of 5, Irish farmers 1.87 and Polish farmers 2.38.

The gender-based analysis reveals a clear gender gap across all age groups and countries. In every case, the number of farms managed by men is significantly higher than those managed by women—with the sole exception of the over-65 age group in Lithuania, where women manage 23,900 farms compared with 19,180 managed by men.

Paradoxically, in the younger age brackets, the gender gap shifts in favour of men, highlighting the persistence of inequality among the new generations. This disparity is particularly pronounced in the demographically dominant age groups, such as 45-54 years and 55-64 years.

The country with the largest gender gap is Ireland, where female representation ranges between 10.2% and 13.3% across all age groups. Spain also shows marked differences, with an increasing imbalance among younger generations: while women represent around 30% of farm managers aged over 55, this share drops to roughly 21% among those under 34.

In Poland and Lithuania, despite higher female representation rates, the same pattern observed in Spain occurs—the gender gap widens among younger farmers. In Poland, the share of farms managed by women falls from 39.5% among those over 65 to 21.0% in the under-25 group. In Lithuania, the decline is from 54.8% to 28.6%.

In Bulgaria, while a gender gap also exists, the trend appears to improve among younger cohorts: women account for 26.5% of farms managed by those over 65, rising to 36.3% among those under 25.

The overall pattern is unmistakable; the European agricultural sector in these countries suffers from a worrying demographic imbalance, with an ageing producer population and insufficient generational renewal, threatening the economic and social sustainability of rural areas in the medium and long term.

The statistical evidence provided here supports the policy priority of promoting generational renewal and greater inclusion of women in European agriculture - although, as the data show, current measures remain insufficient.

Deliverable 2.4: Analysis of the economic competitiveness of organic agribusiness in the case studies

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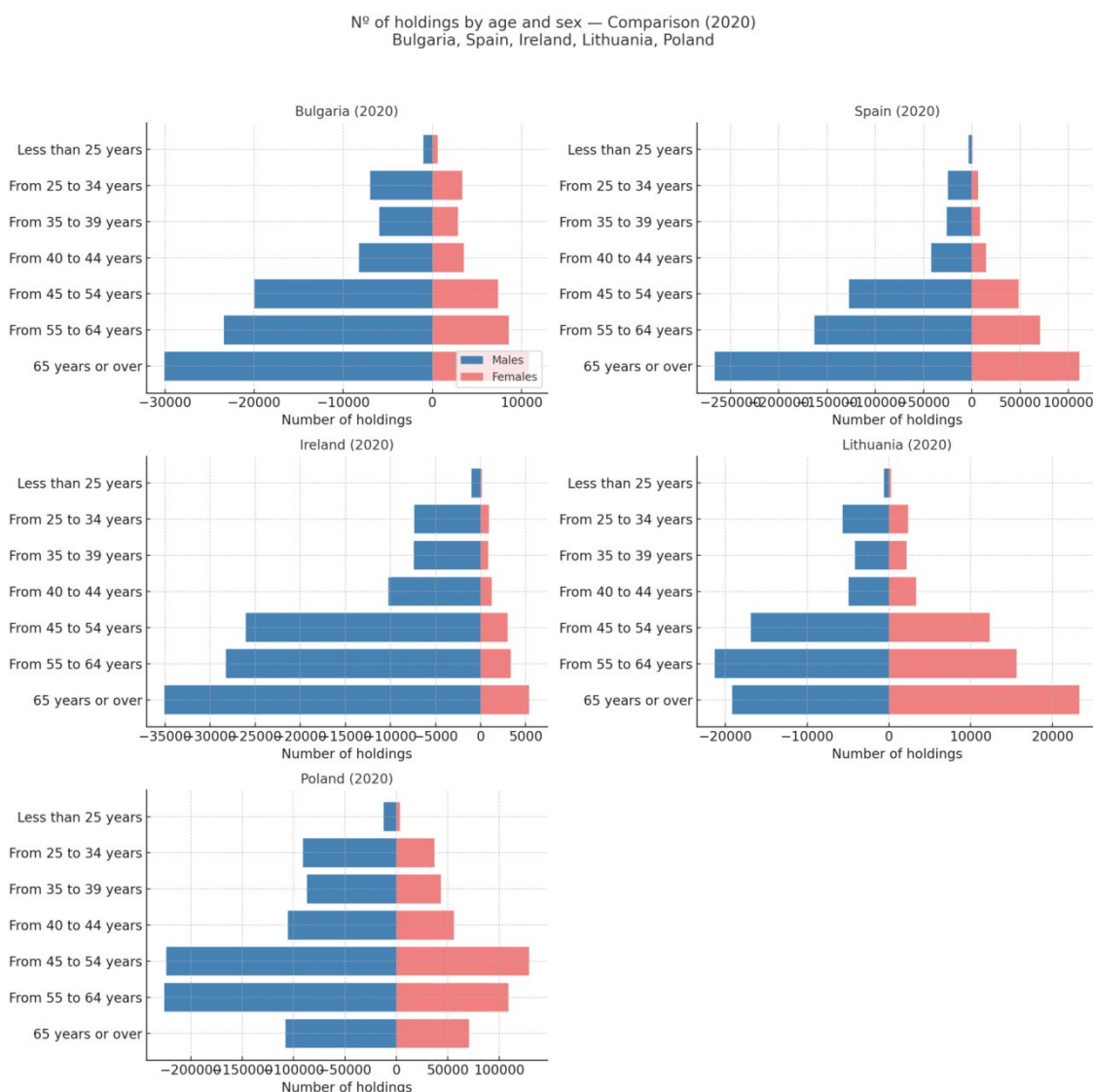


Figure 28. N° of holdings by age and gender in 2020 in Bulgaria, Spain, Ireland, Lithuania and Poland. Source: Own elaboration based on Eurostat (2025).

Among the causes of rural depopulation, OH-FINE surveyed farmers identified different primary factors depending on the country.

In Bulgaria, the main problems were reported to be low profitability and the greater appeal of urban lifestyles (each cited by 31.9% of respondents), while lack of public services was mentioned by 25.5%, and only 10.6% cited the lack of opportunities for women.

This last figure, although seemingly low, may be explained by the positive trend in the gender gap observed among younger generations in Bulgaria.

In the case of Spain, farmers attributed 71.4% of the lack of generational renewal to low profitability, and 50.0% to the lack of public services and the greater attractiveness of cities.

Although the perceived lack of employment opportunities for women was the least frequently selected reason, it was still notably high, with 35.7% of farmers identifying it as one of the contributing factors.

In the case of Irish farmers, the lack of generational renewal was mainly attributed to the lack of profitability (73.3%) and, to a lesser extent, to the greater appeal of urban lifestyles. In Poland, the level of concern is somewhat lower, and the reasons are the same as in Ireland: firstly, low income, and secondly, the stronger attraction of cities.

4.5 Marketing Channels and Cooperative Structures

Agricultural cooperatives have long been fundamental to Europe's rural development and agrarian structure. By organizing farmers into collective entities based on democratic governance and shared economic benefit, cooperatives enhance producers' market power, reduce transaction costs, and promote innovation and sustainability. In recent decades, however, they have faced profound transformations arising from globalization, market liberalization, and institutional change.

Common Challenges among European Agricultural Cooperatives:

Although the cooperative model remains an essential instrument for rural resilience, European cooperatives often struggle to adapt to the demands of modern agri-food markets. Across the five countries examined, several recurring difficulties emerge that hinder their consolidation.

A major shared obstacle is the historical and psychological legacy of collectivization in Central and Eastern Europe. In Bulgaria, Lithuania, and Poland, the memory of forced cooperation during the socialist period has left a deep mistrust among farmers, who frequently associate cooperatives with state control, inefficiency, and loss of autonomy (Sarov, 2021; Drożdż et al., 2021; Chlebicka, 2015). This distrust undermines voluntary participation and makes it difficult to rebuild cooperative structures on genuinely democratic and market-oriented foundations.

Another persistent issue is weak governance and management capacity. Many cooperatives operate with limited professionalization and a lack of transparent internal control. Leadership conflicts, poor strategic planning, and insufficient financial expertise often lead to inefficiency and member disengagement (Sarov, 2021; Grebowiec, 2022). In some cases, as in Spain and Poland, governance problems have also been linked to opportunistic behavior or excessive concentration of power in managerial elites (Mirón-Sanguino & Díaz-Caro, 2022).

Economic and structural limitations further complicate cooperative development. In countries where agriculture is dominated by small and fragmented holdings, such as Lithuania or Poland, the potential for economies of scale remains restricted. Financial dependency on public subsidies also makes many cooperatives vulnerable to market shocks and changing policy frameworks (Sarov, 2020; Guzdek & Petryk, 2016).

Demographic challenges are equally significant. An aging farmer population, combined with the limited participation of younger generations, threatens the continuity of cooperative institutions. In Ireland and Bulgaria, the average age of farmers surpasses fifty-five, while barriers to cooperative share transfer or membership renewal impede generational succession (Cele, 2022; Nikolova, 2020).

Finally, cooperatives across Europe face increasing market pressure from powerful processors and retailers. Large agri-food corporations often dictate prices and standards, while cooperatives struggle to differentiate their products or capture added value through branding, sustainability certifications, or vertical integration (Parrilla-González & Ortega-Alonso, 2021; Javornicky et al., 2021). These structural imbalances require new forms of collaboration, innovation, and policy support.

The following sections examine how these challenges manifest in each national context and the strategies proposed to address them.

Bulgaria

The evolution of agricultural cooperatives in Bulgaria reflects the long shadow of its socialist past. After the collapse of collective farming in 1989, more than 3,000 cooperatives were created, but only about 800 remained by 2017, and just 767 were still active by 2016 (Sarov, 2021). This dramatic decline illustrates the deep institutional distrust that persists among farmers.

Economically, cooperatives contribute to rural livelihoods but remain less competitive than corporate farms. In 2018, they generated on average €38,000 per employee, compared with €45,000 in corporate enterprises (Yalamov et al., 2021). Despite improvements during the 2007-2013 period of CAP funding, many became unprofitable once subsidies were excluded from their income statements (Sarov, 2020).

The roots of these difficulties lie in the erosion of trust and the weakness of democratic governance. Many cooperatives are still marked by hierarchical management structures, low member participation, and limited accountability (Sarov, 2021). In addition, access to markets is constrained by the growing dominance of large retail chains and by the inability of small farms to meet standardization and volume requirements (Nikolova, 2020). Rising input costs, aging farmers, and limited youth involvement further aggravate the situation—only about 14% of Bulgarian farmers are under forty-four years old.

Nevertheless, some promising initiatives are reshaping Bulgaria's cooperative landscape. Efforts to shorten the value chain—for example through local farmers' markets, direct sales, and online platforms—are allowing producers to retain a greater share of the final price. Policies such as Governmental Decree No. 70 (2020) require large retailers to reserve space for regional products, while campaigns like "I Choose 380" encourage consumers to buy Bulgarian food (Nikolova, 2020). Strengthening governance, improving training for cooperative leaders, and supporting young farmers through targeted CAP reforms have been identified as priorities (Sarov, 2021; Yalamov et al., 2021). Moreover, the diversification of cooperative activities toward agro-ecosystem

services—such as eco-tourism or carbon farming—could create new income sources and foster sustainable rural development (Bachev, 2021).

Spain

In contrast to Bulgaria, Spain represents a mature cooperative ecosystem deeply embedded in the country's agri-food sector. Agricultural cooperatives account for roughly 68% of total agricultural production and 70% of national olive oil output, generating €38.4 billion in annual turnover and employing over 123,000 people (Sánchez-Navarro et al., 2024). Particularly dynamic are the fruit and vegetable cooperatives, whose 945 organisations generate around €3.7 billion in revenue and encompass more than 160,000 members (Campos Climent & Sanchis Palacio, 2015).

Despite this success, Spanish cooperatives face mounting pressures from globalization and market concentration. The olive oil sector exemplifies the problem: nearly 70% of production is marketed under retailer brands, leaving producers with low margins and limited visibility (Parrilla-González & Ortega-Alonso, 2021). Traditional strategies emphasizing growth and scale have also proved insufficient. Empirical research shows that larger cooperatives are not necessarily more efficient; rather, management quality and adaptability are the true determinants of success (Campos Climent & Sanchis Palacio, 2015).

Financial constraints and governance complexity pose further challenges. Cooperative shares are illiquid assets, discouraging outside investment and limiting expansion (Mirón-Sanguino & Díaz-Caro, 2022). Moreover, aligning the interests of thousands of members while maintaining democratic control often proves difficult.

To confront these limitations, Spanish cooperatives are turning to social innovation and value differentiation. The Picualia olive oil cooperative's "First Day of Harvest" initiative demonstrates this trend: by combining early-harvest quality, fair value distribution among farmers, and artist-designed packaging with environmental storytelling, Picualia has transformed olive oil into a high-value cultural product (Parrilla-González & Ortega-Alonso, 2021). This example highlights how cooperative identity and market competitiveness can reinforce one another.

Strategic recommendations for the Spanish sector emphasize professional management, innovation, and hybrid financial models that attract external investors without undermining cooperative democracy (Mirón-Sanguino & Díaz-Caro, 2022). In doing so, Spanish cooperatives reaffirm their dual mission: economic efficiency and social cohesion in rural territories.

Ireland

Ireland presents a dual reality; a robust cooperative tradition in the dairy sector and a historically weak cooperative structure in beef production. Dairy cooperatives are long-established pillars of Irish agriculture, with ten milk processors and seventeen milk-purchasing cooperatives owned and governed by farmers (Cele, 2022). They provide essential services (training, funding, and representation) and enjoy strong social legitimacy, particularly among young

farmers. Research by Cele (2022), based on a survey of 255 Irish youth (including young farmers and agricultural students), shows that 67% of respondents under forty are willing to buy cooperative shares, and 68% of those are open to serving on cooperative boards.

By contrast, the beef sector illustrates the structural challenges of cooperation in highly concentrated markets. Four processing companies control about 65% of the market, creating an oligopsony that disadvantages small producers (Javornicky et al., 2021). The 2019 nationwide protests exposed this imbalance and catalysed the creation of the first beef Producer Organisations (POs), designed to strengthen collective bargaining and marketing.

Yet the road ahead remains difficult. The beef producer community is fragmented, leadership is weak, and mistrust between producers and processors persists. Institutional obstacles compound these issues: the Competition and Consumer Protection Commission (CCPC) restricts collective negotiation on price, effectively excluding the main source of conflict from formal discussion (Javornicky et al., 2021). Generational renewal also poses a challenge with sector-specific nuances: while the dairy sector struggles with the legal transfer of shares from inactive or "dry" shareholders to younger members, the beef sector faces a broader crisis in attracting new and an aging workforce with an average age of fifty-eight (Cele, 2022).

Scholars recommend a comprehensive strategy involving leadership training, stronger horizontal cooperation among POs, and public campaigns to promote new forms of vertical integration such as interbranch organisations or value-based supply chains (Hooks et al., 2018, as cited in Javornicky et al., 2021). Leveraging Ireland's reputation for grass-fed, environmentally friendly production could also open premium markets under the Origin Green and PGI schemes. As suggested by Javornicky et al. (2021), the long-term viability of the Irish cooperative system requires the beef sector to achieve a level of social legitimacy and collective cohesion comparable to the successful dairy model, particularly to ensure the engagement of the next generation of farmers.

Lithuania

In Lithuania, the development of agricultural cooperatives remains modest despite the country's long-standing agricultural tradition and its membership in the European Union. Agricultural cooperation involves only between eight and twelve percent of farmers, one of the lowest rates in the EU (Drożdż et al., 2021). The Lithuanian agricultural landscape is dominated by small-scale holdings—over eighty percent of farms report a standard output below €25,000, and more than half farm less than five hectares (Ciburienė, 2015). These figures illustrate the structural fragmentation that limits economies of scale and hinders competitiveness.

Most Lithuanian cooperatives are small, with nearly two-thirds consisting of fewer than ten members. Their activities are often confined to basic operations such as collective purchasing or the sale of raw products, while few engage in higher value-added functions or offer services related to knowledge transfer and innovation (Šumylė & Ribašauskienė, 2017). Although public support mechanisms exist, they overwhelmingly prioritize direct financial aid—representing 76% of all measures—while neglecting capacity building and

institutional strengthening (Ribašauskienė et al., 2019). As a result, many cooperatives emerge primarily to access subsidies rather than to pursue genuine collaborative goals, which undermines their long-term sustainability.

Lithuanian cooperatives face a series of interrelated obstacles rooted in historical, social, and institutional contexts. The collective memory of Soviet-era forced collectivization continues to cast a long shadow over cooperative efforts, producing skepticism among farmers who associate cooperation with state coercion rather than voluntary association (Drożdż et al., 2021). This psychological barrier is reinforced by a lack of visible success stories and weak awareness of the tangible economic benefits that collective organisation can offer. Moreover, low educational attainment among the rural population—particularly among young farmers, nearly half of whom possess only basic vocational training (Ciburienė, 2015)—limits their ability to manage cooperative enterprises, adopt innovations, or participate in strategic decision-making.

Market integration remains another persistent weakness. Only four percent of small farms sell their produce through cooperatives, and merely two percent maintain regular agreements with suppliers of agricultural inputs (Drożdż et al., 2021). Consequently, smallholders are left with little bargaining power and are highly exposed to market volatility. Even where public support is available, its effectiveness is undermined by poor targeting, lack of awareness, and excessive emphasis on short-term subsidies. Meanwhile, the pace of innovation within cooperatives remains slow. Servitization—the incorporation of new services and support systems into cooperative activities—is rare, with fewer than one in five cooperatives introducing any new service in recent years, and most of those limited to traditional rather than knowledge-based or digital offerings (Šumylė & Ribašauskienė, 2017).

Reversing these trends requires a comprehensive reorientation of public policy and cooperative practice. Investment in education and training is essential, particularly for younger and more educated farmers who are more likely to engage in collective initiatives. Strengthening human capital through programs in management, marketing, and financial literacy could create a new generation of cooperative leaders capable of professionalizing the sector. Likewise, public policies should evolve from offering merely financial incentives to supporting institutional development, technical assistance, and governance training (Ribašauskienė et al., 2019). Encouraging cooperatives to diversify their activities by incorporating consulting, legal advisory, and innovation-related services would help them capture additional value and respond more flexibly to market demands.

Equally important is the need to foster trust and social capital among rural actors. Promoting successful case studies, supporting informal collaborations as a bridge to formal cooperative structures, and simplifying legal frameworks for registration and taxation could gradually shift perceptions. If these measures are sustained, Lithuania could transform its cooperative sector into a key instrument for agricultural modernization and rural sustainability.

Poland

The Polish experience reflects both the potential and the limitations of agricultural cooperation in a post-socialist context. The country has a well-

defined legal framework for producer organisations, established at the beginning of the 2000s and recognizing cooperatives as legal entities formed by farmers to improve economic efficiency through collective action (Guzdek & Petryk, 2016). Initially, this framework spurred growth. By 2016, there were 1,308 registered agricultural producer groups, mainly concentrated in the Wielkopolskie and Dolnośląskie regions. The majority were organized as limited liability companies (836) or cooperatives (420), and they were especially active in sectors such as cereal and oilseed production (24.46%), live swine (22.02%), and poultry (11.93%).

However, despite this institutional progress, the number of active producer groups declined sharply over the following years. From a peak of 1,382 in 2013, the total fell to 838 by 2019 (Grebowiec, 2022). Similar trends occurred among fruit and vegetable producer organisations, whose numbers dropped from 265 in 2019 to 245 in 2020. These data reveal the fragility of cooperative structures once initial public funding and external incentives wane.

The obstacles facing Polish cooperatives are complex and multifaceted. Historical memory plays a decisive role. The experience of forced collectivization during the communist period left behind widespread suspicion toward cooperative models, which are often associated with inefficiency and loss of autonomy (Chlebicka, 2015). This legacy has contributed to persistently low levels of social capital in rural areas, where trust and cooperation networks are weak (Chloupkova et al., 2003). Even when farmers join cooperatives, internal governance frequently remains problematic. Leadership deficits, conflicts of interest, and short-term perspectives undermine organisational cohesion (Grebowiec, 2022). Some leaders prioritize personal gain or local power consolidation over collective welfare, resulting in declining motivation among members and eventual withdrawal.

Economic constraints compound these difficulties. The predominance of small, fragmented farms limits the scope for achieving economies of scale, while price volatility and rising input costs threaten profitability. Many cooperatives lack the volume or consistency of production required to compete effectively in both domestic and export markets (Guzdek & Petryk, 2016). Furthermore, the complexity of EU and national funding procedures creates administrative burdens that deter participation, and changes in eligibility criteria have excluded certain sectors -such as poultry- from support under the Rural Development Programme 2014-2020 (Grebowiec, 2022).

In response, a growing body of research highlights several strategic pathways for strengthening the cooperative model in Poland. Rebuilding social capital is paramount. Public authorities and rural organisations could invest in leadership training, community-building activities, and awareness campaigns that emphasize successful examples of cooperation. Improving governance through professionalization -such as external auditing, mentoring, and transparency mechanisms- would help consolidate trust and ensure accountability (Guzdek & Petryk, 2016). Simplifying administrative procedures for EU funding and expanding support to include innovation and environmental certification could further improve financial viability. At the same time, promoting collective branding and vertical integration with processors and retailers would enable cooperatives to capture greater value within supply chains (Chlebicka, 2015).

Poland's case illustrates that policy, management, and culture are deeply intertwined. Only by simultaneously addressing these dimensions -social trust, organisational capacity, and regulatory coherence- can the cooperative sector realize its potential as a cornerstone of sustainable rural development.

Comparative Insights and Emerging Trends

When analysed together, the cases of Bulgaria, Spain, Ireland, Lithuania, and Poland reveal both shared structural constraints and distinctive national trajectories. A clear divide persists between post-socialist countries, where cooperatives are still rebuilding legitimacy and social capital, and Western European contexts, where the challenge lies in adapting mature cooperative systems to new economic realities. In Bulgaria, Lithuania, and Poland, the enduring legacy of collectivization continues to limit farmers' willingness to cooperate, whereas in Spain and Ireland, the cooperative form enjoys broad social acceptance and plays a central economic role.

Governance emerges as a universal concern. Whether through democratic deficits and mismanagement in Eastern Europe or complex member relations and capital constraints in Western Europe, effective governance remains the decisive factor in cooperative success. Spain's experience demonstrates the potential of professional management and social innovation, while Ireland's case highlights the importance of transparent leadership in maintaining trust across the value chain. Conversely, Bulgaria, Lithuania, and Poland still face the fundamental challenge of creating managerial and institutional capacity from the ground up.

Generational renewal also stands out as a cross-cutting issue. The aging of rural populations threatens continuity in all five countries, but only Ireland and, to some extent, Spain have begun to address the problem through concrete measures such as youth engagement in governance, mentoring, and training programs. Educational attainment and managerial competence are thus emerging as decisive variables for future cooperative vitality.

Another common pattern is the increasing emphasis on market differentiation and value-chain innovation. Spain's "First Day of Harvest" olive oil initiative demonstrates how social and environmental storytelling can strengthen competitiveness. Similarly, Ireland's exploration of protected geographical indications (PGIs) and sustainability certifications for grass-fed beef shows how cooperatives can align territorial identity with consumer expectations. Post-socialist countries are also moving in this direction, albeit from a weaker institutional base, with Bulgaria and Poland promoting shorter supply chains and collective branding to capture added value.

Finally, the comparative evidence underscores the need to rethink policy frameworks. The Common Agricultural Policy has been instrumental in financing cooperative development, but its implementation often prioritizes short-term subsidies over institutional capacity-building. The future of European cooperation depends on complementing financial support with governance training, social innovation programs, and mechanisms that encourage genuine farmer participation rather than subsidy-driven organisation.

Conclusion

Agricultural cooperatives across Europe continue to represent one of the most effective mechanisms for ensuring the economic resilience, social cohesion, and environmental sustainability of rural territories. Yet, as the cases of Bulgaria, Spain, Ireland, Lithuania, and Poland demonstrate, their trajectories are shaped by deeply rooted historical experiences and contemporary structural pressures. In post-socialist contexts, the challenge lies in rebuilding trust and social capital; in advanced cooperative systems, it is about renewing models of governance, generational leadership, and market adaptation.

The evidence suggests that successful cooperatives share several key attributes: participatory and transparent management, investment in human capital, and the ability to innovate both organisationally and commercially.

Reforms to the CAP and national policies should, therefore, prioritize not only financial incentives but also training, institutional support, and long-term governance strengthening. By doing so, European cooperatives can continue to evolve as engines of sustainable development and as laboratories for democratic economic participation in rural Europe.

4.6 Technology, Machinery, and Agricultural Digitalization

Over the past two decades, European agriculture has undergone a profound transformation driven by mechanisation, technology, and digitalization. These three dimensions are increasingly interlinked and determine the competitiveness, efficiency, and environmental sustainability of agricultural production across the continent. While Western and Northern European countries traditionally lead in mechanisation and technological innovation, Central and Eastern European regions are steadily modernizing, supported by the Common Agricultural Policy (CAP), EU structural funds, and private investment.

Mechanisation remains the backbone of agricultural productivity, but digitalization, through data, automation, and artificial intelligence, represents the next frontier of efficiency and sustainability. This report provides a comparative analysis of the state of mechanisation, technological advancement, and digital transformation in Bulgaria, Spain, Ireland, Lithuania, and Poland, using recent data and scientific literature. It also explores the barriers and opportunities shaping the adoption of Precision Agriculture and smart technologies across Europe.

Across the EU, mechanisation levels vary considerably. Western and Northern European countries such as Germany, France, and the Netherlands maintain dense tractor fleets and high technological integration, while Eastern and Southern countries are characterized by smaller farm structures and aging machinery.

According to Eurostat (2024), the EU has more than 10 million tractors in use, but their age distribution is uneven, in reality, almost 60% are over 10 years old. EU funding through the Common Agricultural Policy (CAP) has been essential for renewing machinery, particularly in newer Member States that joined the Union after 2004.

At the same time, the shift toward smart farming and agricultural digitalization is transforming the sector. Technologies such as precision agriculture, sensors, GPS guidance, drones, and data analytics are increasingly used to optimize inputs and reduce emissions. However, adoption rates differ widely, reflecting disparities in infrastructure, investment capacity, and digital literacy among farmers.

Mechanisation in Bulgaria

Bulgaria shows a history of delayed mechanisation compared to Western European countries. Its tractor fleet reached its historical peaks during the era of the Machine and Tractor Stations (MTS) in the 1970s, and figures from organisations like FAO and CEIC indicate a significant reduction during the post-communist transition.

The continued reduction in the number of farms and the growing importance of extensive crops suggests a context where, when investment occurs, it tends to materialize as a qualitative leap in terms of power per farm. This investment is often leveraged through funds from the Common Agricultural Policy (CAP) for the 2023-2027 period.

Figure 29 shows the evolution of total and new tractor units between 2016 and 2023. The number of tractors peaked in 2019 - 2020 (coinciding with the Covid-19 pandemic) and then stabilized, while new registrations average 1,200-1,500 units per year.

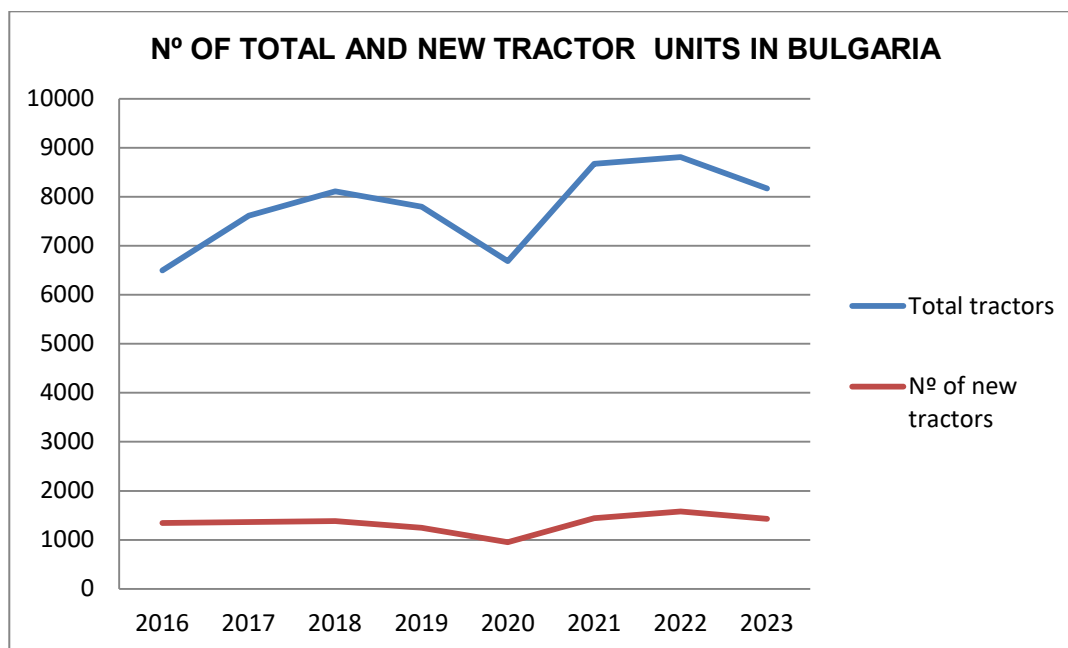


Figure 29. N° of total and new tractor units in Bulgaria. Source: Own elaboration based on the Ministry of Agriculture and Food of the Republic of Bulgaria (2012-2025), Agricultural Reports.

Investment capacity remains limited, and many farms rely on imported second-hand machinery. Nevertheless, CAP rural development funds have improved access to efficient, high-power models, especially in grain-producing areas.

Mechanisation is thus progressing, though still below EU averages in renewal rates.

Mechanisation in Spain

Spain represents the case of a mature market, backed by a robust annual administrative source such as the Official Registry of Agricultural Machinery (ROMA)..

Figure 30 presents the evolution of new tractors and towed machinery from 2006 to 2023. After the 2008 crisis, sales gradually recovered, although never reaching the 2007 levels, until 2017. At that point, sales began to slow down again, reaching 2021 with a negative trend that has continued through 2023, when 8,667 tractors were sold . As for trailed machinery, fluctuations have been greater than in the case of tractors, but the trends have been very similar.

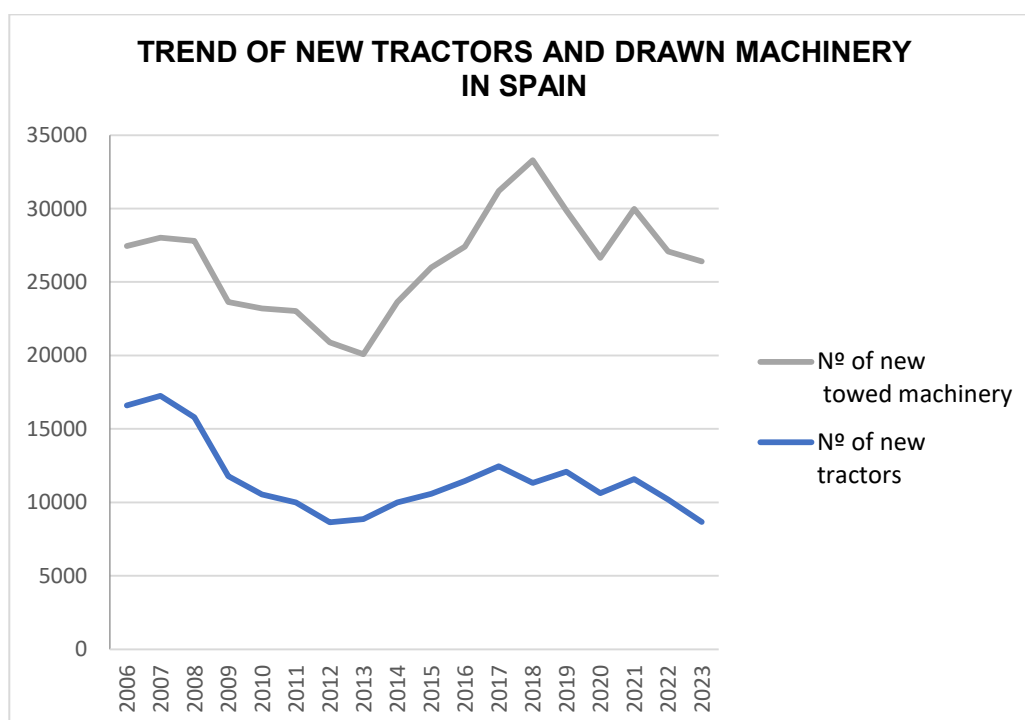


Figure 30. Trend of new tractors and drawn machinery in Spain. Own elaboration based on (MAPA, 2006-2023).

Despite the decrease in tractor purchases, investment did not fall at the same rate and in fact grew from 2012 (with the beginning of the recovery from the 2008 crisis) until 2021, at which point it began to decline again through 2023, as can be seen in Figure 31. This indicates a clear increase in tractor prices, linked to European emission reduction regulations as well as the choice of increasingly powerful and digitalized tractors.

In the case of trailed machinery, its price has also increased since, despite the reduction in purchases, investment has followed an upward trend since 2014.

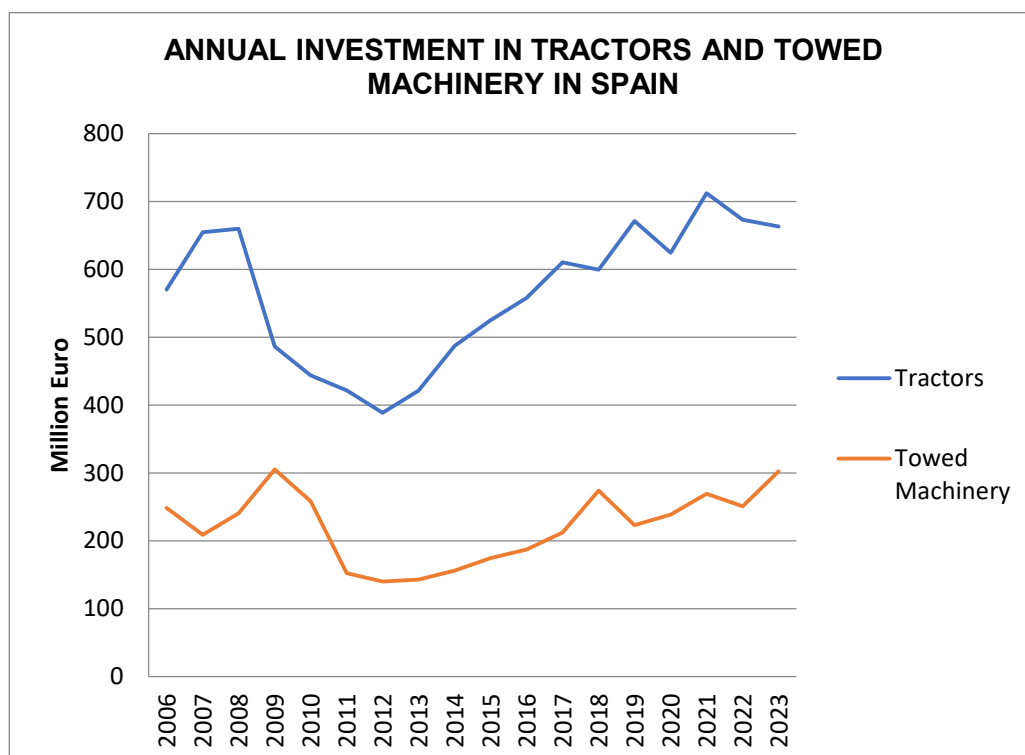


Figure 31. Annual investment in tractors and towed machinery in Spain. Source: Own elaboration based on (MAPA, 2006-2023).

Average power and prices have grown in parallel.

Figure 32 and Figure 33 indicate that the average power of new tractors now exceeds 90 kW, while 4x4 models have reached an average price of €85,546, which is very close to €1,000/kW. In the case of crawler tractors, the price is somewhat lower, suggesting that these are generally smaller tractors, likely intended for steep-slope fruit-growing and viticultural areas.

In the case of two-wheel-drive tractors, the price is plummeting, as the advantages of four-wheel-drive tractors are very evident and most farmers now consider them essential.

Deliverable 2.4: Analysis of the economic competitiveness of organic agribusiness in the case studies

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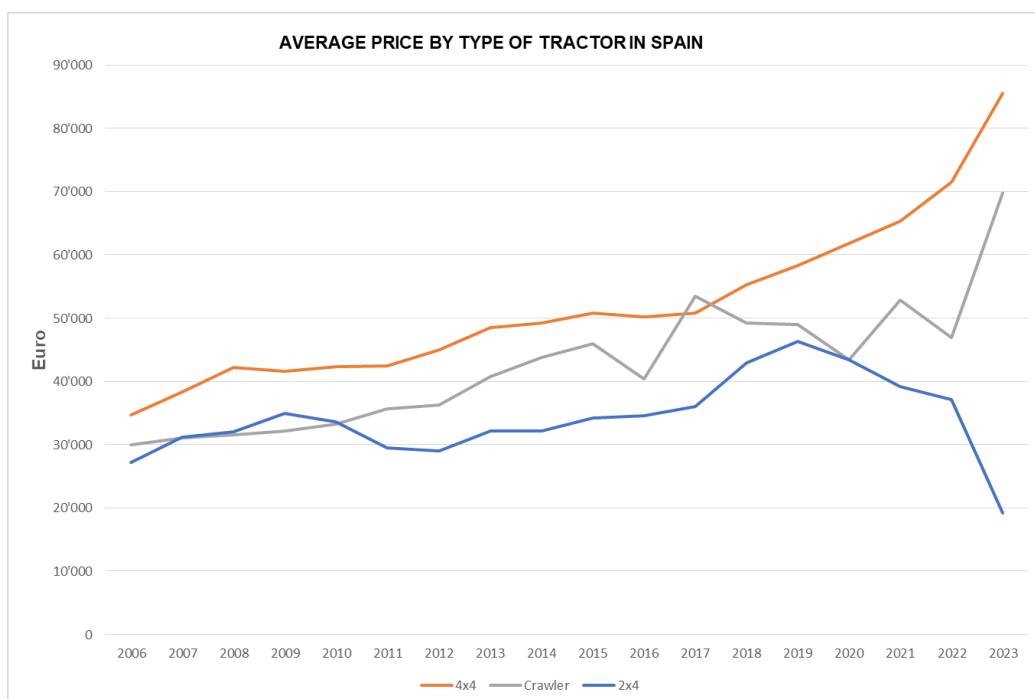


Figure 32. Average price by type of tractor in Spain. Source: Own elaboration based on (MAPA, 2006-2023).

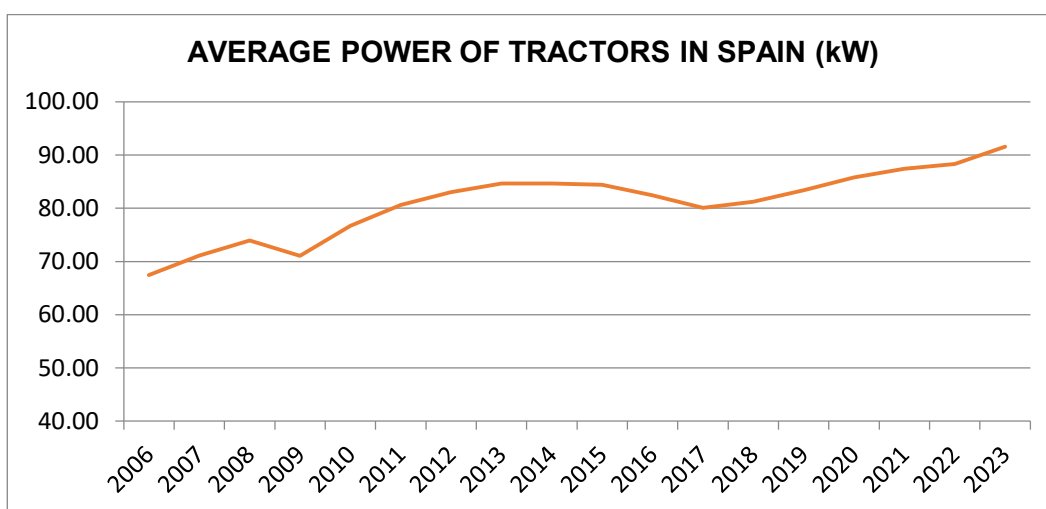


Figure 33. Average power of tractors in Spain (kW). Source: Own elaboration based on (MAPA, 2006-2023).

Mechanisation in Ireland

Ireland has one of Europe's highest tractor densities per hectare, reflecting its productive dairy and livestock systems.

Figure 34 shows tractors licensed for the first time (new and used) between 2000 and 2024. Tractor purchases declined significantly after the 2008 crisis and have now stabilized at around 2,000 units per year.

Used tractor sales, in contrast, increased during the crisis and now account for approximately 55% of the market.

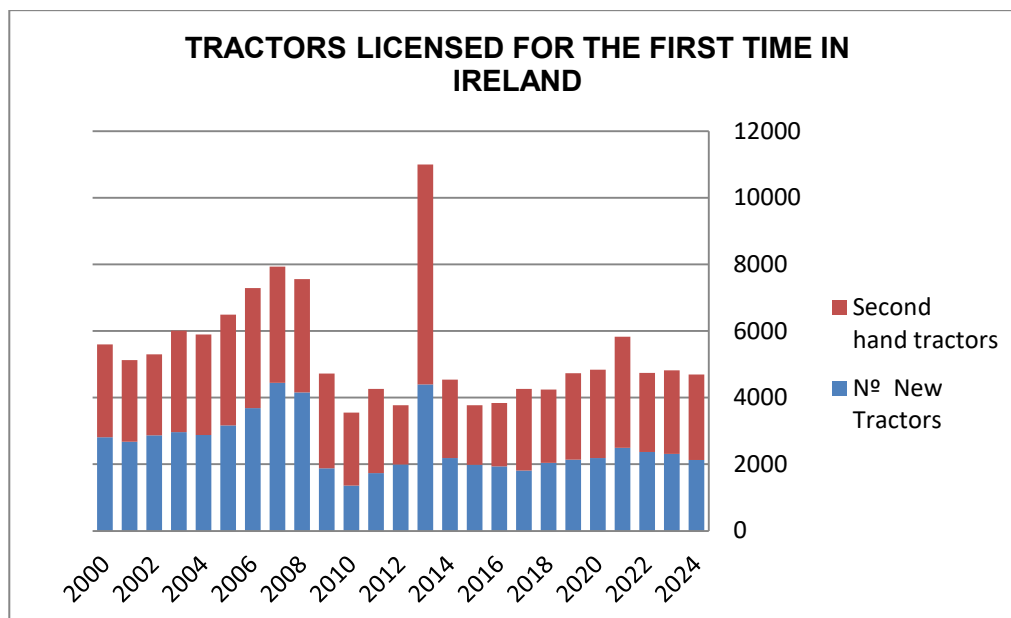


Figure 34. Tractors licensed for the first time in Ireland. Source: Own elaboration based on Central Statistics Office (CSO), TEA21.

The aging of the machinery fleet as a result of rising new machinery prices is a widespread problem in all the countries under study.

Mechanisation in Lithuania

Lithuania represents a case of accelerated consolidation and specialization following its independence. The country underwent a rapid process of farm concentration and a clear shift towards cereal and oilseed production, which generated growing demand for higher horsepower and outsourced mechanized services.

According to *Statistics Lithuania (s. f.)*, *Rodiklių duomenų bazė* and *Eurostat (2016)*, the total number of tractors declined from 111,530 in 2013 to 95,253 in 2023. Yet the fleet now concentrates in the 40-100 kW range, showing a move toward medium- and high-power equipment typical of mixed farming.

The available data do not allow for a determination of whether the decrease in tractor purchases is due to a reduction in the number of farms and higher tractor productivity, or conversely, due to farmers' economic inability to renew their machinery fleet.

Mechanisation in Poland

Poland has one of the largest agricultural machinery fleets in Central and Eastern Europe, a very large but structurally aged park. The total stock is around 1.46 million tractors in use, with an average age of roughly 25 years and an average power output of 54.5 kW, which is low compared to Spain's 91.6 kW.

The dynamics of new tractor registrations between 2010 and 2020 have been highly volatile. A remarkable peak occurred in 2012, when 19,274 new tractors were registered, followed by a deep trough in 2016 with only 8,656 units, and a moderate recovery thereafter (Przywara, 2022). This volatility reflects strong sensitivity to changes in farm income levels and public support cycles.

Although total stock series for 2000-2023 show fluctuations, an underlying gradual modernization is evident through the continuous rise in average power, from around 39 kW in 2005 to 54.5 kW in 2023 (see Figure 36). However, the aging structure of the fleet remains the main bottleneck and a key challenge for Poland's agri-industrial sector, decisively slowing the spread of precision and digital technologies beyond the best-capitalized, export-oriented farms.

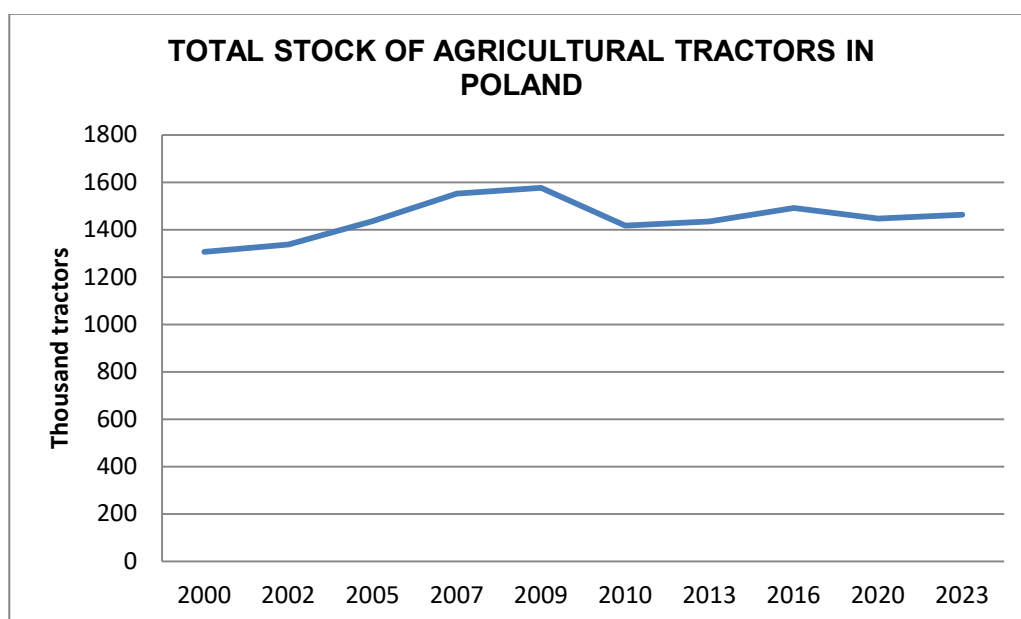


Figure 35. Total stock of agricultural tractors in Poland. Source: Own elaboration based on Statistics Poland (GUS), Statistical Yearbook of Agriculture (2000-2024).

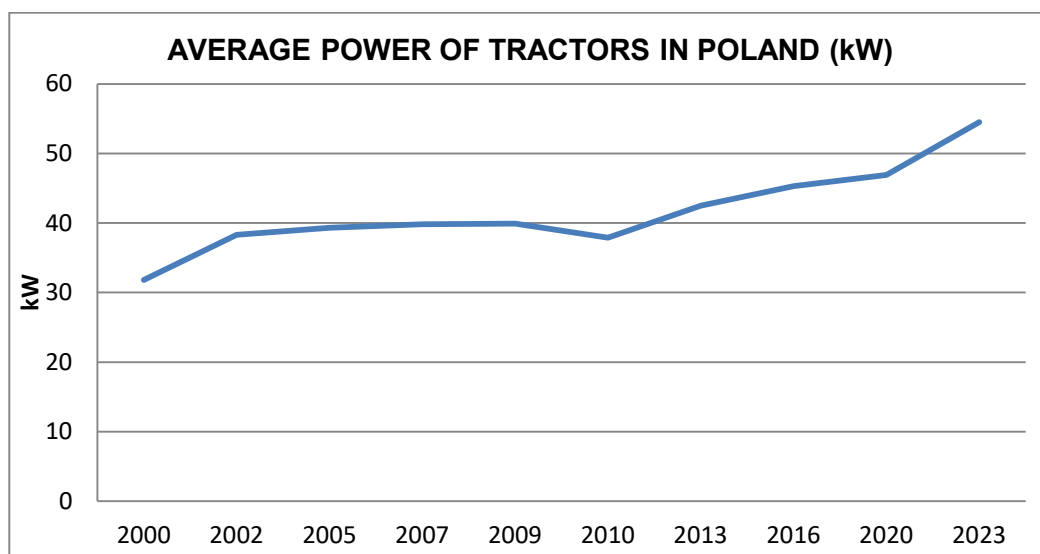


Figure 36. Average power of tractors in Poland (kW). Source: Own elaboration based on Statistics Poland (GUS), Statistical Yearbook of Agriculture (2000-2024).

Technology and Digitalization in European Agriculture

Digital transformation now complements mechanisation as a pillar of modernization. Precision Agriculture (PA) uses GPS guidance, variable-rate technologies, sensors, and farm management information systems (FMIS) to optimize input use and improve environmental outcomes.

According to Eurostat (2023), about 30% of EU farms employ some digital or precision technology, but adoption varies widely. Northern and Western Member States show advanced integration, while adoption remains slower in Eastern and Southern regions due to differences in digital literacy, broadband access, and investment capacity.

Balafoutis et al. (2020) classify Smart Farming Technologies into three main groups: FMIS platforms, precision systems, and automation or robotics. Their adoption across the EU is driven by CAP incentives, demonstration projects, and technology-transfer programs such as EIP-AGRI.

Nevertheless, common barriers persist: high investment costs, lack of training, and limited interoperability between equipment from different manufacturers (Tey & Brindal, 2012; Kutter et al., 2011). Profitability also plays a decisive role—farmers often hesitate to invest without clear economic returns (Lowenberg-DeBoer, 2019).

In regions such as the Iberian Peninsula and Central Europe, connectivity gaps and digital skills shortages slow progress. EU initiatives under the Digital Europe Programme and the CAP 2023-2027 aim to overcome these obstacles through support for broadband deployment, digital advisory services, and investment in data-driven equipment.

Precision Irrigation and Resource Efficiency

Smart irrigation is one of the most promising digital applications within European agriculture. According to Evans et al. (2012), variable-rate irrigation systems can save 10-25% of water, optimizing application according to soil conditions. IoT-based irrigation platforms combining sensors, meteorological data, and predictive algorithms are increasingly implemented in Mediterranean regions such as Spain and southern Italy. These tools connect mechanisation with digitalization, supporting both productivity and environmental objectives.

Strategies to Enhance Technology Adoption

Experience in European programs shows that technology transfer and collaboration are essential. The Nebraska On-Farm Research Network model has inspired similar EU initiatives that directly involve farmers in testing and validating digital tools (Thompson et al., 2024). Cooperative approaches, machinery rings, and digital innovation hubs help small and medium-sized farms access technologies otherwise beyond their means.

Building digital competence is equally crucial. CAP strategic plans now include measures for training, demonstration farms, and advisory services, reinforcing adoption capacity. According to the European Commission (2023), promoting digital literacy and standardizing data systems will be key to ensuring equitable access to smart technologies across Europe.

Conclusions

Mechanisation and digitalization jointly define the modernization of European agriculture. The comparative analysis of Bulgaria, Spain, Ireland, Lithuania, and Poland reveals distinct national realities within a shared European framework of convergence. Overall, all five countries are advancing toward more efficient, powerful, and technologically integrated machinery fleets, although at different speeds and from different starting points.

Spain and Ireland stand out as mature markets, characterized by continuous fleet renewal, the widespread incorporation of high-power tractors, and growing integration of digital systems. In Ireland, the extensive use of contractors further enhances the level of effective mechanisation and contributes to maintaining a modern, efficient machinery base. Poland, despite having the largest number of tractors, faces the structural challenge of an ageing fleet and comparatively low average power, which hinders the diffusion of precision and smart technologies beyond the most capitalized farms. Bulgaria, starting from a lower baseline, shows encouraging signs of recovery in machinery renewal, driven by EU investment and rural development funds. Lithuania, while operating on a smaller scale, has consolidated a younger and more powerful fleet that reflects a steady modernization process.

The transition toward data-driven and precision farming is gradually consolidating across Europe. However, its pace still depends on farmers' access to finance, connectivity, and digital skills. Sustained modernization will

require continued public and private investment, training programs, and stronger advisory networks. In the coming decade, the combined evolution of mechanical efficiency and digital capability will be decisive in shaping the competitiveness, sustainability, and resilience of European agriculture.

In all five countries, recent trends show a decline in new tractor purchases and growth in the second-hand market, raising concerns about a potentially ageing machinery fleet. If current price increases continue and public incentives remain insufficient, this situation could further aggravate in the coming years, undermining efforts toward modernization and technological renewal.

4.6.1 Regulatory Framework, Aid, and Incentives for Organic Farming

Introduction: The General Situation in the European Union

Organic farming represents an agricultural management and food production system that relies on natural substances and processes, emphasizing environmental and climate action, biodiversity, natural resource preservation, and high standards of animal welfare. The European Commission identifies organic farming as a central pillar in the transition toward a more sustainable agricultural model (European Commission, n.d.).

The regulatory foundation for organic farming across the European Union (EU) is defined by Regulation (EU) 2018/848 on organic production and the labeling of organic products, which became applicable on January 1, 2022. This regulation harmonizes the principles, rules, and procedures governing organic production, processing, and distribution across all Member States (EUR-Lex, 2025). Its overarching goals include ensuring fair competition among producers and reinforcing consumer confidence in organic labeling.

Strategically, the European Green Deal sets the target that at least 25% of EU agricultural land should be managed organically by 2030. As of 2022, organic production represented approximately 10.5% of the total utilized agricultural area (UAA). Achieving the 25% goal will thus require accelerating the current rate of adoption significantly (European Court of Auditors, 2024).

Funding and Incentives under the CAP 2023-2027

The Common Agricultural Policy (CAP) constitutes the main financial framework supporting the development of organic agriculture. Between 2014 and 2022, roughly €12 billion were devoted to conversion or maintenance of organic practices across the EU. For the 2023 - 2027 period, Member States plan to allocate around €14.7 billion through their CAP Strategic Plans (PEPACs) to further strengthen organic farming (Unión de Uniones de Agricultores y Ganaderos, n.d.).

Support is provided primarily through:

Direct Payments (Pillar I), particularly via Eco-schemes, which remunerate voluntary agricultural practices beneficial to the climate and environment.

Rural Development (Pillar II / EAFRD), which finances multiannual commitments under agri-environmental and climate measures, often including

specific support for conversion and maintenance of organic systems (Ministry of Agriculture, Fisheries and Food [MAPA], 2022).

In addition, all CAP beneficiaries must comply with enhanced Conditionality requirements, encompassing Statutory Management Requirements (SMRs) and Good Agricultural and Environmental Conditions (GAEC). Breaches of these obligations may result in reductions or cancellations of payments (European Court of Auditors, 2009).

Despite substantial funding, the EU framework faces several structural challenges. The absence of measurable long-term sustainability goals beyond area expansion, limited post-2030 strategic vision, and farmer discontent over restrictive conditionality measures, particularly regarding fertilizer and pesticide use, have constrained policy effectiveness (El Ágora, 2024). Moreover, data limitations continue to hinder precise evaluation of CAP impacts on environmental and market outcomes (Friends of the Earth Europe, 2022).

Organic Farming Regulatory Framework and Incentives by Country

Ireland

Ireland implements the Organic Farming Scheme (OFS), co-funded by the National Exchequer and the European Agricultural Fund for Rural Development (EAFRD) within the Irish CAP Strategic Plan 2023-2027. The program aims to enhance environmental performance, improve animal welfare, and stimulate domestic organic food supply (Department of Agriculture, Food and the Marine, 2022).

Participation in the OFS is voluntary and aligned with Regulation (EU) 2018/848. Farmers must adhere to SMRs and GAEC standards, maintain registration with an approved Organic Control Body (OCB), and complete a certified training course. Contractual commitments generally last up to five years, with a minimum eligible area of 3 hectares (or 1 hectare for horticulture). Partial conversion of farms is permissible when distinct crops or livestock species differentiate organic from conventional units.

The OFS applies a tiered entry system—prioritizing categories such as female and young farmers, full conversions, mixed farming, and larger organic areas—and allocates payments accordingly. Rates vary by production type and conversion stage: for example, in-conversion horticultural farms receive €800/ha for the first 70 hectares, while tillage farms receive €320/ha. Co-participation with other schemes such as Agri-Climate Rural Environment Schemes (ACRES) and Eco-schemes is permitted, provided that double funding is avoided.

Spain

Spain's CAP Strategic Plan (PEPAC) 2023-2027, approved by the European Commission on 31 August 2022, integrates organic farming as a crucial environmental and rural development tool (MAPA, 2022). The national goal

aims to reach 20% of agricultural land under organic management by 2030, slightly below the EU's 25% target.

Approximately €837 million are allocated to organic farming through agri-environmental and climate measures. Spain's PEPAC emphasizes redistribution mechanisms to support small and medium-sized farms that face structural disadvantages (García Delgado & García Grande, 2005). Two dedicated Eco-schemes -extensive grazing and biodiversity mowing- reward environmentally beneficial extensive livestock practices. Additionally, young farmers under 41 years old who are women receive a 15% top-up payment, addressing gender inequality (Parlamento Europeo, 2025). Spain also stands out for implementing social conditionality-linking aid to compliance with labour law-one year earlier than required, beginning in 2024.

Poland

Poland supports organic agriculture through Intervention I.8.11 in its CAP Strategic Plan 2023 - 2027, designed to promote voluntary conversion and maintenance of organic practices (Szalast-Piwińska, 2024). However, the sector faces significant challenges: between 2014 and 2022, the number of organic farms declined by 14.6% and organically managed land by 15.6%, despite growing subsidy levels. Low profitability, high production costs, and underdeveloped market infrastructure have limited growth (Fernández Salido, 2001).

Poland's organic target is only 4.5%, among the lowest in the EU. To address structural imbalance, payment rates are degressive: 100% of the basic rate up to 50 ha, 75% between 50 - 100 ha, and 60% above 100 ha. Crop-specific rates provide higher incentives for horticulture (PLN 3,105/ha during conversion). Small farms under 10 ha receive a flat rate of PLN 1,640/ha, while integrated plant-animal production earns a sustainability bonus (PLN 573/ha) conditioned on livestock density (0.5 - 1.5 LU/ha). A previous authorization allowing tethering in small holdings (despite organic aid eligibility) was revoked in 2022 (EFE, 2023).

Lithuania

Lithuania has shown steady progress, with organic farming area increasing by 48% between 2014 and 2022, reaching 8.59% of total agricultural land, slightly above the EU average (Lithuanian Ministry of Agriculture, 2023). Nevertheless, no National Action Plan for organic farming had been adopted by the end of 2023.

Support measures have largely benefited larger enterprises, creating disparities between farm sizes. While organic programs have reduced greenhouse gas emissions and soil erosion, enforcement of penalties for non-compliance remains weak (European Court of Auditors, 2024). To enhance redistribution, Lithuania applies capping and degressivity to income support, aligning with EU goals of equitable aid distribution.

Bulgaria

Bulgaria approved its National Action Plan for the Development of Organic Production 2030 in February 2025 (Ministry of Agriculture and Food, 2025). The plan sets a target of 6.98% of agricultural area (354,279 ha) under organic production by 2027. Bulgaria demonstrates strong specialization in organic beekeeping and is a leading global producer of rose and lavender oils.

The country's strategy emphasizes three objectives: (1) stimulating consumer demand and confidence, (2) reinforcing value chain integration, and (3) improving the sector's sustainability contribution. Key policy instruments include green public procurement for schools and hospitals, promotion of national organic products through fairs and digital platforms, and priority access to state-owned pastures for certified organic livestock farms. The plan also foresees financial assistance for certification costs for small first-time producers (<0.5 ha) not participating in other schemes. Bulgaria maintains one of the lowest pesticide footprints in the EU, with organic farming heavily reliant on RDP and Strategic Plan support (Tribunal de Cuentas Europeo, 2024).

Conclusion

All five Member States—Bulgaria, Spain, Ireland, Lithuania, and Poland—operate within the shared regulatory and financial framework of the CAP 2023-2027 and Regulation (EU) 2018/848, aiming to expand organic farming as a key component of the Green Deal. Yet, their ambitions and implementation approaches differ markedly.

From a regulatory and financial standpoint, all rely on CAP funding (EAGF/EAFRD) and apply conditionality standards as a baseline for payments. However, Bulgaria, Ireland, and Poland have developed distinct national schemes with tailored interventions, whereas Lithuania's measures have been criticized for favoring large holdings disproportionately (Friends of the Earth Europe, 2022).

In terms of ambition, Spain's 20% target and Poland's 4.5% objective fall short of the EU benchmark, while Bulgaria and Lithuania maintain moderate ambitions. Ireland's structured tiered system demonstrates an effort to improve targeting and inclusiveness, especially toward young and female farmers.

Redistribution and market integration also reveal important contrasts. Poland and Spain employ degressive mechanisms and specific bonuses to strengthen equity, while Bulgaria focuses on stimulating market demand and public procurement as a means to consolidate its organic sector. Conversely, Poland's lack of infrastructure and profitability issues continue to hinder progress (González Temprano, 2013).

Environmental integrity remains a cornerstone of all programs, with incentives primarily designed to encourage conversion and maintenance of organic systems. Nevertheless, enforcement challenges persist in Poland and Lithuania, where compliance mechanisms and penalty systems have been insufficiently robust. Spain's linkage of eco-schemes to extensive grazing illustrates a more integrated approach to ecosystem management.

Overall, while each Member State aligns formally with EU objectives, divergent implementation capacities, market structures, and social incentives shape distinct national trajectories. Strengthening monitoring systems, improving market access, and harmonizing enforcement standards will be essential for the EU to meet its 2030 organic farming targets.

4.6.2 Trends and Strategic Challenges

Global agriculture is undergoing a profound transformation driven by demographic growth, climate change and increasing pressure on finite resources. This shift, often described as Agriculture 4.0 or Smart Farming, integrates Artificial Intelligence (AI), robotics and biotechnology to enhance efficiency, resilience and sustainability (FAO, 2021). Key global trends include the rapid rise of AI and automation, the expansion of regenerative agriculture focused on soil health and carbon management, and accelerating investment in ag-biotechnology (ICL Group, 2025; Palacios-López, 2024).

At the heart of this technological evolution lies the principle of maximizing efficiency in resource use through precision agriculture (Valero, 2019). However, the transition still faces major barriers: high investment costs, the persistent rural digital divide, data-governance uncertainty, and the lack of generational renewal in rural areas (Carvajal Chávez, 2025).

The European organic-farming sector, although growing strongly in both area and retail value, confronts unique regulatory and economic constraints. Ambitious policy targets under the European Green Deal and the Farm to Fork Strategy aim to achieve 25% of agricultural land under organic management by 2030 (European Commission, 2023). Yet the sector remains highly dependent on CAP support, and its competitiveness is limited by low farm profitability, policy inconsistencies among Member States and market fragmentation (Tribunal de Cuentas Europeo, 2024b; World Bank, 2023). Strengthening domestic demand, farmer cooperation and equitable access to modernization resources are key policy priorities.

The global population is expected to exceed 10 billion by 2050, increasing pressure on food systems (FAO, 2021). This challenge accelerates the adoption of innovations collectively known as AgroTech, which redefine how food is produced and managed. The technological evolution of agriculture is usually described in several stages (Valero, 2019; Barreiro & Diezma, 2025): Agriculture 2.0, or Precision Agriculture, marked by electronic components in machinery such as GPS, ISOBUS control and Variable Rate Technology (VRT); Agriculture 3.0, or Digital Agriculture, which incorporates large-scale data transfer, cloud storage and advanced analytics (Big Data and Machine Learning); and Agriculture 4.0, or Smart Farming, characterized by full integration of digitization, automation and AI within connected systems and the Internet of Things (IoT).

This paradigm shift moves beyond mechanisation toward automation and robotics (González-de-Santos et al., 2017). Its goal is to improve productivity and quality while reducing environmental impact and production risks. Current global trends for 2025 confirm this trajectory: the growth of AI in farming, carbon

utilization and remote sensing, the consolidation of regenerative agriculture, and breakthroughs in biotechnology (Plataforma Tierra, 2025; ICL Group, 2025).

AI is becoming an input as strategic as seed or fertilizer. It accelerates decision-making, compensates for labour shortages and contributes to sustainability goals under the Green Deal and the CAP (2023-2027). AI models process data from IoT sensors, satellite imagery and weather stations to forecast yields and detect diseases with high precision (Larrazabal, 2025). The global AI-in-agriculture market reached approximately 4.7 billion USD in 2024 and is expected to grow at more than 26% CAGR between 2025 and 2034 (ICL Group, 2025).

Key AI applications include predictive analytics for yield forecasting, early detection of pests and diseases, and the development of digital twins that allow virtual testing of irrigation or nutrient scenarios without intervening physically on the field (Carvajal Chávez, 2025). AI also accelerates R&D for new crop varieties and high-efficiency agro-inputs (Larrazabal, 2025).

Precision Agriculture (PA) enhances efficiency by observing, measuring and responding to field variability. Its implementation can reduce fertilizer and pesticide use by up to 30% while maintaining yields (Valero, 2019; Barreiro & Diezma, 2025). Core tools include VRT, GPS and GIS-based mapping, advanced sensors, drones and smart-irrigation systems that optimize water use based on real-time soil-moisture and climate data (Cancela & Ballesteros González, 2023). These innovations directly support climate-adaptation goals and water-efficiency policies in drought-prone regions (van Leeuwen et al., 2024).

Automation and robotics complement this digital transition by tackling labour shortages and enhancing operational precision. The global market for agricultural robotics is projected to reach 7.7 billion USD in 2025 (González-de-Santos et al., 2017). Autonomous tractors and specialized robots already perform tasks such as seeding, weeding or selective harvesting, reducing soil compaction and chemical use. Light robotic platforms integrated with machine-vision systems can identify weeds and apply inputs only where needed, lowering environmental impact.

Despite technological progress, structural and strategic challenges persist. The high upfront cost of advanced systems remains a key barrier for small and medium-sized producers (World Bank, 2023). AgroTech start-ups often face regulatory and scalability obstacles that slow commercialization. Connectivity limitations in rural areas constrain real-time data collection and hinder AI deployment, particularly in regions with insufficient broadband coverage (FAO, 2021). The shortage of digital skills and unresolved issues of data ownership and privacy further restrict adoption.

Climate change intensifies the urgency of innovation. Adaptation to droughts, heatwaves and extreme events requires smarter water management, diversification of drought-resistant crops and restoration of degraded soils; actually 70% of European soils are currently classified as deteriorated (European Commission, 2023). Regenerative practices aim to reverse this trend by improving soil health, biodiversity and carbon sequestration (Palacios-López, 2024).

The survey designed by OFISET confirms that in all the countries studied, farmers have been negatively affected by climate change, although the intensity has varied greatly. The countries showing the highest levels of concern are Bulgaria and Spain, with scores of 4.83 and 4.3 out of 5, respectively. Polish farmers also report having suffered the consequences of climate change, with a score of 3.81 out of 5, while Irish farmers show the lowest level of concern among the analysed countries, with a score of 2.83.

Respondents also expressed concern about soil conditions, particularly in Spain, where concern about organic matter content reached the maximum value of 5 out of 5, closely followed by soil compaction and nutrient status, with scores of 4.5 and 4.7, respectively. The other Mediterranean country, Bulgaria, also shows concern about nutrient status (3.6), compaction (2.9), and organic matter (2.9).

Poland and Ireland, characterized by more humid climates and fertile soils, are less worried about soil conditions. One of the most frequent demands in Bulgaria, Spain, and Poland is the development of hydrological plans and the construction of storage ponds and irrigation systems. This is not the case in Ireland, where the demand for water infrastructure is non-existent.

A major socio-demographic constraint is the aging farming population and the weak **generational renewal**. Younger people often perceive agriculture as financially insecure and technologically obsolete. In Spain, for instance, 41.31% of farms are managed by individuals over 65, while only 3.94% are run by people under 34 (Deliverable 2.4 data). Reversing this trend demands policies that emphasize innovation, quality of life and environmental purpose in farming careers.

European organic agriculture occupies a central position within the EU's sustainable-food vision, shaped by the European Green Deal and its Farm to Fork and Biodiversity Strategies for 2030 (European Commission, 2023). As of 2021, organic land represented slightly more than 10% of the EU's UAA, meaning adoption must accelerate to reach the 25% target by 2030. Financial support flows mainly through the CAP Strategic Plans (2023-2027), eco-schemes and rural-development measures. However, ambition levels vary widely: Poland's target is only 4.5%, while Spain aims for 20%.

Although the 2023-2027 plans are greener than in previous periods, the European Court of Auditors (2024a, 2024b) found that they still fall short of the EU's environmental objectives. The Court criticized the lack of quantified contributions to Green Deal targets such as the 50% pesticide-reduction goal.

Globally, organic farmland has expanded by over 400% and retail sales by 700% since 2000 (Willer, Trávníček & Schlatter, 2024). Europe accounts for about 17 million ha (> 10% of total UAA) in 2022. Spain leads the EU with 2.99 million ha certified or in conversion, and retail sales of 2,747.8 million € in 2023 (Veganic Bio, 2025). While Spain continues to grow, markets in countries such as Ireland stagnated due to inflation and reduced purchasing power (Arndt & Apostolov, 2023).

Yet a structural gap persists: the organic market value has grown twice as fast as organic area. This imbalance limits farm profitability and increases

vulnerability to shocks. Value distribution across the organic supply chain remains inequitable—farmers capture between 9% and 62% of final product value, while distributors may retain up to 70% in mature markets such as the UK and Italy (World Bank, 2023). In the Czech and Spanish dairy chains, producers receive only 3% to 12% of unit value added.

Dependence on subsidies further undermines stability. In Poland, 80% of the organic area is subsidized under the CAP, and when support declines, certified surfaces shrink dramatically (Tribunal de Cuentas Europeo, 2024b; De Arriba, 2025).

Policy effectiveness and consistency remain critical bottlenecks. The CAP's current design still lacks measurable alignment with the Green Deal's quantified environmental targets (Tribunal de Cuentas Europeo, 2024a). The relaxation of environmental conditionality in 2024, such as the weakening of crop rotation (BCAM 7) and non-productive land requirements (BCAM 8), has diluted the policy's climate ambition. The instability of financial incentives, as observed in Bulgaria and Poland, shows how organic expansion can reverse rapidly when public support is uncertain (Arndt & Apostolov, 2023).

Operationally, organic farms continue to face higher unit production costs compared with intensive conventional systems, mainly due to labour intensity and the price of biological inputs (MAPA, n.d.). Digitalization within organic production remains limited because of small farm size, limited access to credit and a lack of specialized training (Barreiro & Diezma, 2025). In several Member States, including post-socialist economies, weak cooperative structures hinder economies of scale and collective bargaining (World Bank, 2023).

Market stagnation and unfair competition from “greenwashed” products labeled as “local” or “natural” without organic certification further erode consumer trust and price premiums (De Arriba, 2025). Strengthening traceability and communication about certified value is essential for maintaining market confidence.

In summary, global agriculture is at the intersection of technological acceleration and ecological urgency. AI, robotics and biotechnology provide unprecedented potential to achieve both productivity and sustainability goals, but their success depends on inclusive access, transparent governance and robust public policy (FAO, 2021; Palacios-López, 2024). European organic agriculture stands at the forefront of this transition yet faces deep structural challenges (policy incoherence, dependency on subsidies and uneven value-chain distribution) that threaten its long-term competitiveness.

Future policy priorities should therefore focus on three interconnected areas.

First, strengthening farmers' position in the value chain by promoting cooperative structures, fair-pricing mechanisms and local or premium branding strategies (e.g., biodistricts). These measures can improve income stability and increase domestic demand for certified products.

Second, ensuring equitable access to innovation and technology through targeted funding for small and medium-sized organic producers, as well as improving digital infrastructure in rural areas. Facilitating access to AI-based decision-support systems and precision technologies can enhance productivity

while preserving the ecological integrity of organic systems (Valero, 2019; Cancela & Ballesteros González, 2023).

Third, enhancing CAP ambition and accountability by integrating measurable environmental targets derived from the Green Deal into future policy cycles and by developing robust monitoring indicators. Progress should be evaluated not only by the expansion of organic acreage but also by tangible improvements in biodiversity, soil health and climate performance (European Commission, 2023; Tribunal de Cuentas Europeo, 2024b).

Ultimately, the resilience of global and European agriculture depends on balancing technological innovation with ecological and social inclusion. The convergence of AI-driven efficiency, regenerative practices and evidence-based policy can build a food system that is both competitive and sustainable, capable of feeding a growing population while preserving the planet's natural capital.

4.7 Economic Competitiveness of Agricultural Holdings

4.7.1 Agricultural Income and General Economic Indicators

Regarding agricultural income, the analysis of Entrepreneurial Income (Figure 37), which represents the net earnings remaining to farmers after remunerating all external production factors, provides valuable insight into the sector's real profitability across countries. Throughout the series, a general upward trend can be observed, albeit marked by strong volatility linked to energy and input costs. Spain and Poland stand out once again as the countries with the highest income levels and the most stable growth patterns, reflecting the solidity of their agri-industrial structures and their greater ability to pass rising costs on to final prices.

In Spain, agricultural entrepreneurial income increased from approximately 16,363.76 million euros in 2000 to nearly 27,787.33 million in 2024, reflecting a sustained expansion of the sector's operating margin driven by specialization in high-value-added products and the strong weight of exports. Poland also shows a notably positive evolution, multiplying its initial value more than sixfold thanks to farm modernization following EU accession and the inflow of structural funds. Both countries, however, experienced a temporary decline in 2022 due to the sharp rise in energy and fertilizer costs, though they recovered rapidly from 2023 onwards.

Ireland shows a more irregular pattern, with pronounced peaks in 2017 and 2022 followed by steep declines. This volatility is closely related to its high dependence on international prices for dairy and meat products, which are particularly sensitive to transport costs and global market fluctuations.

In contrast, Bulgaria and Lithuania maintain much lower levels of entrepreneurial income, with a moderate upward trend until 2021 followed by a sharp contraction in 2022-2023, from which they have not yet recovered. This loss of profitability is closely linked to inflationary pressures and the energy crisis triggered by the Russia-Ukraine war, which hit hardest those countries with greater dependence on imported gas and weaker agri-industrial integration.

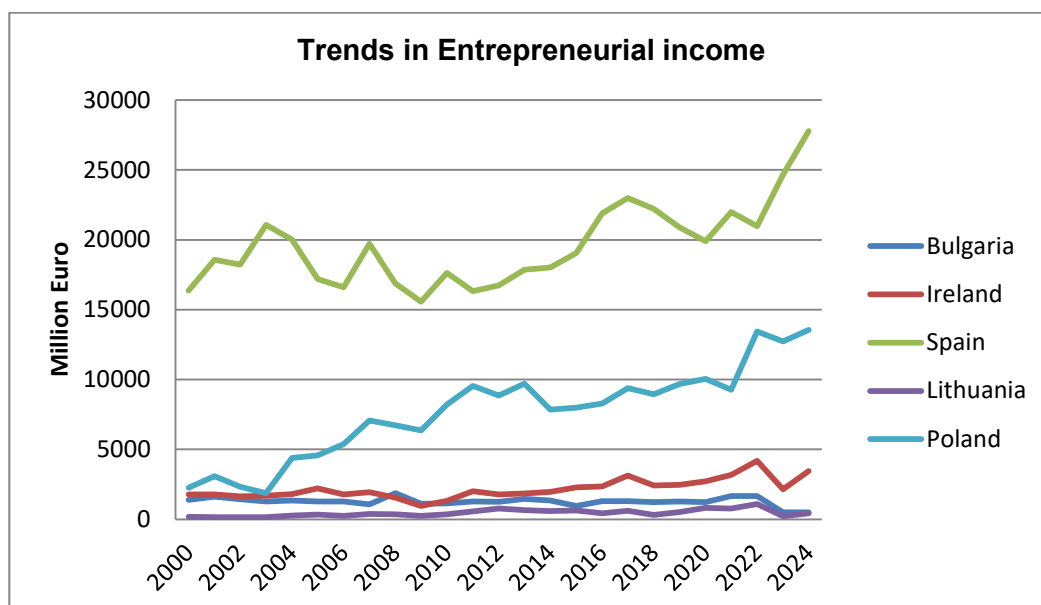


Figure 37. Trends in Entrepreneurial income. Source: Own elaboration based on Eurostat, 2025.

The comparison with the evolution of the Harmonized Index of Consumer Prices (HICP) (Figure 38) confirms this relationship. Between 2021 and 2024, cumulative inflation in Lithuania, Poland and Bulgaria exceeded 140% (base 2015 = 100), compared with values around 125% in Spain and Ireland. Although this price increase raised the nominal value of agricultural production, it reduced producers' purchasing power and real profit margins. As a result, the growth in Agricultural Industry Output did not fully translate into a proportional increase in Entrepreneurial Income.

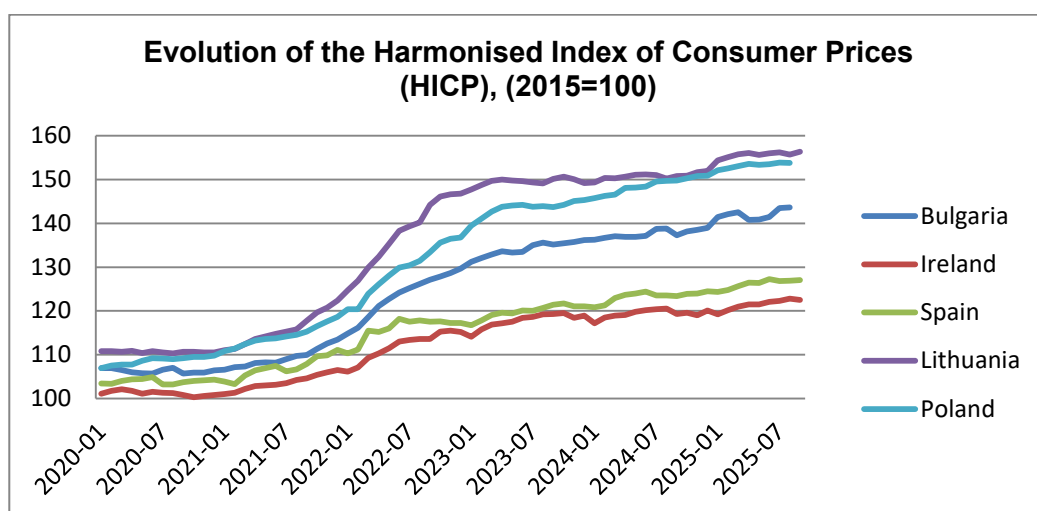


Figure 38. Evolution of the Harmonised Index of Consumer Prices (HICP), (2015=100). Source: Own elaboration based on Eurostat, 2025.

This inflationary effect on production costs is further exacerbated by the evolution of agricultural input price indices (Figure 39). All countries experienced a sharp surge beginning in 2021, peaking in 2022. However, while

in Spain, Ireland and Poland the index began to stabilize or decline from 2023 onwards, in Bulgaria and Lithuania it remained persistently high, continuing to exert downward pressure on farm profitability.

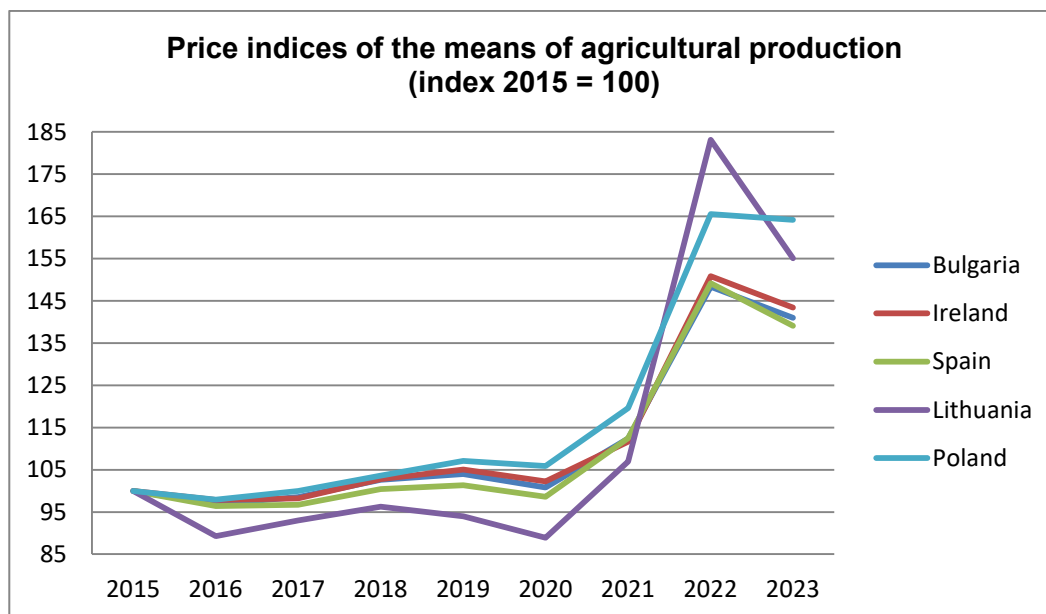


Figure 39. Price indices of the means of agricultural production (index 2015 = 100) Source: Own elaboration based on Eurostat, 2025.

A more accurate perspective on real income emerges from the analysis of Agricultural Real Factor Income per Annual Work Unit (AWU) shown in Figure 40. This indicator, which measures real income per full-time equivalent worker, reveals an even more pronounced divergence. Spain clearly leads the ranking, surpassing 35,000 euros per AWU in 2024, underscoring its high labour productivity. Poland and Ireland show a positive trend as well, although with significantly lower income per AWU.

In contrast, Bulgaria and Lithuania record the lowest values in the series, indicating not only lower aggregate profitability of the sector but also a productive structure with less value added per worker, possibly associated with smaller farm sizes or lower levels of mechanisation.

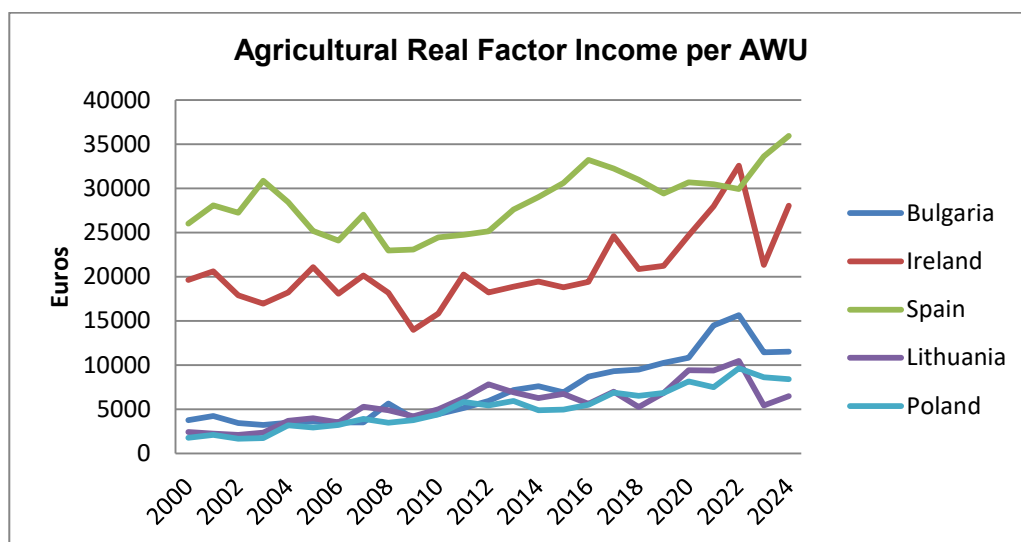


Figure 40. Agricultural Real Factor Income per AWU. Source: Own elaboration based on Eurostat, 2025.

The analysis of land purchase markets provides a key structural factor for understanding these differences. Figures 41 and 42, which show the evolution of prices for permanent grassland and arable land respectively, reveal a clear stratification.

Ireland displays the highest purchase prices, reflecting strong demand for agricultural assets and expectations of future profitability. Poland shows a markedly upward trend, particularly in arable land values, indicating a process of revaluation and sectoral intensification.

Bulgaria and Lithuania, although they have also experienced growth, start from much lower levels and show a more moderate dynamic, which correlates with lower expected profitability. In the case of Spain, although land prices initially ranked just below those of Ireland, they have remained stable for arable land and have even declined for grassland.

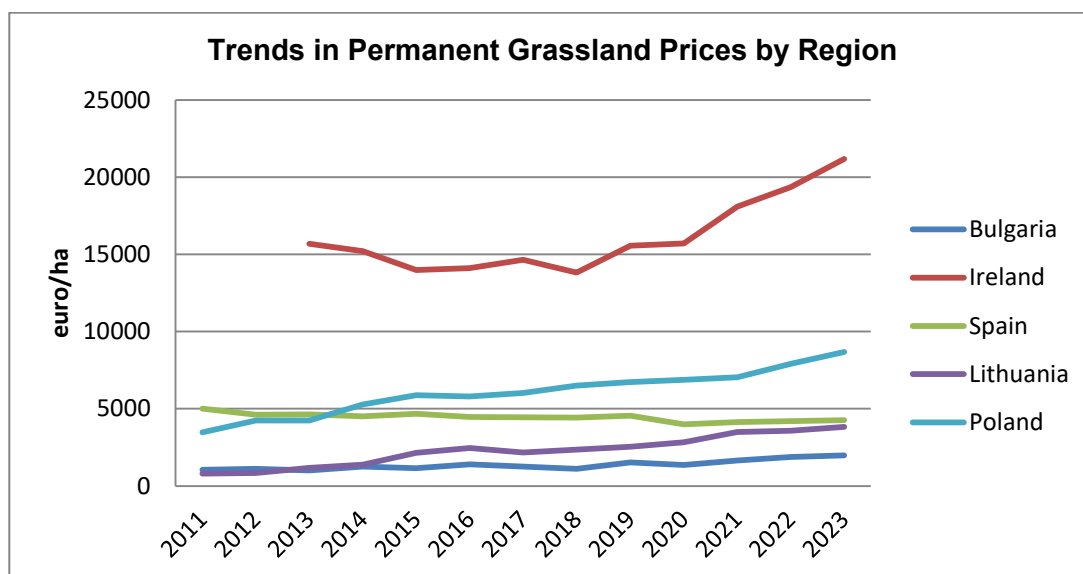


Figure 41. Trends in Permanent Grassland Prices by Region. Source: Own elaboration based on Eurostat, 2025.

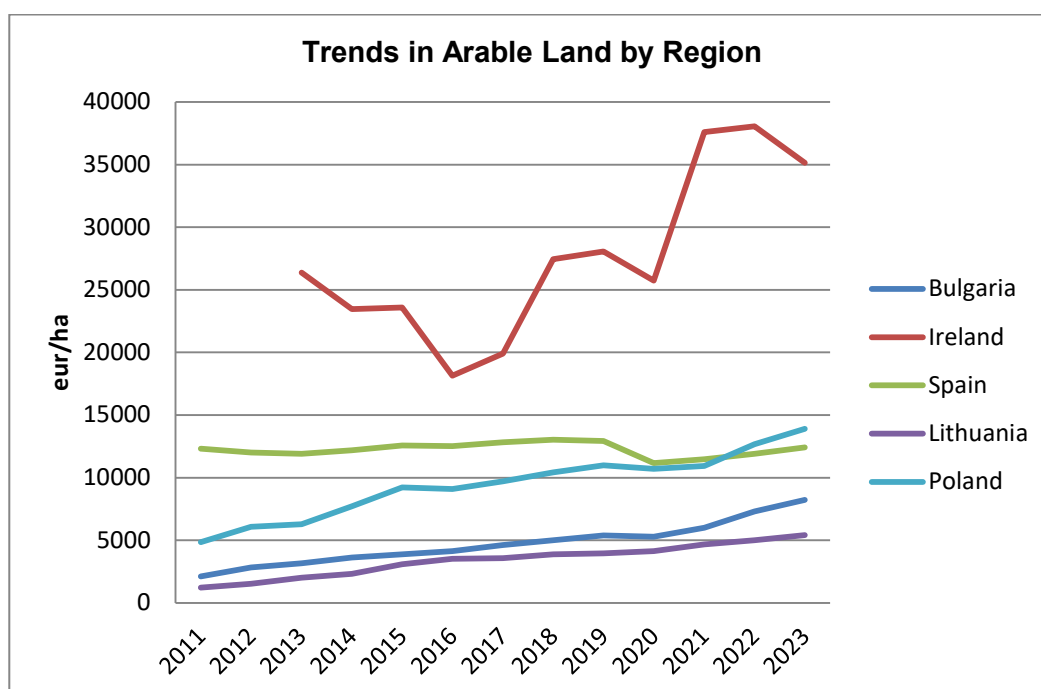


Figure 42. Trends in Arable Land by Region. Source: Own elaboration based on Eurostat, 2025.

Finally, the cost of access to land, reflected in the average rental price (Figure 43), completes the picture and reveals growing pressure on production costs. A general upward trend can be observed in all countries throughout the series, becoming particularly pronounced from 2020 onwards.

Ireland not only starts from the highest rental levels but continues to show growth, reaching 417 €/ha. In Bulgaria, the trend is also strongly upward,

although it appears to have stabilised since 2022, possibly due to the stagnation of the Bulgarian agricultural sector's profitability from that year onwards.

Lithuania, meanwhile, has seen rental costs quadruple since 2011, reaching 227 €/ha in 2023. In Poland, prices appear to be increasing as well, although the lack of recent data prevents drawing reliable conclusions.

In the case of Spain, rental prices remain remarkably stable, standing apart from the rest of the countries analysed.

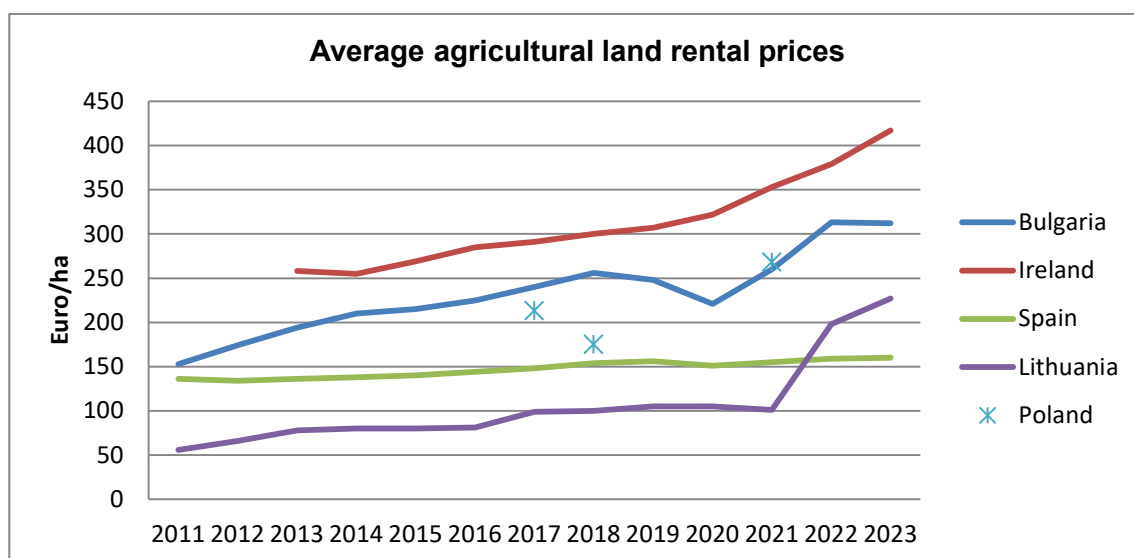


Figure 43. Average agricultural land rental prices. Source: Own elaboration based on Eurostat, 2025.

This escalation in land costs, while initially suggesting higher asset value, when combined with rising input prices (Figure 43), poses a direct threat to the economic viability of a large number of farms.

Production models that lack a predominantly owned land base or are highly dependent on external inputs experience severe compression of their operating margins under this dual cost pressure. Farmers face higher prices both for production inputs and for access to their main production factor - land - while the final sale price of their output does not always guarantee coverage of these increased costs.

This phenomenon may accelerate processes of land and production concentration in the hands of larger, better-capitalised operators, to the detriment of family farming and smaller holdings, thereby endangering the social and economic sustainability of rural production systems in several regions.

4.7.2 Competitiveness of Organic Production Systems

The past three decades have placed agricultural systems at the center of policies designed to foster a more sustainable future. Ecological, organic, and regenerative agricultural systems (EA, OA, and RA, respectively) are recognized as vectors of change capable of contributing significantly to transforming economic models from linearity toward circularity. This

transformation is essential to achieve the Sustainable Development Goals (SDGs) and transition to a fossil-fuel-independent system that conserves resources for future generations (Constantin et al., 2022).

The European Union (EU) has embraced this vision through initiatives like the European Green Deal, which incorporates the circular economy concept, prioritizing the reuse, reintegration, recycling, and reconditioning of materials, and sets ambitious goals, including achieving carbon neutrality by 2050. In the agricultural sector, OA, EA, and RA systems embody these principles, focusing on biodiversity support, soil protection, water conservation, and eliminating chemical inputs or genetic engineering associated with conventional agriculture (Martín-García et al., 2023).

Building on this framework, it is essential to understand how the competitiveness of these environmentally friendly systems is conceptualized and measured. The competitiveness of EA, OA, and RA systems is a complex, multi-faceted, and relative concept. In the context of sustainability, competitiveness and performance must be viewed through a modern lens that prioritizes achieving the SDGs (Tomashuk, 2023).

Research generally finds that EA, OA, and RA systems are highly competitive in terms of low environmental impact when compared to conventional agriculture (Crowder & Reganold, 2015)

However, they often face challenges related to financial and legislative viability (Kuberska et al., 2020)

This report reviews the competitiveness and performance of ecological production systems, focusing on the main challenges and solutions observed across Europe. The general European overview is then complemented by a country-level analysis of Bulgaria, Spain, Ireland, Lithuania, and Poland.

Main Challenges and Solutions in European Organic Agriculture

Ecological and organic agricultural systems face systemic hurdles related to production, economics, legislation, and market structure. These constraints limit their large-scale adoption despite their clear environmental advantages (Constantin et al., 2022).

Production and Economic Challenges

One of the most persistent challenges for organic agriculture is managing productivity and profitability without relying on synthetic inputs.

Yield Gap and Costs: Organic farms generally experience lower crop yields compared to their conventional counterparts. Meta-analyses suggest this yield gap ranges widely but averages between 10% and 34% less than conventional systems. This yield reduction is mainly attributable to the ban on synthetic fertilizers and pesticides (Crowder & Reganold, 2015)

While total costs between the two systems may not differ significantly, labour costs are notably higher in organic farming (7-13%) due to labour-intensive practices replacing chemical controls.

Financial Performance: When organic premiums are not applied, indicators such as benefit/cost ratios and net present values are significantly lower for

organic agriculture (Crowder & Reganold, 2015). The high volatility of yields and world prices often leads to significant variations in annual profitability, generating economic instability for farmers.

Technical/Environmental Management: Organic farmers face technical difficulties related to pests, diseases, and maintaining optimal soil fertility. Without synthetic inputs, systems rely on complex rotations and biological processes. Deficiencies in macroelements like phosphorus (P) and potassium (K) are sometimes observed in nutrient balances of organic farms (Feledyn-Szewczyk & Kopiński, 2024).

Legislative and Institutional Barriers

The financial viability of organic farming systems is often heavily reliant on external financial support.

Dependence on Subsidies: Ecological and organic farms are typically considered poorly competitive from a legislative perspective because they rely substantially on incentives and political support (Kuberska et al., 2020)

The legislative framework and incentive systems are crucial, especially given that environmentally friendly farms often register higher cost volumes.

Regulatory Complexity: Farmers in Central and Eastern Europe, including Poland and Hungary, cite the high degree of bureaucracy, complex regulations, high certification costs, and lack of advisory services as significant barriers to entry and operation (Mazurek-Kusiak et al., 2021).

In the survey conducted among OH-FINE farmers, bureaucracy stands out as one of the most cross-cutting problems across countries. Even so, farmers perceive greater difficulty in Bulgaria and Spain, with scores of 4.28 and 4.5 respectively (where 5 represents the highest level of complexity), while in Ireland and Poland farmers report fewer difficulties, with average scores of 3.63 and 3.57, respectively.

Market and Social Challenges

Market dynamics pose additional difficulties, especially regarding distribution and consumer demand.

Limited Demand and Price Sensitivity: In many newer EU Member States, organic food remains a niche market due to limited consumer purchasing power and awareness. High organic prices compared to conventional food restrict consumption by average customers (Sobocińska et al., 2021).

In the survey conducted among OH-FINE farmers, they reported that the almost negligible price difference between conventional and organic products was one of the main reasons for abandoning organic farming. In Ireland, 100% of respondents stated this was the main reason; in Poland, 66.7%; and in Spain, 50%, where the primary reason was instead the decrease in yields (75% indicated this as the main cause). In Bulgaria, 80% of respondents declared that the end of subsidies was the reason for abandoning organic farming.

Market Structure: Regional disparities and structural issues in marketization often lead to imbalances between supply and demand. The increasing presence of large operators risks the "conventionalization" of organic agriculture,

potentially marginalizing small farms (Moreno-Pérez & Blázquez-Soriano, 2023).

Solutions and Competitive Advantages

Despite these challenges, organic agriculture has significant potential and viable pathways for expansion, even if price premiums decline.

Financial Competitiveness via Premiums and Low Inputs: The key to financial success lies in achieving price premiums and maintaining low input costs. When actual premiums (typically 29-32%) are applied, organic agriculture becomes significantly more profitable than conventional farming (Crowder & Reganold, 2015)

In Polish case studies, lower direct costs were the main factor determining higher economic efficiency (Feledyn-Szewczyk & Kopiński, 2024)

Strategic Market Approaches: Direct marketing strategies (DMS), such as sales to consumers or local stores, allow farmers to capture more value by eliminating intermediaries. These approaches are positively correlated with efficiency (Balanovska et al., 2021).

In the OH-FINE survey, farmers were asked whether they were aware of any law that had helped shorten the agri-food value chain. Among those who responded affirmatively, 83.3% mentioned the “Rolniczy Handel Detaliczny” (RHD) as a key example.

The RHD, or Agricultural Retail Trade, is a Polish legal framework introduced in 2016 that allows farmers to sell food products directly to consumers or local outlets such as restaurants and shops. This regulation simplifies administrative procedures, reduces fiscal burdens, and enables farmers to market products primarily derived from their own farms, thus strengthening the connection between producers and consumers.

This framework aligns closely with direct marketing strategies (DMS) by facilitating shorter supply chains and greater price autonomy for farmers. By legally supporting on-farm processing and local sales, RHD contributes to improving economic efficiency and rural resilience, particularly among small- and medium-scale producers engaged in sustainable and organic farming systems.

Diversification into value-added products and adherence to schemes like PDO or organic labels enhance efficiency and consumer trust (Sobocińska et al., 2021)

Policy and Institutional Support: CAP subsidies, especially under Pillar II, play a key role in closing profitability gaps. Targeted policies — such as educational campaigns, R&D support, and development of disease-resistant varieties — are crucial for long-term competitiveness (Komor et al., 2025)

Efficient Input Management: Practices like reducing external inputs and rational use of organic fertilizers improve profitability. For example, optimization models show higher gross production value using organic vs. mineral fertilizers, due to lower input costs and higher market prices (Balanovska et al., 2021).

Specific Situations in Selected EU Countries

While the previous section provided a European overview of the main barriers and potential solutions for organic agriculture, this section analyses how such dynamics unfold in five specific EU Member States: Bulgaria, Spain, Ireland, Lithuania, and Poland. These countries differ significantly in terms of organic sector maturity, policy frameworks, competitiveness, and socio-economic contexts.

Bulgaria

In Bulgaria, the overall competitiveness of agricultural holdings is considered moderate, with an index of 0.4. However, this average value masks considerable weaknesses: particularly low scores in adaptive potential (0.16) and economic efficiency (0.19) hinder sectoral development (Bachev, 2021).

Beekeeping stands out as the most competitive specialization (index 0.46), followed by field crops (0.44), while grazing livestock remains the least competitive (0.32).

These disparities are closely related to the availability of knowledge, advisory services, and access to support programs, elements previously identified as decisive for improving competitiveness in Bulgaria's agricultural sector.

Administrative burdens and certification costs are particularly high, acting as major obstacles to scaling up organic production (Arabska et al., 2024).

A structural issue also persists: much of Bulgaria's organic output is exported as raw materials and then re-imported as finished products, evidencing a weak domestic value chain.

Policy initiatives increasingly aim to stimulate organic consumption and strengthen local processing and marketing infrastructure to retain value within the country (Arabska et al., 2024).

Spain

Spain plays a leading role in the European organic sector, being the first-largest country in certified organic area. However, regional disparities exist in Corporate Social Responsibility (CSR) performance and the adoption of Sustainable Technological Innovation (STI). For example, Castile and Leon, Andalusia, and Aragon score high in CSR, while the Valencian Community lags behind (Abad-Segura et al., 2024).

A recent foresight study focused on smallholder agriculture in the Valencian Region foresees continued expansion of organic area and sales by 2030. This growth is expected to occur alongside a slight reduction in the price differential between organic and conventional food. However, structural challenges remain, such as the aging farming population, weak purchasing power among consumers, and the need to maintain premium prices (Moreno-Pérez & Blázquez-Soriano, 2023).

The olive sector provides a concrete case: while conventional farms are more productive due to higher intensification, organic olive farms show greater resilience and adaptability. CAP subsidies, especially under Pillar II (agri-

environmental schemes), effectively offset profitability gaps between both systems, encouraging conversion (Martín-García et al., 2023)

The CORDIS report also highlights how sustainable practices (such as reducing inputs and diversifying production) have demonstrated dual benefits for environmental protection and farmer income in Mediterranean countries like Spain.

Ireland

Irish agriculture is highly specialized in dairy and beef production, sectors that have been extensively analysed in terms of technical and environmental efficiency. Research conducted by Martínez Cillero and Tovar Reaños (2023) indicates that Irish dairy farms demonstrate a higher level of professionalization, with an average technical efficiency score of 0.87, whereas beef farms operate at a lower average of 0.63. This disparity highlights a more homogenized and technically advanced dairy sector in contrast to a highly fragmented and heterogeneous beef sector.

These structural differences dictate how each sector responds to the Common Agricultural Policy (CAP). The analysis by Martínez Cillero and Tovar Reaños (2023) further shows that decoupled support - payments not tied to production volume - is negatively associated with technical efficiency in both sectors. These findings suggest that a high reliance on direct income support may inadvertently reduce the incentives for farmers to optimize their production techniques and management practices.

The impact of agri-environmental schemes, such as the Green, Low-Carbon, Agri-Environment Scheme (GLAS), also varies by system. According to the study, GLAS payments were positively associated with improved technical efficiency for participating dairy farms; however, the sector's overall impact remained limited due to historically low participation rates. Conversely, for the beef sector, the impact of these environmental payments on economic efficiency was found to be statistically insignificant.

Finally, policy simulations within the same study reveal a trade-off between maximizing productivity and maximizing environmental outcomes.

Lithuania

Lithuania presents a paradoxical situation. Despite having a relatively high share of organic land and producers (input competitiveness index: 0,326; rank: 7th), the country performs poorly in terms of output competitiveness (index: 0,044; rank: 22nd), reflecting weak market integration and low sales and export values (Komor et al., 2025).

This imbalance suggests that while structural potential exists, systemic issues are impeding the transformation of that potential into market performance. Indeed, Lithuania dropped six positions in output competitiveness between 2020 and 2023, indicating growing difficulties in converting production capacity into tangible economic results (Komor et al., 2025)

Policy interventions that promote marketing skills, product differentiation, and local consumption are essential to close this gap.

Poland

Poland remains one of the few EU countries where the organic sector has contracted in recent years. Between 2014 and 2023, the certified organic area fell by 16%, and the number of producers declined annually by 1.7% (Komor et al., 2025). Legal uncertainty and rapidly changing support requirements are the main culprits.

Despite these structural barriers, case studies demonstrate that organic farms in Poland can be highly efficient when managed with cost control strategies. For instance, cereal farms in eastern Poland had yields about one-third lower than their conventional counterparts, but achieved 59% higher economic efficiency due to dramatically lower direct costs (Feledyn-Szewczyk & Kosiński, 2024).

Farms specializing in labour-intensive sectors (e.g., dairy) or in certain crops were among the most profitable, aligning with findings from CORDIS on the economic potential of ecological intensification.

Moreover, nutrient balance analyses reveal that while organic farms may face slight deficiencies in phosphorus and potassium, conventional farms often show nitrogen and potassium surpluses, posing a risk to soil and water health. Organic systems, especially those focused on mixed or livestock farming, showed positive organic matter balances, a key indicator of long-term soil sustainability (Feledyn-Szewczyk & Kosiński, 2024).

Conclusion

The analysis of ecological, organic, and regenerative agricultural systems across five EU Member States demonstrates that competitiveness in these systems cannot be assessed through traditional economic indicators alone. Instead, it must integrate environmental, social, and policy dimensions to fully capture their long-term value and contribution to sustainability goals (Constantin et al., 2022).

Despite significant challenges, including lower average yields, complex regulations, dependence on subsidies, and limited market access, these systems consistently exhibit strengths such as higher environmental performance, resource-use efficiency, and resilience.

As shown in case studies from countries like Spain and Poland, competitiveness can be achieved through cost reduction, effective use of CAP instruments, strategic marketing, and product differentiation (Crowder & Reganold, 2015; Feledyn-Szewczyk & Kosiński, 2024).

The diversity in national trajectories highlights the importance of contextualized policies. While countries like Spain demonstrate high growth potential and institutional support, others like Lithuania and Poland struggle with legal instability or weak output competitiveness, despite structural potential. In all cases, targeted public policy, particularly support for R&D, training, and consumer awareness, remains essential for scaling sustainable models.

Going forward, efforts must focus on balancing productivity with sustainability by integrating ecological intensification strategies, supporting innovative market access models, and ensuring stable and inclusive policy frameworks. These

actions are vital for realizing the full potential of EA, OA, and RA systems within the EU's Green Deal and global sustainability commitments.

5. ANALYSIS OF AGRICULTURAL SURVEY DATA (BG, ES, IE, LT, PL)

Political Framework

1. How influential are public policies (local, national or EU) on your farming activity?

(1: No impact - 5: Very influential)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	4.4	3.5	4.4	4.4	3.9
Mean - Conventional	3.5	3.6	4.0	4.4	4.2
Mean - In Conversion	4.4	3.4	4.3	4.5	3.7
Mean - Post Conversion	5.0	3.6	4.8	4.2	3.8
Nº of responses	18	18	15	20	21

Public policies are perceived as closer to “very influential” in BG, IE and LT, while farmers in ES perceive a more moderate influence.

In BG, public policies feel much more influential for organic (post-conversion) farmers than for conventional farmers.

Among organic farmers, the influence of public policies is clearly strongest in BG and weakest in ES.

2. How do you evaluate the effect of the Common Agricultural Policy on your agricultural activity?

(1: Very negative - 5: Very positive)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	3.9	3.7	4.1	3.6	3.3
Mean - Conventional	3.8	3.5	4.0	3.6	3.2
Mean - In Conversion	4.2	3.8	4.0	3.3	3.4
Mean - Post Conversion	3.5	3.8	4.5	4.0	3.2
Nº of responses	18	18	15	20	21

The effect of the CAP is seen as clearly positive in Ireland and more modestly positive in Poland, with Bulgaria, Spain and Lithuania in an intermediate position.

In Bulgaria, farmers in conversion to organic rate the CAP more towards “positive” than organic farmers, who are nearer to a neutral-positive position.

Among organic farmers, the CAP effect is most positive in Ireland and least positive in Poland.

3. How do you evaluate the effect of agricultural policies implemented by regional and local public administrations on your agricultural activity?

(1: Very negative - 5: Very positive)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	2.7	3.1	--	3.0	3.2
Mean - Conventional	3.5	3.0	--	2.4	3.0
Mean - In Conversion	2.7	3.5	--	3.1	3.3
Mean - Post Conversion	1.8	2.5	--	3.2	3.2
Nº of responses	18	16	0	20	21

The policies implemented by local and regional administrations have been rated as neutral in all responding countries. It should be noted that Ireland (IE) did not provide data for this indicator (“--” indicates no data provided), as its agricultural policy framework is centralized at the national level, making regional/local evaluation non-applicable for Irish respondents.

In Bulgaria, conventional farmers are closer to a “somewhat positive” view, while organic farmers move towards “negative” assessments.

Among organic farmers, regional/local policies are seen as more positive in Lithuania and Poland and more negative in Bulgaria.

4. Have any local or regional policies had a notably positive effect on your farm? If so, could you please specify which one?

☐ Yes / ☐ No

[Space to answer]

	BG	ES	IE	LT	PL
Overall% YES	11.1	40.0	0.0	5.0	9.0
Overall% NO	88.9	60.0	100.0	95.0	81.0
Nº of responses	18	10	15	20	21

In Bulgaria, among the few farmers who answered “yes”, none provided a specific example or description of such a policy. Overall, the responses suggest a general lack of visibility or perceived impact of existing local or regional measures within the Bulgarian farming community.

In Spain, 40% of farmers reported knowing at least one local or regional policy with a positive effect on their farm, while 60% indicated they were not aware of any such policy. Among those who did report positive impacts, the most frequently mentioned policies included organic certification support, agri-environmental measures, and initiatives promoting native livestock breeds. Some farmers also noted mixed effects, describing both benefits and challenges linked to these policies.

Irish farmers reported no positive local or regional policies affecting their farms. This is due to the fact that agricultural policy in Ireland is developed and implemented exclusively at a national level, resulting in a virtual absence of local-scale policies.

Out of 20 Lithuanian responses, only one indicated being aware of a positive local or regional policy. The single measure identified referred to “feeding children with organic products,” highlighting a policy linked to public procurement for schools as the only positively perceived initiative.

From 21 Polish respondents, four farmers identified positive policy influences. The examples provided included:

- Support for on-farm processing under the 2016 Agricultural Retail Trade legislation;
- The national network of educational farms;
- Subsidies for the protection of high-biodiversity meadows;
- Advisory support from MODR Siedlce (Mazovian Agricultural Advisory Centre).

Despite these examples, 81% of Polish farmers reported not knowing any local or regional policy with a positive effect on their farm.

5. Do you think you compete under equal conditions with other producers?

(1: Not at all - 5: Completely)

Within the EU: [] 1 [] 2 [] 3 [] 4 [] 5

	BG	ES	IE	LT	PL
Overall Mean	1.6	2.3	YES	2.0	2.9
Mean - Conventional	1.0	2.5	YES	2.0	2.8
Mean - In Conversion	1.8	1.9	YES	2.1	2.6
Mean - Post Conversion	2.0	2.7	YES	1.6	3.4
Nº of responses	18	18	15	20	21

Outside the EU: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	1.0	1.4	--	3.9	1.8
Mean - Conventional	1.0	1.0	--	4.0	1.6
Mean - In Conversion	1.0	1.1	--	3.8	1.7
Mean - Post Conversion	1.0	2.1	--	4.0	2.5
Nº of responses	17	18	15	12	18

Within the EU, farmers in Poland are closest to “somewhat equal conditions”, while Bulgarian farmers stay nearer “not at all”; Spain and Lithuania occupy intermediate, more sceptical positions.

Outside the EU, Lithuanian farmers are much closer to “compete under equal conditions”, whereas Bulgaria and Spain remain near “not at all”; Poland again sits in a more moderate, but still sceptical range.

Among organic farmers, perceptions of fair competition within the EU are best in Poland and worst in Lithuania, while outside the EU they are best in Lithuania and worst in Bulgaria and Spain.

6. Would you like to access new markets?

(1: Not interested - 5: Very interested)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	4.6	4.5	3.7	2.4	2.7
Mean - Conventional	3.8	4.3	3.2	1.6	2.3
Mean - In Conversion	4.8	4.7	4.0	2.0	3.0
Mean - Post Conversion	5.0	4.3	3.6	4.0	2.4
Nº of responses	18	17	15	20	20

Interest in accessing new markets is very strong (near “very interested”) in Bulgaria and Spain, while Ireland is closer to moderate interest and Lithuania and Poland show clearly weaker interest.

In Lithuania, conventional farmers are closer to “not very interested”, whereas organic farmers are nearer to “interested”.

Among organic farmers, enthusiasm for new markets is highest in Bulgaria and lowest in Poland.

7. If you are interested, please indicate which markets:

Thirteen Bulgarian farmers showed the strongest interest in EU markets (especially Greece), followed by direct sales. Some respondents highlighted international markets, including Turkey, Arabian countries, and the USA.

Fourteen Spanish farmers mainly indicated interest in local and short-supply-chain markets and direct selling, which were the most common preferences. Additional mentions included institutional markets (such as schools and community canteens), export outside the EU, and organic markets.

Fourteen Irish farmers expressed interest in a wide range of markets. The most frequent categories were organic meat markets and direct selling/domestic markets, followed by tillage markets. Occasional mentions included Asian export markets and dairy health foods.

Lithuanian farmers showed the strongest interest in EU markets and mixed LT/EU markets, followed by fresh and processed fruit, berry and vegetable markets, organic markets, and domestic Lithuanian markets.

The five Polish farmers who responded mostly referred to local and direct-selling markets (including Warsaw and restaurants). Other notable mentions included EU markets, ethical/animal-welfare-focused markets, and niche markets emphasising quality and production conditions.

Economic Factors

8. How is the land you currently farm accessed or managed?

- ☐ I own most of it
- ☐ I rent most of it
- ☐ A mix of owned and rented land
- ☐ I farm land through family or informal arrangements
- ☐ Other (please specify):

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	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Majority owned land	11.8	22.2	60.0	15.0	66.7
Majority rented land	23.5	50.0	13.3	0.0	4.8
Mixed owned and rented land	58.8	16.7	13.3	85.0	38.1
Family or informal land arrangements	5.9	11.1	6.7	0.0	14.4
Others	0.0	0.0	6.7	0.0	0.0
Nº of responses	17	18	15	20	21

A mixed owned-and-rented structure is dominant in Lithuania and Bulgaria, while majority owned land is most common in Poland and Ireland.

Majority rented land is relatively important in Spain but almost absent in Lithuania and Poland.

9. If you own land, how did you come to farm it?

- ☐ Through family inheritance or gifts
- ☐ Through a land purchase or investment
- ☐ Through government or public programs
- ☐ Other (please specify):

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Through family inheritance or gifts	50.0	70.0	66.7	40.0	56.0
Through a land purchase or investment	50.0	30.0	26.7	60.0	44.0
Through government or public programs	0.0	0.0	0.0	0.0	0.0
Other	0.0	0.0	6.7	0.0	0.0
Nº of responses	15	10	15	20	20

The two most common methods for acquiring land in all countries are through inheritance or purchase/investment. In Spain and Ireland, inheritance is clearly

the predominant means, whereas in Poland and Bulgaria inheritance and purchase are of similar importance. In Lithuania, however, most land has been obtained through purchase.

10. Regarding rented land: how was it acquired?

☐ Municipal land auction (___% of rented land)

☐ Private contract (___%)

☐ Other (specify):

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Municipal land auction	23.10	0.0	--	0.29	0%
Private contract	67.50	66.67	--	98.82 ¹	82.50
Other	0.0	33.33	--		0.04
Nº of responses	18	6	0	17	12

¹ The averages of the two categories do not sum to exactly 100% due to minor inconsistencies in individual responses where respondents did not allocate the full total.

Across the five countries, rented land was predominantly acquired through private contracts, particularly in Lithuania (98.82%), Poland (82.50%) and Bulgaria (67.50%). Municipal land auctions played a relevant role only in Bulgaria (23.10%), while being nearly absent in the remaining countries. The “Other” category appeared mainly in Spain (33.33%) and Poland (0.04%). In Spain, respondents referred to family-based arrangements such as family contracts or plots leased through family bidding processes. In Poland, the “Other” category corresponded to cases of good-faith possession of abandoned agricultural land with unknown ownership, typically involving small parcels located between the farmer’s owned or rented fields. Overall, the data show that private agreements remain the central mechanism for accessing rented land, with country-specific exceptions linked to local legal or structural land market conditions.

11. What are the average land sale prices (€/ha) in your area?

☐ Dryland

[Space to answer]

☐ Irrigated

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[Space to answer]

☐ Grasslands

[Space to answer]

☐ Pastures

[Space to answer]

	BG	ES	IE	LT	PL
Mean dryland prices	5.919	5.919	--	4.681	15.609
Nº of responses	16	13	--	18	17
Mean irrigated prices	5.000	11.333	--	7.465	15.000 ¹
Nº of responses	7	6	--	10	2
Mean grasslands prices	2.944	4.920	--	3.816	10.427
Nº of responses	16	5	--	19	11
Mean pastures prices	2.913	4.533	33.406	4.044	10.763
Nº of responses	16	3	14	17	8

¹ The price should be higher for irrigated land than for rain-fed land, but due to the low number of responses received for irrigated plots, the average has been distorted.

For dryland, sale prices are much higher in Poland than in BG, ES and LT, which have similar prices.

For pastures, Ireland shows very high prices compared to the rest, where Bulgaria remains relatively low to moderate.

12. What are the average land rental prices (€/ha) in your area?

☐ Dryland

[Space to answer]

☐ Irrigated

[Space to answer]

☐ Grasslands

[Space to answer]

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☐ Pastures

[Space to answer]

	BG	ES	IE	LT	PL
Mean dryland prices	246	123	--	205	280
Nº of responses	17	13	--	17	10
Mean dryland irrigated prices	239	450	--	203	370
Nº of responses	7	3	--	8	4
Mean grasslands prices	152	98	--	171	221
Nº of responses	13	5	--	19	7
Mean pastures prices	119	110	643	184	221
Nº of responses	17	3	14	19	7

Rental prices for dryland are lowest in Spain and noticeably higher in Poland and Bulgaria, with Lithuania in between.

For pastures, Ireland again stands out with very high rental prices, while Bulgaria, Spain and Lithuania remain closer to the bottom of the scale.

13. Which input most limits your competitiveness?

- ☐ Fertilizers
- ☐ Seeds
- ☐ Pesticides
- ☐ Labour
- ☐ Energy
- ☐ Water
- ☐ Transport and logistics
- ☐ Technology and machinery

☐ Other (specify)

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Fertilizers	3.7	13.5	26.7	15.2	10.0
Seeds	11.1	8.1	--	7.6	5.0
Pesticides	1.9	16.2	--	9.1	2.5
Labour	22.2	18.9	20.0	13.6	15.0
Energy	--	8.1	--	10.6	12.5
Water	24.1	13.5	--	10.6	15.0
Transport and Logistics	16.7	5.4	13.3	9.1	5.0
Technology and Machinery	20.4	10.8	13.3	24.2	20.0
Other	--	5.4	26.7	--	15.0
Nº of responses	18	16	15	19	18

The table shows notable cross-country differences in the inputs that farmers consider most limiting for their competitiveness. In Bulgaria, the main limiting inputs were water (24.1%), labour (22.2%) and technology and machinery (20.4%).

In Spain, constraints were led by labour (18.9%), followed by pesticides (16.2%) and fertilizers (13.5%) and water (13.5%), pointing to rising input costs and resource pressures. The Other category referred to issues such as external feed dependency while one respondent reported no additional constraints.

In Ireland, the strongest limiting factors reported were fertilizers (26.7%) and labour (20.0%). Although Other accounted for a high percentage (26.7%), no specific details were provided by respondents.

In Lithuania, the most significant constraints were technology and machinery (24.2%), followed by fertilizers (15.2%) and energy and water (10.6%), showing the importance of capital-intensive investments and rising operational costs.

In Poland, farmers predominantly highlighted technology and machinery (20.0%), labour (15.0%), and water (15.0%) as the main factors limiting competitiveness. The other responses (15.0%) reflected broader structural challenges, including high machinery costs, regulatory and bureaucratic burdens, competition from cheap non-EU imports, water scarcity, and limited access to capital and farmland.

14. How accessible is financing or state support for your farming activity?

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(1: Not accessible - 5: Very accessible)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	3.2	2.6	--	3.1	3.2
Mean - Conventional	3.3	1.9	--	3.6	2.7
Mean - In Conversion	3.1	2.6	--	2.9	3.3
Mean - Post Conversion	3.3	3.3	--	3.2	3.6
Nº of responses	18	17	0	20	21

Access to finance or state support is around “moderately accessible” in Bulgaria, Lithuania and Poland, and perceived as less accessible in Spain.

In Spain, conventional farmers are closer to “not very accessible”, while organic farmers move towards a more acceptable level of access.

15. If you received an incentive to convert to organic during the first year, would you be willing to do so?

(1: Not willing - 5: Very willing)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	3.9	4.1	n/a	3.2	3.8
Mean - Conventional	3.0	3.6	n/a	3.5	3.2
Mean - In Conversion	4.1	4.3	n/a	2.9	4.3
Mean - Post Conversion	4.3	5.0	n/a	3.6	3.0
Nº of responses	17	12	15	18	18

Willingness to convert with a first-year incentive is close to “very willing” in Spain and Bulgaria, moderate in Poland and clearly lower in Lithuania.

Conventional farmers consider it a positive incentive in all countries.

In Bulgaria, organic farmers are more clearly willing than conventional farmers; in Spain the strongest willingness is among organic farmers, who are near “very willing”.

As Irish farmers already receive conversion incentives, it was marked n/a.

16. Do you think the length of the value chain is appropriate?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	2.1	2.8	--	3.1	3.2
Mean - Conventional	2.7	3.3	--	3.2	2.8
Mean - In Conversion	1.9	2.5	--	2.9	3.4
Mean - Post Conversion	2.5	2.8	--	3.3	3.4
Nº of responses	16	16	0	19	21

Farmers in Lithuania and Poland are closer to “value-chain length is appropriate”, whereas Bulgaria remains nearer “not really appropriate”; Spain sits in between.

In Bulgaria, conventional farmers are slightly more satisfied with the current chain length than farmers in conversion, who stay rather unsatisfied.

17. Would you like to sell directly to final consumers?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	4.5	4.3	3.7	3.8	4.6
Mean - Conventional	5.0	3.3	4.3	4.0	4.5
Mean - In Conversion	4.3	4.6	3.4	4.0	4.8

Mean - Post Conversion	4.3	5.0	3.9	3.0	4.2
Nº of responses	18	16	15	20	21

The desire to sell directly to consumers is very strong in Bulgaria, Spain and Poland, while Lithuania and Ireland show moderate to high interest.

Across countries, conventional, in-conversion and organic farmers are generally all above “quite interested”, with only Lithuanian organic farmers clearly less enthusiastic.

18. Are you aware of any EU or national policies aimed at shortening the value chain? If so, could you please specify?

☐ Yes ☐ No [Space to answer]

	BG	ES	IE	LT	PL
Overall% YES	66.7	16.7	100	55.0	28.6
Overall% NO	33.3	83.3	0.0	45.0	71.4
Nº of responses	18	12	15	20	21

Although two-thirds of Bulgarian farmers (66.7%) stated they were aware of policies aimed at shortening the value chain, the specific examples provided were highly concentrated. Respondents mainly referred to the Strategic Plan and to the role of cooperatives as mechanisms supporting shorter supply chains. No additional concrete measures or programmes were mentioned beyond these two recurrent elements.

Only 16.7% of Spanish farmers reported being aware of such policies, and those who responded highlighted several initiatives in principle, such as the “Farm to Fork” strategy, mobile slaughter units, and artisan production legislation. However, they stressed that despite these frameworks “on paper”, bureaucratic and sanitary hurdles remain excessively burdensome, limiting their practical impact on shortening value chains.

Although all Irish respondents (100%) answered “yes” to the first part of the question, none provided any concrete examples of EU or national policies supporting shorter value chains.

More than half of Lithuanian farmers (55%) indicated awareness of policies related to shortening the value chain, yet no respondent specified any particular measure, programme or regulation.

In Poland, 28.6% of farmers stated they were aware of policies that support shorter value chains. Those who elaborated referred consistently to instruments enabling direct sales, especially the framework of “Rolniczy Handel Detaliczny (RHD)”, which allows farmers to sell agricultural products and processed goods directly to consumers. Additional mentions included cooperation projects and short supply-chain initiatives, all centred on strengthening direct farmer-to-consumer channels.

19. Is it easy to find labour?

(1: Not at all - 5: Very easy)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

	BG	ES	IE	LT	PL
Overall Mean	1.1	2.1	2.1	1.9	2.0
Mean - Conventional	1.2	2.1	2.8	1.6	1.8
Mean - In Conversion	1.0	1.7	1.8	2.3	1.7
Mean - Post Conversion	1.0	3.1	2.1	1.2	2.6
Nº of responses	18	17	15	20	21

The lack of labour is a very serious problem common to all five countries. Bulgaria has the most negative outlook in this regard. Organic farmers in Spain and Poland appear to have fewer labour problems than the other groups of farmers.

20. Is it easy to find service companies to carry out the agricultural tasks?

(1: Not at all - 5: Very easy)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	1.7	2.1	3.8	1.7	3.6
Mean - Conventional	1.6	2.5	4.2	1.6	3.7

Mean - In Conversion	1.8	2.4	3.6	1.7	3.5
Mean - Post Conversion	1.8	2.2	3.9	1.6	3.6
Nº of responses	17	17	15	20	21

The hiring of service companies is a lesser concern than labour shortages across all surveyed countries. However, it still poses a significant challenge for farmers in Bulgaria and Lithuania. While Spain faces a less acute problem compared to those two nations, it remains a serious issue. In contrast, Poland and Ireland are the only countries where engaging service providers for agricultural work appears to be relatively straightforward.

21. Are you part of any cooperative or producer group?

☐ Yes / ☐ No

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Overall Mean	33.3	83.3	46.7	10.0	0.0
Mean - Conventional	40.0	75.0	33.3	0.0	0.0
Mean - In Conversion	55.6	83.3	50.0	0.0	0.0
Mean - Post Conversion	60.0	100.0	50.0	40.0	0.0
Nº of responses	18	12	15	20	21

Spain is, by far, the country with the highest percentage of farmers belonging to a cooperative. Some cooperative activity is observed in Ireland and Bulgaria, whereas in Lithuania and Poland it appears to be almost negligible; in fact, there are no farmers belonging to a cooperative in Poland.

Across all countries, organic farmers or those in transition to organic farming show a greater tendency to join cooperatives than those engaged in conventional farming.

22. Has this improved your competitiveness?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	1.4	4.0	--	2.5	2.6
Mean - Conventional	2.0	3.7	--	--	2.0
Mean - In Conversion	1.1	4.0	--	1	1.8
Mean - Post Conversion	1.7	4.3	--	3	5
Nº of responses	18	12	0	4	8

Organic farmers show a stronger tendency to believe that cooperatives enhance competitiveness compared to other groups. In Spain, the perception that cooperatives lead to increased competitiveness is well-established, whereas in the other countries the outlook is generally negative.

In Bulgaria, despite most organic farmers belonging to a cooperative, their competitiveness has seen little improvement.

Agronomic Factors

23. How problematic are the following soil-related issues on your farm?

(1: Not problematic - 5: Very problematic)

Organic matter deficiency: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Salinity: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Soil compaction: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Nutrient status: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BULGARIA			
	Overall Mean	Mean - CO	Mean - IC	Mean - PC
Organic matter	2.9	3.8	2.6	2.5
Salinity	1.3	1.0	1.2	1.7
Soil compaction	2.9	3.3	2.8	3.0

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Nutrient status	3.6	4.2	3.4	3.0
Nº of responses	18	5	9	4

	SPAIN			
	Overall Mean	Mean - CO	Mean - IC	Mean - PC
Organic matter	3.8	3.5	3.3	5.0
Salinity	1.6	1.4	2.4	0.8
Soil compaction	3.1	4.0	2.3	4.0
Nutrient status	3.1	2.5	2.5	4.8
Nº of responses	16	4	8	4

	IRELAND			
	Overall Mean	Mean - CO	Mean - IC	Mean - PC
Organic matter	--	--	--	--
Salinity	1	1	1	1
Soil compaction	2.2	2.5	2.3	2.0
Nutrient status	2.2	1.5	2.5	2.3
Nº of responses	15	3	8	4

LITHUANIA			
Overall Mean	Mean - CO	Mean - IC	Mean - PC

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Organic matter	3.6	3.2	3.6	4.0
Salinity	1.5	1.2	1.7	1.5
Soil compaction	2.6	2.8	2.3	2.8
Nutrient status	3.6	3.0	3.5	4.2
Nº of responses	20	5	10	5

	POLONIA			
	Overall Mean	Mean - CO	Mean - IC	Mean - PC
Organic matter	2.8	3.3	2.5	2.6
Salinity	1.6	2.2	1.4	1.4
Soil compaction	2.3	2.5	2.1	2.2
Nutrient status	2.4	2.3	2.6	2.0
Nº of responses	21	6	10	5

In Bulgaria, the most serious soil problems are considered to be nutritional status, followed by organic matter content and soil compaction. In Spain, Lithuania, and Poland, organic matter is the primary concern. Across all countries, the least evident problem is salinization. Data for soil organic matter in Ireland were not provided as these factors are not considered significant issues between the farmers of the sample.

24. How difficult is it to manage pests and diseases in your crops?

(1: Easy - 5: Very difficult)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	2.9	3.0	2.5	3.4	3.8

Mean - Conventional	2.8	2.8	2.3	2.8	4.0
Mean - In Conversion	3.3	2.9	2.6	3.1	3.6
Mean - Post Conversion	2.3	3.3	2.4	4.4	3.8
Nº of responses	16	15	10	20	21

Managing pests and diseases appears to be more complex in Poland and Lithuania. It is also a significant challenge in Spain and Bulgaria, whereas in Ireland it does not seem to be a major concern. This issue is also linked to the ratio of crop farmers to livestock farmers in the different countries.

Except in Lithuania, where organic farmers report more difficulties with pest and disease management than their conventional counterparts, no substantial differences between these groups are observed in the other countries.

25. If switching to organic farming, do you think you could manage pests and diseases adequately?

(1: Easy - 5: Very difficult)

[] 1 [] 2 [] 3 [] 4 [] 5

	BG	ES	IE	LT	PL
Overall Mean	3.4	2.8	--	3.7	3.6
Mean - Conventional	3.4	3.5	--	3.8	3.7
Mean - In Conversion	3.9	2.7	--	3.3	3.4
Mean - Post Conversion	2.5	2.0	--	4.5	3.6
Nº of responses	18	17	0	18	20

Lithuania, Poland, and Bulgaria express greater concerns regarding pest and disease management than Spain. In the two Southern European countries, Spain and Bulgaria, conventional farmers and those in transition have greater concerns than those already farming organically. In Poland, all three groups report a similar level of difficulty, whereas in Lithuania, organic farmers are the ones who face the greatest concerns.

26. To what extent does your farm depend on external financing (e.g., loans)?

(1: Not dependent - 5: Fully dependent)

1 2 3 4 5

	BG	ES	IE	LT	PL
Overall Mean	2.8	3.6	2.3	2.9	2.0
Mean - Conventional	2.8	3.6	2.9	3.0	2.3
Mean - In Conversion	2.6	4.0	2.9	2.5	1.5
Mean - Post Conversion	3.3	2.9	2.8	3.6	2.4
Nº of responses	18	17	15	20	21

Dependence on loans varies significantly by country. Spain shows the highest level, nearing "quite dependent," while Poland exhibits the most limited reliance. Bulgaria, Ireland, and Lithuania demonstrate moderate dependence.

In Spain organic farmers are significantly less dependent on loans than both their conventional counterparts and those transitioning to organic methods.

Legal Factors

27. How complex is the bureaucracy for obtaining subsidies or meeting legal requirements?

(1: Not complex - 5: Very complex)

1 2 3 4 5

	BG	ES	IE	LT	PL
Overall Mean	4.3	4.1	3.7	3.9	3.6
Mean - Conventional	4.0	4.8	3.3	3.2	3.0
Mean - In Conversion	4.2	3.8	4.3	3.9	3.4
Mean - Post Conversion	4.8	4.3	3.6	4.4	4.6
Nº of responses	18	16	15	20	21

All countries face severe issues with bureaucratic complexity. Bulgaria and Spain are at the forefront of this problem, while in Ireland and Poland it appears to be somewhat less severe.

With the exception of Spain, organic farmers in all other countries are the ones who report the highest number of complaints regarding bureaucratic complexity.

Technological Factors

28. How accessible are advanced technologies (automatic irrigation, livestock monitoring, variable-rate fertilization, etc.)?

(1: Not accessible - 5: Very accessible)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

	BG	ES	IE	LT	PL
Overall Mean	1.7	2.5	--	2.3	2.7
Mean - Conventional	2.2	2.5	--	2.0	2.5
Mean - In Conversion	1.4	2.6	--	2.1	2.6
Mean - Post Conversion	1.8	2.2	--	2.8	3.0
Nº of responses	18	16	0	19	21

In no country advanced technologies appear easily accessible. Poland and Spain present the most positive outlook, followed closely by Lithuania, while Bulgaria reports the most negative assessments.

29. How beneficial would new technologies be to improve your yields and product quality?

(1: Not beneficial - 5: Very beneficial)

Yields: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Quality: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

YIELDS	BG	ES	IE	LT	PL
Overall Mean	3.9	4.3	--	4.4	4.0
Mean - Conventional	3.2	4.0	--	4.2	4.0
Mean - In Conversion	4.1	4.3	--	4.2	3.9
Mean - Post Conversion	4.5	4.3	--	5.0	4.2

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Nº of responses	18	16	0	20	20
QUALITY	BG	ES	IE	LT	PL
Overall Mean	3.7	3.1	--	4.3	4.0
Mean - Conventional	2.7	2.2	--	4.2	4.0
Mean - In Conversion	4.1	3.2	--	4.0	4.0
Mean - Post Conversion	3.8	3.5	--	4.8	3.8
Nº of responses	15	15	0	20	20

All countries hold a very positive view regarding increased yields and a moderately positive one regarding improved quality. Concerning yield increases, organic farmers are the ones who believe technology will have the most positive effect. The same pattern holds true for quality perceptions in all countries except Poland. Lithuania is the country that places the highest trust in the improvements associated with technology.

30. How difficult would it be to mechanize tasks for which you currently hire labour?

(1: Not difficult - 5: Very difficult)

[] 1 [] 2 [] 3 [] 4 [] 5

	BG	ES	IE	LT	PL
Overall Mean	3.8	2.9	--	2.7	2.8
Mean - Conventional	4.8	2.1	--	1.8	3.0
Mean - In Conversion	3.0	3.2	--	2.8	3.0
Mean - Post Conversion	4.3	3.3	--	3.4	2.4
Nº of responses	18	15	0	19	19

Bulgarian farmers consider it very complex to mechanize the tasks that currently require manual labour, while farmers in the other countries (except Ireland, from which no responses were obtained) believe it would not be very complicated.

31. Which factors make mechanisation more difficult?

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- ☐ Limited knowledge or training to use machines (technological skills)
- ☐ Poor access to machinery or tools
- ☐ High cost of machinery or equipment
- ☐ Machines or tools don't fit the type of farm or crops
- ☐ Fear of / reluctance to adopt new technologies

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Limited knowledge or training to use machines	21.7	5.0	6.7	14.3	4.2
Poor access to machinery or tools	0.0	0.0	0.0	14.3	0.0
High cost of machinery or equipment	65.2	80.0	80.0	71.4	87.5
Machines don't fit the type of farm or crops	13.0	15.0	6.7	0.0	8.3
Reluctance to adopt new technologies	0.0	0.0	6.7	0.0	0.0
Nº of responses	18	20	15	20	21

In all countries, the high cost of machinery and equipment is the main barrier to mechanisation, especially in Poland, Spain, Ireland and Lithuania.

Limited knowledge or training is a secondary issue, somewhat more relevant in Bulgaria and Lithuania than in the other countries.

The difficulty of adapting available machinery to the type of farm or crop is also a relevant factor in Bulgaria and Spain.

32. If you haven't mechanized due to cost, what's the main barrier?

- ☐ Initial investment
- ☐ Maintenance

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Initial investment	58.3	57	--	79.2	94.7
Maintenance	41.7	43	--	20.8	5.3
Nº of responses	18	14	0	20	19

When mechanisation is blocked by cost, initial investment is clearly the main obstacle in Lithuania and Poland and also predominant in Bulgaria and Spain.

Maintenance costs play a noticeable role only in Spain and Bulgaria and are almost marginal in Poland.

33. Do you use digital tools to manage your farm?

☐ Yes / ☐ No

Which ones?

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Overall% YES	50.0	66.7	73.3	31.6	19
Overall% NO	50.0	33.3	26.7	68.4	81
Nº of responses	18	18	15	19	21

Use of digital tools is most widespread in Ireland and Spain, moderate in Bulgaria and clearly less frequent in Lithuania and especially Poland.

In all countries, a sizable minority of farmers still do not use digital tools in farm management.

Farm management apps, GPS-guidance systems, and digital tools for record-keeping are commonly used across all five countries, reflecting a shared baseline of digital adoption.

Beyond these, each country shows specific technological preferences. In Bulgaria, some farmers also use GPS tracking collars for livestock, drones, and soil moisture sensors. Spanish farmers report a wide range of tools, including GIS systems, digital irrigation control, accounting software, and e-commerce platforms. In Ireland, the use of weather and pest alert apps is particularly common, along with some adoption of drones and tracking collars. Lithuanian farmers highlight the use of automated irrigation systems, while in Poland, tools such as the COMARCH software, the ARiMR mobile app, and solar-based irrigation systems are mentioned.

Environmental Factors

34. Has climate change negatively impacted your farm?

(1: Not at all - 5: A lot)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	4.8	3.5	2.8	3.7	3.8

Mean - Conventional	4.8	3.1	2.5	3.6	4.2
Mean - In Conversion	4.9	3.7	2.9	3.5	3.7
Mean - Post Conversion	4.8	3.3	2.9	4.2	3.6
Nº of responses	18	17	15	20	21

Climate change is perceived as affecting farms “a lot” in Bulgaria and clearly in Poland, Lithuania and Spain, while Ireland is closer to “moderate impact”.

The differences are not substantial among the different production systems and vary depending on the country.

35. How useful would additional measures be to mitigate the environmental impact of your activity?

(1: Not useful - 5: Very useful)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	4.2	3.6	1.0	3.7	4.3
Mean - Conventional	5.0	2.8	1.0	3.6	4.5
Mean - In Conversion	4.3	4.0	1.0	3.7	4.4
Mean - Post Conversion	3.3	3.5	1.0	3.6	3.8
Nº of responses	18	17	15	20	21

Additional measures are seen as very useful in Bulgaria and Poland and much less useful in Ireland (near “not useful”).

Among organic farmers, these measures are rated most useful in Bulgaria and Poland and least useful in Ireland.

In Poland and Bulgaria, conventional farmers consider taking measures against climate change more useful than organic farmers do. In Spain, the opposite is true.

36. What about infrastructure improvements (drainage, storage ponds, irrigation canals, water plans)?

(1: Not useful - 5: Very useful)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	4.4	4.2	1.0	4.3	4.3
Mean - Conventional	4.2	4.5	1.0	4.2	4.3
Mean - In Conversion	5.0	4.1	1.0	4.0	4.4
Mean - Post Conversion	4.4	4.0	1.0	5.0	4.0
Nº of responses	18	17	15	20	21

Except for Irish farmers, who do not consider infrastructure improvement useful, all other countries regard it as highly beneficial, with no substantial differences among the various farmer groups. This discrepancy is likely due to the specific environmental conditions in Ireland, where drought is typically not a significant concern, making irrigation or water-related infrastructure less critical than in other regions.

37. Which of those infrastructures is most needed? Do you think it's a common need in the rest of the country?

[Space to answer]

☐ Yes ☐ No

The following section presents farmers' opinions on whether the infrastructure they deem necessary constitutes a common demand:

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Overall% YES	100	93.3	--	100	88.2
Overall% NO	0.0	6.7	--	0.0	17.8
Nº of responses	17	15	0	18	17

Water management infrastructure, such as reservoirs, ponds, irrigation systems, and hydrological plans, emerges as a shared and pressing need across all countries. In Bulgaria, besides this common demand, some farmers also mentioned the need for water wells and stressed that this is a national issue, not just specific to individual farms. In Spain, one respondent additionally highlighted the importance of fencing and land clearing. In Lithuania, the priority was unanimous, with 100% of farmers agreeing on the urgent need for water-related infrastructure, particularly drainage systems. In Poland, along with the shared concerns, farmers emphasized the dual need for drainage ditches to manage heavy rainfall and retention structures to combat drought. In Ireland drought is not usually a problem.

38. Are any of your plots protected under environmental designations such as Natura 2000 or archeological designations? If yes, which one?

☐ Yes ☐ No

[Space to answer]

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Overall% YES	27.8	23.5	28.6	29.4	33.3
Overall% NO	72.2	76.5	71.4	70.6	66.7
Nº of responses	18	17	14	17	21

Having plots in protected areas is very common in Spain and less common in Bulgaria, Ireland, Lithuania and Poland, where around one quarter to one third of farmers report such designations.

39. What do you consider the most positive aspect of this protection?

Farmers across countries highlighted different positive aspects of environmental protection, with biodiversity conservation being the most recurrent theme. In Bulgaria, farmers under Natura 2000 valued soil and water protection and biodiversity, while those without protected land mainly appreciated the protection of birds and wildlife. However, 11.1% of Bulgarian respondents did not perceive any benefits. In Spain, only one farmer identified a marketing advantage as a benefit of environmental protection. In Ireland, most farmers did not answer, and the few who did reported no positive aspects. In Lithuania, the most valued benefits included biodiversity conservation, ecosystem protection, and landscape preservation. Polish farmers offered the most comprehensive responses, highlighting biodiversity, harmonious coexistence with nature, water retention, and recreational value, as well as a clear marketing benefit due to increased consumer trust in products from protected areas.

40. Do you consider any aspect of the protection to be negative? Which one?

Among the main common negative aspects of environmental protection reported by farmers are strict or poorly adapted regulations and insufficient support or compensation, concerns raised in several countries. In Bulgaria, while over half of all respondents saw no drawbacks, 80% of those with protected land criticized the ban on mowing until late summer, linking it to reduced forage quality, narrow mowing windows, and increased fire risk, as seen in the Sakar region. In Spain, farmers mentioned yield losses and perceived unbalanced demands. Lithuanian farmers highlighted a lack of tailored regulations and limited information or support. In Poland, some farmers expressed concern over restrictions on land use and infrastructure, while others saw no impact or called for more practical, experience-based management of protected areas.

41. Do you consider the existing environmental protection to be beneficial to your farm?

(1: Not satisfied - 5: Very satisfied)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	2.8	2.9	3.4	3.4	3.3
Mean - Conventional	2.8	N/A	N/A	3.3	3.5
Mean - In Conversion	2.2	3.6	1.0	3.0	3.1
Mean - Post Conversion	1.5	2.0	4.2	4.0	3.5
Nº of responses	18	7	4	17	17

Environmental protection is viewed as somewhat beneficial in Ireland, Lithuania and Poland and more ambiguous in Bulgaria and Spain (closer to “not very satisfied”).

Among organic farmers, perceived benefits are highest in Ireland and Lithuania and lowest in Bulgaria and Spain.

Social Factors

42. If your neighbours switched to organic, would you consider it too?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	4.1	3.1	--	2.7	3.9
Mean - Conventional	3.0	3.3	--	2.4	3.0
Mean - In Conversion	4.25	3.4	--	2.4	4.5
Mean - Post Conversion	5.0	1.0	--	3.5	5.0
Nº of responses	18	10	0	18	16

Neighbours' conversion to organic strongly influences decisions in Bulgaria and Poland (near "very much"), while in Spain and Lithuania the influence is closer to "moderate".

Among organic farmers, this peer effect is especially strong in Bulgaria and Poland and very weak in Spain.

43. Do you think generational renewal in agriculture is sufficient in your community?

(1: Not at all - 5: Absolutely)

[[1 [[2 [[3 [[4 [[5

	BG	ES	IE	LT	PL
Overall Mean	1.7	1.4	1.9	2.4	2.4
Mean - Conventional	1.2	2.5	1.5	2.2	2.5
Mean - In Conversion	1.6	1.4	2.0	3.5	2.4
Mean - Post Conversion	2.5	1.0	1.9	2.0	2.2
Nº of responses	18	17	15	20	21

Generational renewal is considered clearly insufficient everywhere, with Spain and Bulgaria closest to 'not at all', Lithuania and Poland nearer to 'still insufficient but less extreme', and Ireland in an intermediate position.

Despite Bulgaria being one of the countries that considers the generational turnover most insufficient, its group of organic farmers is the most positive among the five countries.

In the case of Spain, which has the lowest generational turnover, the opposite of Bulgaria occurs: organic farmers are the most pessimistic.

44. Which factor most hinders generational renewal?

- ☐ Lack of profitability
- ☐ Lack of services in rural areas
- ☐ Lack of job opportunities for women
- ☐ Greater attraction to urban life
- ☐ Other (please specify):

	BG	ES	IE	LT	PL
Lack of profitability	31.9	30.8	66.7	30.2	62.1

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Lack of services in rural areas	25.5	23.1	20.0	23.8	0.0
Lack of job opportunities for women	10.6	10.3	0.0	19.0	3.4
Greater attraction to urban life	31.9	20.5	6.7	27.0	27.6
Other	0.0	15.4	6.7	0.0	6.8
Nº of responses	18	18	15	20	21

Lack of profitability is a main barrier everywhere, especially in Ireland and Poland.

Greater attraction to urban life is perceived as particularly relevant in Bulgaria and Lithuania, while lack of services in rural areas weighs more in Bulgaria, Spain and Lithuania than in Poland.

The lack of employment opportunities for women in the agricultural sector is considered as particularly relevant in Lithuania.

45. Have you or someone in your network practiced organic farming and then abandoned it?

- ☐ Yes, myself
- ☐ Yes, someone I know
- ☐ No

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Overall% YES	26.8	42.1	26.7	50.0	47.6
Overall% NO	72.2	52.9	73.3	50.0	52.4
% of CO farmers that left organic farming	40.0	0.0	--	0.0	20.0
% of IC farmers that left organic farming	0.0	22.2	--	0.0	16.7
Nº of responses	18	17	15	20	21

Knowing cases of organic abandonment is most common in Lithuania and Poland and less frequent in Bulgaria, Spain and Ireland.

Among conventional farmers, the share that has left organic is notable in Bulgaria and Poland and zero in Spain and Lithuania.

Despite having previously abandoned organic farming, approximately one-fifth of farmers are still attempting it and are in the process of conversion in Spain and Poland.

46. If yes, what were the reasons for quitting?

- ☐ Incentives ended
- ☐ Input limitations
- ☐ Pesticide limitations
- ☐ Lower yields
- ☐ Same prices as conventional products
- ☐ Other (please specify):

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Incentives ended	50.0%	16.7	0.0	13.5	20.0
Inputs limitations	0.0%	8.3	0.0	13.6	0.0
Pesticide limitations	12.5%	8.3	0.0	16.2	6.7
Lower yields	12.5%	33.3	0.0	27.0	20.0
Same prices as conventional products	12.5%	16.7	75.0	29.7	40.0
Other	12.5%	16.7	25.0	0.0	13.3
Nº of responses	5	5	4	11	9

The main reported reason for quitting organic is the ending of incentives in Bulgaria and relevant in Spain and Poland. Same prices as conventional products is the other main problem in Ireland, Lithuania and Poland. Lower yields is the main problem in Spain.

Territorial Factors

47. Would your farm be more competitive with better transportation infrastructure in your area?

(1: Not at all - 5: Very much)

[[1 [[2 [[3 [[4 [[5

	BG	ES	IE	LT	PL
Overall Mean	3.89	2.9	YES	2.55	2.0
Nº of responses	18	17	15	20	21

Better transport infrastructure is seen as contributing quite strongly to competitiveness in Bulgaria and more moderately in Spain, Ireland, Lithuania and Poland.

48. Is it easy to access your farm?

(1: Not at all - 5: Very easy)

[[1 [[2 [[3 [[4 [[5

	BG	ES	IE	LT	PL
Overall Mean	3.7	4.3	3.9	3.8	4.1
Nº of responses	18	17	15	20	21

Access to farms is rated easiest in Spain and Poland and slightly less easy in Bulgaria, Ireland and Lithuania, though still close to “rather easy”.

49. Would improving access routes boost your farm’s competitiveness?

(1: Not at all - 5: Very much)

[[1 [[2 [[3 [[4 [[5

	BG	ES	IE	LT	PL
Overall Mean	3.25	2.7	NO	2.6	2.8
Nº of responses	16	14	15	20	21

Improving access routes is perceived as moderately beneficial in all four continental countries, with slightly higher expectations in Bulgaria. Irish farmers don’t consider that it could improve their competitiveness.

50. Is your farm made up of a single plot or scattered plots?

☐ Single plot

☐ Scattered plots

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Single plot	0.0	33.3	53.3	0	20.0
Scattered plots	100	66.7	46.7	100	80.0
Nº of responses	18	18	15	20	20

Farms in all countries consist of scattered plots, except in Ireland, where just over half of all farms comprise a single parcel. The most unfavorable cases are those of Bulgaria and Lithuania, where all farms are fragmented into scattered holdings. In contrast, in Poland and Spain, one-fifth and one-third of farms, respectively, are concentrated on a single property.

51. Would you like a farm consolidation service in your area?

(1: Not at all - 5: Very much)

[] 1 [] 2 [] 3 [] 4 [] 5

	BG	ES	IE	LT	PL
Overall Mean	3.4	3.8	YES	3.0	3.2
Mean - Conventional	3.2	2.0	YES	3.0	3.3
Mean - In Conversion	4.3	4.0	YES	2.9	3.1
Mean - Post Conversion	3.4	4.7	YES	3.2	3.2
Nº of responses	17	12	15	20	21

Demand for a farm consolidation service is moderate to high in all countries, with Spain showing a particularly strong interest (close to “very much” among organic farmers).

52. Do you know of any government efforts to consolidate farmland?

☐ Yes

☐ No

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Overall% YES	38.9	70.6	100	10	9.5

Overall% NO	61.1	29.4	0	90	90.5
Nº of responses	18	17	15	20	21

Knowledge of government consolidation efforts is universal in Ireland, high in Spain, moderate in Bulgaria, and very low in Lithuania and Poland.

53. If yes, were those efforts successful?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

	BG	ES	IE	LT	PL
Overall Mean	1.8	4.5	2.5	1.5	2.5
Mean - Conventional	2.4	4.6	2.2	--	--
Mean - In Conversion	1.5	4.2	2.6	--	--
Mean - Post Conversion	1.0	5.0	2.5	--	--
Nº of responses	13	12	15	2	2

Among state-led efforts to promote land consolidation, farmers have rated those in Spain most positively. In Ireland, although all farmers are aware of the land consolidation policies promoted by the administration, they rate them as unfruitful, on par with Poland. In Lithuania and Bulgaria, these efforts have been rated as highly unproductive.

9.A. Specific Section - Crop and Mixed Farming Systems

54. Is your production insured?

☐ Yes

☐ No

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Overall% YES	11.1	37.5	46.7	10	23.8
Overall% NO	88.9	62.5	53.3	90	76.2
Nº of responses	18	16	15	20	21

Having production insured is more common in Ireland and Spain and less common in Bulgaria, Lithuania and Poland.

55. Is it common in your area to have insurance?

☐ Yes

☐ No

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Overall% YES	0.0	50.0	40	21.1	25.0
Overall% NO	100	50.0	60	78.9	75.0
Nº of responses	15	14	15	19	20

Farmers consider insurance to be “common in the area” much more often in Spain and Ireland than in the other three countries. All farmers in Bulgaria state that having insurance is not common in their area.

56. How many times have you had to use your agricultural insurance in the past 7 years?

	BG	ES	IE	LT	PL
Overall Mean	0.1	2.0	0.9	0.2	1.3
Nº of responses	7	5	14	9	17

The number of times farmers used insurance in the last 7 years is highest in Spain, moderate in Poland and Ireland, and almost zero in Bulgaria and Lithuania.

57. List the risks you have experienced, ranking them from most to least significant in terms of impact/damage.

Drought and hail are the most commonly reported risks across all countries. In Bulgaria, 61.1% of farmers reported crop damage, with additional concerns such as wildfires (16.7%). In Spain, other risks include frost, heavy rainfall and flooding, wildlife and pest outbreaks, wildfires, and livestock diseases. Lithuanian farmers also mentioned freezing as a relevant threat. In Poland, beyond the common risks, farmers highlighted frost, torrential rain, wild animal damage, price fluctuations, overproduction, and isolated cases of infectious livestock diseases and infrastructure damage.

58. Do you use herbicides? How many applications per season?

☐ Yes ☐ No

[Space to answer]

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	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Overall% YES	11.8	12.5	0.0	20%	19.0
Overall% NO	88.2	87.5	100.0	80%	81.0
% YES - Conventional	40.0	50.0	0.0	80.0	66.7
% YES - In Conversion	0.0	25.0	0.0	0.0	0.0
% YES - Post Conversion	0.0	0.0	0.0	0.0	0.0
Nº of responses	17	16	15	20	21

Herbicide use is rare overall, with very low percentages of users in all countries and no users at all in Ireland. Organic farmers do not use organic herbicides in any of the five countries, and farmers in conversion only use herbicides in Spain (one-fourth of this group).

The number of herbicide applications reported is generally low across all countries. In Bulgaria, there were only 2 responses, with an average of 1.25 applications. Spain reported an average of 1.83 applications based on 3 responses. In Lithuania, 4 farmers responded, with an average of 1.38, while in Poland, the average was 1.5 applications based on 2 responses.

59. How many insecticide or fungicide applications do you make?

Insecticides:

Fungicides:

	BG	ES	IE	LT	PL
Overall Mean Insecticides	0.25	0.3	0.0	0.4	0.5
Mean - Conventional	0.8	0.5	0.0	0.6	0.8
Mean - In Conversion	0.0	0.3	0.0	0.0	0.0
Mean - Post Conversion	0.0	0.0	0.0	1.0	0.6
Nº of responses	16	9	15	19	17
Overall Mean Fungicides	0.25	0.2	0	0.7	0.6
Mean - Conventional	0.8	1.0	0.0	1.7	1.2

Mean - In Conversion	0.0	0.0	0.0	0.0	0.5
Mean - Post Conversion	0.0	0.0	0.0	0.8	0.2
Nº of responses	16	5	15	18	17

Insecticide and fungicide applications per season are very low on average, with somewhat higher intensities in Poland and Lithuania, and minimal applications in Ireland and Bulgaria.

The group in conversion uses the least amount of insecticides and fungicides. Organic farmers in Bulgaria, Spain, and Ireland do not use organic insecticides or fungicides, while those in Lithuania and Poland do.

60. What fertilizer do you usually use?

Manure is the most commonly used fertilizer across countries, particularly in Spain, Poland, and Bulgaria, where it often comes from the farms' own livestock. In Bulgaria, 41.2% of farmers stated they do not fertilize, relying on grazing alone, while a small number mentioned using guano pellets, compost, or vermicomposting. In Spain, some farmers also use compost and green manure, with limited use of NPK fertilizers (conventional). Irish farmers reported not using fertilizers at all. In Lithuania, fertilizer use is highly variable, combining both organic (like manure and compost) and mineral fertilizers such as NPK, urea, and ammonium nitrate (conventional farmers).

61. Approximate dosage per hectare?

Across countries, manure and compost are commonly applied at high rates, typically ranging between 5000 and 30,000 kg/ha, while mineral fertilizers such as NPK, ammonium nitrate, and urea are used at much lower rates, usually between 50 and 300 kg/ha. In Bulgaria, average application rates were 10,500 kg/ha for manure, 30 kg/ha for guano, and 1000 kg/ha for compost/vermicompost. In Spain, manure was applied at around 5000 kg/ha, and the most common mineral fertilizer doses ranged from 220 to 250 kg/ha. In Lithuania, manure doses varied from 6500 to 17,500 kg/ha, compost from 2,000 to 2,500 kg/ha, and mineral fertilizers from 400 to 700 kg/ha. In Poland, several farmers reported manure and compost rates around 20,000 kg/ha, while mineral fertilizers were typically applied at 50 to 300 kg/ha, with specific examples like urea at 200 kg/ha and NPK around 200 kg/ha.

62. What machinery do you use for soil preparation?

Ploughing combined with disc harrows and cultivators is the most widespread method of soil preparation across the surveyed countries. In Bulgaria, all farmers reported using tillage, with no cases of direct seeding. The most common setup involves moldboard ploughing, followed by disc harrowing and superficial cultivation. In Spain, while traditional tillage with disc harrows and moldboard ploughs is still common, some farmers have adopted direct seeding and vertical ploughing, reflecting a move toward reduced tillage. In Ireland, the plough is the most frequently used tool, often combined with harrows or

aerators, especially on grasslands. Lithuanian farmers typically use a sequence of plough, disc harrow, and cultivator, though other combinations like chisel + disc harrow or plough + roller are also reported. In Poland, the standard practice is moldboard ploughing followed by disc harrow and cultivator, with some farmers also mentioning reduced tillage systems or the use of chisel ploughs to prevent soil compaction.

63. How many workers do you employ? Are they hired year-round?

	BG	ES	IE	LT	PL
Overall Mean of hired workers	2.6	0.5	0.9	1.2	0.3
Nº of responses	14	11	15	8	17

Bulgaria is the country where farms tend to have the highest number of hired workers on average. Regarding employment type, seasonal labour is more common in Spain, Ireland, Lithuania, and Poland, where most of the few responses indicate that workers are hired temporarily. In contrast, Bulgaria stands out as the only country where all respondents who answered about seasonality reported year-round employment.

9.B. Specific Section - Livestock Farmers and Mixed Farming Systems

64. How many LU does your farm have?

The variability in farm models across the different countries, combined with the diverse methods used by each farmer to express livestock load (in Livestock Units), prevents a meaningful comparison of farm size among the five nations.

65. Do you operate under an integration system or as an independent farmer?

- ☐ Integration system
- ☐ Independent farmer

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Integration system	0.0	0.0	0.0	0.0	5.0
Independent farmer	100	100	100	100	95.0
Nº of responses	17	11	15	17	20

Livestock farms are almost entirely independent (not under integration systems) in all countries, with only a small minority under integration in Poland, linked to poultry farming.

66. What type of livestock production system do you operate?

- ☐ Closed-cycle (Breeding, rearing, and fattening all take place on the same farm)
- ☐ Fattening (Animals are bought at a young age and raised for meat production)
- ☐ Sale at weaning (Animals are sold shortly after weaning)
- ☐ Other (please specify):

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Closed-cycle	72.7	62.5	33.3	100	25.0
Fattening	13.6	6.3	13.3	0.0	25.0
Sale at weaning	13.6	31.2	26.7	0.0	30.0
Other	0	0.0	26.7	0.0	20.0
Nº of responses	18	16	15	10	20

Closed-cycle systems are particularly common in Lithuania and Bulgaria. Ireland and Poland, however, show more diversified systems (including closed-cycle, fattening, and sale at weaning). In Spain, the closed-cycle system is the most common, although sale at weaning represents nearly one-third of operations.

67. Do you know the average prolificacy of your herd? Please specify:

Reported average prolificacy rates vary between countries, with Spain and Poland showing similar averages of around 82-83%, and Bulgaria slightly lower at 76%. In Bulgaria, only 47.1% of farmers said they knew this figure, while others either didn't know or didn't respond. In Spain and Poland, responses also varied, with some farmers confusing prolificacy with general productivity. This misunderstanding was especially evident in Lithuania, where many farmers interpreted prolificacy as milk or meat output rather than the number of offspring, suggesting the need for clearer definitions in future surveys.

68. How many veterinary visits per season?

	BG	ES	IE	LT	PL
Average veterinary visits	9.4	2.6	5.4	1.2	5.6
Nº of responses	14	8	15	8	18

The number of veterinary visits is high in Bulgaria and moderate in Ireland and Poland, but very low in Lithuania and especially Spain.

69. Do you know the feed conversion ratio of your animals (kilograms of feed required for the animal to gain one kilogram of body weight)?

Feed conversion ratio data is generally limited and tends to be better monitored in intensive farming systems, where producers are more likely to track this indicator. In Spain, three farmers provided numerical values, resulting in an average of 5.7 kg of feed per kg of live weight for cattle. In Bulgaria, only two farmers gave figures, with values ranging between 3 and 5 kg of feed per kg of meat, while most respondents either did not know the ratio or considered it irrelevant due to year-round grazing. In Lithuania and Poland, nearly all farmers stated they did not know their conversion ratio, with the only response in Poland coming from a poultry farmer, who reported 1 kg of feed per 4 eggs.

70. What type of pasture management system do you use?

- ☐ Traditional (continuous grazing)
- ☐ Rotational grazing
- ☐ Regenerative grazing
- ☐ Other:

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Traditional (continuous grazing)	27.8	7.7	0.0	60.0	35.7
Rotational grazing	72.2	53.8	86.7	40.0	64.3
Regenerative grazing	0.0	38.5	13.3	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0
Nº of responses	17	13	15	10	14

Rotational grazing is the main system in Ireland and Poland and also important in Bulgaria, while Lithuania relies more on traditional continuous grazing.

Regenerative grazing is considerably less frequent than rotational grazing and appears mostly in Spain, where a substantial share of livestock farmers report using this system.

71. Is your farm self-sufficient in animal feed production?

- ☐ Yes
- ☐ Partially (%):

[] No

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Overall% YES	41.2	12.5	40.0	100	62.5
Overall% of Partially	17.6	50.0	26.7	0.0	31.2
Overall% NO	41.2	37.5	33.3	0.0	6.3
Nº of responses	17	8	15	10	16

Feed self-sufficiency is complete in Lithuania and high in Poland. In Bulgaria and Ireland, it stands at around 40%, while Spain is the least self-sufficient country in feed. Spain and Bulgaria are predominantly partially self-sufficient. Furthermore, Spain, Bulgaria, and Ireland have a significant percentage of farmers who are completely dependent on feed imports, whereas in Lithuania and Poland this dependence is almost non-existent.

72. What percentage of the total animal feed comes from external supplementation?

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
External supplementation as% of total feed	16.3	7.1	5.4	1.2	5.6
Nº of responses	15	8	15	8	18

The share of total animal feed coming from external supplementation is highest in Bulgaria (around 16%), intermediate in Spain, Ireland and Poland (about 5-7%), and very low in Lithuania (about 1%).

This means that Bulgaria relies much more on external feed than the other four countries, while Lithuania is almost fully self-reliant in terms of feed volume.

73. What percentage of your total farm expenses is due to external feed supplementation?

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
Farm expenses due to external feed (% of total farm expenses)	13.4	26.7	5.4	1.2	5.6

Nº of responses	9	9	15	8	18
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The share of total farm expenses accounted for by external feed is very high in Spain (about 27%), moderate in Bulgaria (about 13%), and low in Ireland, Lithuania and Poland (around 1-6%).

Thus, even though Bulgaria uses more external feed in physical terms, Spain is the country where external feed represents by far the largest part of total farm costs.

74. Do you use antibiotics on your livestock?

☐ No

☐ Yes → If yes, please indicate the purpose(s):

☐ Therapeutic use - To treat diagnosed diseases

☐ Metaphylaxis - To treat a group of animals when one or more are sick and the disease may spread

☐ Prophylaxis - Preventive use in exceptional cases and only under veterinary prescription

☐ Other (please specify): _____

	BG (%)	ES (%)	IE (%)	LT (%)	PL (%)
NO	82.4	9.1	26.7	90	78.9
YES	17.6	90.9	73.3	10	22.1
Therapeutic use	100	90.0	63.6	100	100
Metaphylaxis	0.0	10.0	27.3	0.0	0.0
Prophylaxis	0.0	10.0	9.1	0.0	25
Other	0.0	0.0	0.0	0.0	0.0
Nº of responses	0.0	10	15	10	19

In organic farming, antibiotics shall not be used for preventive treatments. However, they can be used to treat diseases where necessary, under strict conditions and under the responsibility of a veterinarian, when the use of phytotherapeutic, homeopathic and other products is inappropriate. Restrictions with respect to courses of treatment and withdrawal periods are defined.

Taking into account the three cohorts participating in the project, the majority of farmers have had to use antibiotics in Spain and Ireland while most farmers in Bulgaria, Lithuania and Poland report not using antibiotics.

Among those who do use antibiotics, therapeutic use is reported by all farmers in Bulgaria, Lithuania and Poland, and by the great majority in Spain and Ireland; metaphylaxis and prophylaxis appear only in Spain, Ireland and Poland and involve a much smaller share of users in each country.

6. PESTLE ANALYSIS (BG, ES, IE, LT, PL)

The PESTLE (Political, Economic, Social, Technological, Legal, and Environmental) analysis provides a comprehensive framework for assessing the macro-external factors influencing the competitiveness of the organic agro-industrial sector in the five countries studied. This analysis allows for contextualizing the specific findings from the farms within the structural trends of each national environment.

6.1 PESTLE Analysis EU Single Market

6.1.1 Political

The European Green Deal and the Farm-to-Fork Strategy establish a strong supranational impetus for sustainable agriculture, including the target of 25% of EU farmland under organic management by 2030. The 2023-2027 CAP Strategic Plans integrate organic production through eco-schemes and agri-environmental measures, though implementation remains uneven across Member States. This territorial asymmetry and the persistence of high administrative burdens hinder uptake—particularly among small and medium farms.

Bureaucratic complexity is a severe and widespread characteristic in all analysed regions.

There is a shared demand towards public administrations for infrastructure improvements, specifically those related to water management.

Farmers in all countries consider it positive to shorten the value chain and establish direct sales channels. The most valued regional policies are those that align with this goal.

6.1.2 Economic

Rising input and energy costs since 2021 have compressed margins, while organic systems continue to face higher labour and certification expenses. Economic viability is often dependent on CAP support, exposing the sector to policy changes. Domestic demand for organic products remains modest and volatile in most countries, and limited local processing prevents greater value capture. Access to credit, especially for young or converting farmers, is

constrained. Nonetheless, expanding export markets, rural tourism synergies, and digital innovation provide important growth opportunities.

The labour shortage is a serious problem common to all the agricultural economies studied.

The high cost of machinery and equipment is universally identified as the main economic barrier to farm mechanisation.

The lack of profitability is a structural economic factor cited in all countries as a primary obstacle to the entry of new farmers.

6.1.3 Social

Across the EU, the farming population is ageing and rural depopulation continues, with inadequate public services reducing the appeal of rural life. Generational renewal is weak, and women remain under-represented in farm leadership roles. There is a growing skills gap in technical and business management tailored to organic and regenerative systems.

6.1.4 Technological

Digitalization and precision farming tools offer significant potential to enhance efficiency and sustainability, yet adoption is uneven. Financing, connectivity, and digital-skills gaps constrain smaller holdings. Investment in machinery follows a cyclical pattern, slowing in 2024 but showing selective reactivation in 2025. Countries such as Spain and Ireland lead in sensor-based irrigation and data-driven livestock systems respectively, while Central-Eastern Europe shows gradual modernization aided by EU funds. However, advanced technologies are not perceived as "easily accessible" in any of the countries, particularly due to the high initial investment.

6.1.5 Legal

Organic Agriculture operates under a harmonized framework (EU Reg. 2018/848) ensuring consumer trust and market coherence. However, certification costs and processing delays remain high for SMEs, and inspection capacities differ among countries. Regenerative Agriculture lacks legal definition or certification, limiting recognition in public-support schemes.

In the realm of environmental protections, there is a shared perception that regulations are often overly strict or poorly adapted to the realities of agricultural management.

Sanitary and bureaucratic regulations are perceived sometimes as obstacles that limit the practical impact of short supply chain policies in theory.

6.1.6 Environmental/Territorial

Climate change is perceived as a factor that has negatively impacted farms in all countries, although with different intensity.

Drought is a commonly experienced and reported natural risk in all five nations.

Water management infrastructure (reservoirs, ponds, irrigation systems) is an urgent and common need identified by farmers across all territories.

6.2 PESTLE Analysis for Bulgaria

6.2.1. Political

Bulgaria's policy framework for Organic Agriculture (OA) exists but suffers from weak enforcement and low administrative capacity. Financial incentives are unstable and unpredictable, leading to cyclical expansions and contractions in organic areas.

Public policies are perceived by farmers as highly influential, especially for post-organic conversion farmers. The bureaucracy related to subsidies and legal requirements is considered very complex. Farmers believe they do not compete on a level playing field against producers from outside the EU.

6.2.2. Economic

The organic sector remains marginal and highly dependent on CAP subsidies. Profitability is low due to high input costs and weak local value chains. Investment levels are limited, and domestic demand for organic products remains underdeveloped. Access to finance for young and innovative farmers is restricted, constraining sector renewal.

Bulgarian farmers identify water access, labour shortages, and the cost of technology/machinery as the main factors limiting competitiveness. There is a strong dependence on external financing in some sectors, though it is moderate overall. There is significant interest in accessing new markets and direct-to-consumer sales channels. Access to public funding or support is perceived as "moderately accessible," and dependence on loans is rated as neutral-to-low. It is not common for production to be insured.

6.2.3. Social

The agricultural sector faces a profound demographic crisis: rural depopulation and an ageing workforce threaten its continuity, and outmigration is depleting its skilled labour. Among these challenges, a slight improvement in gender balance is seen in the younger generation, where 36% of farm managers under 25 are women. Compounding these structural issues, consumer awareness of organic products remains minimal.

In Bulgaria, the shortage of labour constitutes a particularly pressing problem, and the farmers surveyed report the most negative assessment of the availability of agricultural workers among all the cases analysed. Generational renewal in the agricultural sector is considered by participants clearly insufficient, constrained mainly by the low perceived profitability of the activity, the greater appeal of urban lifestyles, and the lack of services in rural areas.

The influence of neighbours acts as a decisive factor in the conversion to organic farming, so that decisions to change are strongly shaped by the immediate environment.

Cooperative membership is generally uncommon between participants, as well as in the whole country, although participation in cooperatives is notably higher among organic farmers than among conventional ones.

6.2.4. Technological

Access to advanced technologies is rated as very low among farmers.

The mechanisation of currently manual tasks is perceived as quite difficult, and the main barrier for participants is the high cost of machinery, followed by the lack of technical training.

Precision and digital agriculture technologies in Bulgaria are mainly adopted by large holdings, while small farms face cost and training barriers. Connectivity gaps in remote areas continue to limit innovation.

6.2.5 Legal

EU organic rules are transposed but often ineffectively implemented. Administrative procedures for subsidies and certification are slow and opaque.

Restrictions in protected areas (e.g., a prohibition on mowing until late summer) generate discontent among the surveyed farmers.

Bureaucratic complexity related to subsidies and legal requirements is very high; organic farmers are the group that highlights this issue the most among those surveyed.

Public land consolidation efforts are known to farmers, but their success rate is considered insufficient.

6.2.6 Environmental

Recurrent summer droughts reduce yields and heighten fire risk. The negative impact of climate change on their farms is rated highest by the surveyed farmers among the analysed countries.

Additional mitigation measures are considered very useful, as are infrastructure improvements (reservoirs, ponds, canals, water management plans). Water emerges as an infrastructure need shared by 100% of respondents and is perceived as a common demand nationwide.

Soil problems are concentrated, among the producers surveyed, in nutritional status and, secondarily, in organic matter and compaction.

6.3 PESTLE Analysis for Spain

6.3.1. Political

Spain shows strong regional support for OA, though without a coordinated national framework. Decentralised competences create heterogeneity in implementation and funding across regions.

The surveyed farmers consider the influence of public policies to have a moderate impact, and the Common Agricultural Policy (CAP) is viewed positively.

Local policies are also rated more favorably compared to other countries. Forty percent of respondents identify a local or regional policy with a positive effect

(e.g., support for organic certification, agri-environmental measures, native breeds).

Only 16.7% of surveyed farmers claim to know specific policies aimed at shortening the value chain (e.g., the "Farm to Fork" Strategy, mobile slaughterhouses, food craftsmanship regulations), citing bureaucratic and health-related hurdles as factors limiting their practical impact.

6.3.2. Economic

Spain's organic sector has high export orientation and solid agrifood integration, but structural duality persists: large, technified farms coexist with small family holdings operating on narrow margins. Land rental prices remain relatively stable, and the livestock sector demonstrated resilience during recent energy and input crises. Domestic consumption of organic products continues to grow but remains modest relative to production.

The main factors limiting competitiveness indicated by the Spanish surveyed farmers are the lack of labour, the cost of phytosanitary products, the cost of fertilizers and the access to water. Labour is difficult to find, although the organic farmers surveyed reported having fewer problems than conventional ones.

Agricultural service companies are considered somewhat more accessible by respondents, though still within the difficult range.

Access to financing is perceived as relatively low, particularly on conventional farms, while dependence on loans is the highest between the analysed countries.

There is a strong desire to access new markets, especially local markets, short supply chains, and direct sales, along with some interest in institutional markets and exports. The Spanish farmers surveyed reported land rental prices significantly lower than those in other analysed countries, despite similar purchase prices.

6.3.3. Social

The rural population is ageing and generational renewal is among the weakest in the EU (only 3.9% of farm managers under 34). The gender gap widens among younger farmers (around 21% of women managers under 34). Migration inflows provide labour flexibility but low job stability.

Spain is a highly cooperative country, also among organic farmers. Furthermore, the surveyed farmers perceive belonging to a cooperative as a clear factor in improving competitiveness, with more satisfaction among the organic farmers. Generational turnover is critical, and farmers agree, giving very low ratings regarding its adequacy. They primarily attribute this insufficiency to a lack of profitability (30.8%) and a lack of rural services (23.1%) as the most cited factors

According to the surveyed farmers, the influence of the surrounding environment (such as neighbours) on the transition to organic farming is moderate. The 42.1% are aware of cases where organic farming was abandoned, primarily attributing it to decreased yields.

6.3.4. Technological

Spain leads the EU in irrigation efficiency, sensor technologies, and data-based farm management, particularly in Mediterranean regions. Nonetheless, a significant share of the machinery fleet remains old, and digitalisation gaps persist in inland areas.

Among the surveyed farmers, access to advanced technologies is rated as medium-low, but they hold a very positive view of its impact on yields and a more moderate one on quality.

The mechanisation of tasks that currently require manual labour on farms is perceived as of medium difficulty; the cost of machinery is the main barrier, followed by maintenance and adapting machinery to the crop type (15%).

The use of digital tools is high among the surveyed farmers (66.7%), with mentions of GIS, digital irrigation control, accounting, e-commerce, etc.

6.3.5. Legal

Some Spanish farmers mentioned regional initiatives supporting organic certification and agri-environmental policies, as well as programs for promoting indigenous breeds as having benefitted their farms.

Bureaucratic complexity is perceived as high, especially among conventional farmers.

70.6% of respondents are aware of public land consolidation efforts, and their success is rated very positively.

6.3.6. Environmental

Spain faces acute climate vulnerability: recurrent droughts, water scarcity, and advancing desertification, especially in the southeast.

The impact of climate change is rated as moderate by the Spanish surveyed farmers (3.5/5).

Around one-quarter of respondents have plots in protected areas (e.g., Natura 2000). The overall perceived benefit of this protection is rated as neutral-to-low, with negative comments linked to yield losses and perceived imbalanced requirements.

Additional environmental measures are considered useful, and the most demanded are water-related infrastructure improvements, with a large majority calling for a new hydrological plan.

The main soil problems identified by farmers are organic matter deficit and compaction.

Among the surveyed producers, Spanish farmers were the ones who consider production insurance to be most common. Spain is also the country with the highest average number of claims reported over a 7-year period (an average of 2).

6.4 PESTLE Analysis for Ireland

6.4.1. Political

Ireland integrates OA into its climate and agricultural strategies and benefits from strong institutional support (e.g., Teagasc). Policy pressure focuses on emission reduction from the dominant livestock sector.

Public policies are rated between the surveyed farmers as highly influential, and the Common Agricultural Policy (CAP) as clearly positive.

All respondents state that they are aware of EU or national policies aimed at shortening the value chain, although they do not provide specific examples.

The perceived effectiveness of land consolidation policies is limited, even though 100% declare they are aware of these efforts.

6.4.2. Economic

Ireland's export-oriented livestock model remains difficult to reconcile with organic transition goals. High labour and land rental costs raise production expenses. Nevertheless, efficient contractor networks maintain competitiveness and mechanisation. Energy and input price volatility remains a key risk.

The tenure structure among the surveyed farmers is based primarily on ownership: 60% hold the majority of their land as owned property, while only 13.3% hold the majority as leased; mixed farms account for another 13.3%.

Pastureland shows high sale and rental prices compared to the other analysed countries according to the survey.

According to the surveyed farmers, the most limiting factors for competitiveness are fertilizers and labour.

Dependence on loans is considered low according to the farmers surveyed.

6.4.3. Social

A strong productivist culture shapes farmer attitudes. Women represent only 10-13% of farm managers, though generational continuity is more stable than elsewhere (average age $\approx$ 58).

The difficulty of finding labour is one of the main problems in Ireland, as confirmed by surveys conducted among Irish farmers. However, according to respondents, hiring service companies is considered relatively straightforward.

46.7% of the surveyed farmers belong to cooperatives, the second highest rate behind Spain.

Generational renewal is insufficient, and according to the surveyed farmers, the lack of profitability is the main obstacle, followed by a lack of services in rural areas.

The 26.7% of respondents are aware of cases where organic farming has been abandoned and believe that the main reason is the small price difference between organic and conventional products

6.4.4. Technological

Ireland is a leader in agricultural digitalisation, particularly in the dairy sector, where sensors and data platforms are widespread.

According to the interviewed farmers, the main obstacle to mechanisation is the cost of machinery.

It is the country according to the surveys with the highest reported use of digital tools (73.3%), highlighting applications for management, weather and pest alerts, drones, and tracking collars.

6.4.5. Legal

OA is regulated under the EU framework with strong national support measures.

Bureaucratic complexity is considered a serious problem by farmers but receives more positive ratings than in Bulgaria and Spain.

Regarding environmental protection, the majority do not identify clear benefits, and participation in protected areas is relatively low (28.6% have protected plots). Overall satisfaction with the protection measures stands at 3.4/5.

6.4.6. Environmental

Agriculture depends heavily on imported feed and fertilisers. Nutrient runoff (nitrates, phosphorus) continues to affect water bodies, prompting stricter regulations.

The impact of climate change is rated as neutral-low by farmers, the lowest score among the countries.

The usefulness of additional environmental measures is rated at 1.0/5 (not useful), as are infrastructure improvements (drainage, ponds, canals...), also at 1.0/5.

Soil problems are perceived as low-intensity: salinity 1.0/5, compaction 2.2/5, and nutritional status 2.2/5.

Herbicide use is non-existent between producers surveyed (0% report using them), and the average applications of insecticides and fungicides are 0 per season.

6.5 PESTLE Analysis for Lithuania

6.5.1. Political

Public policies are perceived as highly influential by farmers (4.4/5). The Common Agricultural Policy (CAP) is rated moderately positive.

Regional and local policies are received as slightly positive. Only 1 in 20 farmers identifies a specific local or regional policy with a positive effect (organic food in school cafeterias).

The 55% state that they are aware of policies aimed at shortening the value chain, but none provide specific measures; examples are absent.

The perception of a level playing field is low within the EU (2.0/5) and significantly higher when competing against third countries (3.9/5).

6.5.2. Economic

Competitiveness is hampered by low domestic demand ($\approx 1\%$ market share), rising land rental costs, and dependence on CAP subsidies. Access to finance for smallholders is limited, though EU investment programmes have modernised parts of the sector.

According to the surveys, a mixed structure of owned and leased land predominates (85% of farms), with 15% being mostly owner-operated and no predominant leasehold land.

The 60% of the farmers acquired the land through purchase/investment and the 40% by inheritance.

The farmers claimed that the factor that most limits competitiveness is technology/machinery, followed by fertilizers and labour. The interest in accessing new markets is relatively low (2.4/5), with a preference for fresh and processed fruit/vegetable markets, organic markets, and combinations of national/EU markets.

According to surveyed farmers, production is insured on 10% of the farms, and only 21.1% consider having insurance to be common in their area; the average insurance usage over 7 years is 0.2 claims.

6.5.3. Social

Outmigration of rural labour continues, and the population is ageing. Female participation is comparatively higher than BG, ES, IE and PL but declining among younger age groups. Technical and entrepreneurial training programmes are insufficient.

Finding labour is considered difficult by farmers, and unlike in other countries, finding service companies is also perceived as difficult.

Only 10% of the surveyed farmers belong to cooperatives, and the perceived improvement in competitiveness through cooperatives is rated as neutral.

Generational renewal is rated as moderately insufficient, although the scores are less severe than those of Spain or Ireland. According to the surveyed farmers, the main factors behind the lack of succession are lack of profitability, the appeal of urban life, lack of rural services, and lack of opportunities for women.

The 50% are aware of cases where organic farming has been abandoned; the most frequent reasons are prices equal to conventional products and lower yields.

6.5.4. Technological

Lithuania maintains a comprehensive machinery registry that supports monitoring and targeted aid. Precision agriculture adoption is expanding, though hindered by limited access to finance and digital infrastructure in remote zones.

Access to advanced technologies is rated by the surveyed farmers as medium-low (2.3/5), behind Spain and Poland but ahead of Bulgaria.

Additional mechanisation is perceived with moderate difficulty, and the main barrier is considered the cost of machinery (71.4%), followed by lack of training and physical access to machinery (14.3% each).

The use of digital tools in management is relatively low according to the farmers. It is also the country that shows the greatest confidence in the effect of technology on yields and quality.

6.5.5. Legal

Bureaucratic complexity is rated as high, though less so than in other analysed countries such as Spain. Organic farmers are the ones who report the highest bureaucratic complexity.

Only 10% of the interviewed farmers are aware of land consolidation efforts, and their success level is rated as very low.

Approximately 29.4% of farmers have plots in protected areas; the protection is perceived as moderately beneficial, although issues are raised regarding a lack of regulatory adaptation and support/information.

6.5.6. Environmental

Agricultural pollution from nitrates and phosphates remains localised but significant.

The impact of climate change is rated at 3.7/5 (notably high).

Additional mitigation measures against climate change are considered useful, but the main demand is for infrastructure improvements (especially those linked to water management). All respondents agree on the need for water infrastructure and consider it a common national demand.

The most serious soil problems, according to the interviewed farmers, are low organic matter content and poor soil nutritional status.

Herbicide use is low (20% of users, with ≈ 1.4 applications per season among those who use them), and applications of insecticides and fungicides are low but not non-existent.

6.6 PESTLE Analysis for Poland

6.6.1. Political

Poland's support focuses primarily on OA through EU funds, but the absence of a coherent national strategy and past policy instability (post-2014 subsidy changes) have undermined farmer trust. The surveyed farmers consider public policies to be quite influential. The Common Agricultural Policy (CAP) is perceived as positively influential but receives the lowest rating among the analysed countries.

Regional and local policies are considered slightly positive. 9% of farmers identify specific local/regional policies with a positive effect. They particularly highlighted measures that combine market access, environmental conservation, and advisory support. Key examples include the framework for on-farm processing under "Rolniczy Handel Detaliczny (RHD)," the national network of educational farms, subsidies for high-biodiversity meadows, and the support provided by regional advisory centers like the Mazovian Agricultural Advisory Centre.

The 28.6% of the surveyed farmers state that they are aware of policies aimed at shortening the value chain, primarily the "RHD" framework and other cooperation and short supply chain projects.

The perception of competition under equal conditions is higher within the EU (2.9/5) and lower against third countries (1.8/5), although both are still considered unfair.

6.6.2. Economic

The sector shows limited international competitiveness and weak processing capacity. Access to credit is difficult, especially for young farmers. Domestic organic consumption is extremely low (0.57% market share). The farm structure is highly fragmented (over 86% are small mixed holdings) which limits economies of scale.

Among the surveyed farmers, ownership predominates: 66.7% of farms have a majority of owned land, and 38.1% operate under a mixed tenure system; only 4.8% are primarily based on leasing.

Land is acquired mainly through inheritance (56%) and purchase (44%). In leasing, private contracts predominate (82.5%).

It is the country with the highest rain-fed land prices in the sample (≈15,609 €/ha) and similarly high rain-fed land rents; pasture and meadow prices are also high.

According to the farmers, the factors most limiting competitiveness are technology/machinery (20%), labour (15%), water (15%), and "other" (15%), which includes machinery costs, regulatory burden, competition from cheap non-EU imports, capital shortages, and land scarcity.

Access to financing is rated as moderately accessible (3.2/5), with a relatively low dependence on loans.

Production is insured in 23.8% of cases among the respondents, and only 25% consider insurance use "common"; the average claims usage over 7 years is 1.3.

6.6.3. Social

Perception of organic added value is low, and cultural resistance to cooperation persists, probably due to historical reasons. There are no farmers in cooperatives in the sample (0%), unlike in other countries.

The gender gap is widening among younger generations. Collective initiatives and cooperatives remain weak despite policy encouragement.

Generational renewal is rated as insufficient, and according to farmers this is mainly due to a lack of profitability (62.1%) and the appeal of urban life (27.6%).

Regarding the influence of the surrounding environment, Lithuanian farmers consider neighbours converting to organic farming to be very influential. 47.6% are aware of cases where organic farming has been abandoned, citing reasons focused on prices similar to conventional (40%), lower yields (20%), and the end of incentives (20%).

6.6.4. Technological

The machinery fleet is old ($\approx$ 25 years on average, 54.5 kW average power), and rural digital connectivity is poor. Organic farms are concentrated in the eastern and southern regions, where innovation uptake is slower.

Access to advanced technologies is rated as relatively better than in other countries (2.7/5, the highest along with Spain), although still below "easily accessible".

The mechanisation of tasks requiring manual labour is perceived with moderate difficulty (2.8/5), but the cost of machinery is a dominant barrier (87.5% of responses), with the investment cost as the main problem (94.7% among those who cite cost).

The use of digital tools is the lowest in the group (19% of users).

6.6.5. Legal

Bureaucratic complexity is considered high but lower than in Bulgaria and Spain.

Only 9.5% of the interviewed farmers are aware of land consolidation efforts, and their outcome is rated as poor.

One-third of farmers (33.3%) have plots in protected areas, and the protection is perceived as "somewhat beneficial" (3.3/5), with mentions of both restrictions (land use, infrastructure) and benefits for biodiversity, water, and consumer trust.

6.6.6. Environmental

Poland faces growing water-quality problems and alternating droughts and floods that intensify soil-degradation risks.

The impact of climate change is rated as notably high (3.8/5).

Additional climate change mitigation measures are considered very useful, as are infrastructure improvements, highlighting the simultaneous need for drainage and water retention.

Soil problems are perceived as moderate, with organic matter content being the main concern.

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	Political	Economic	Social	Technological	Legal	Environmental/ Territorial
C o m m o n A n a l y s i s	• Green Deal/Farm-to-Fork targets drive policy • Bureaucratic complexity is severe everywhere • Shared demand for water management infrastructures • Support for short supply chains. • Perception of unfair 3rd country competition	• Subsidy Dependence • High Production Costs • Weak Local Value Addition • Access to Finance • Labour shortage is a serious common problem • High machinery cost prevents mechanisation • Lack of profitability hinders new entrants • Rising input/energy costs compress margins	• Aging population and rural depopulation • Weak generational renewal • Skills gap in organic/regenerative management • Women under-represented in the farming sector.	• Digitalization potential exists but adoption is uneven • Advanced tech not "easily accessible" due to high initial investment • Digital skills gaps constrain small holdings.	• Regulations often overly strict or poorly adapted to reality • Sanitary rules hinder short supply chains • Regenerative Ag lacks legal definition.	• Climate change negatively impacts all regions • Drought is a common natural risk • Urgent need for water reservoirs and irrigation systems
B U L G A R I A	• Weak enforcement & low admin capacity • Unstable financial incentives • Policies highly influential for post-conversion farmers • Perception of unfair non-EU competition.	• Low profitability & high input costs • Water access & labour limit competitiveness • Moderate loan dependence; insurance uncommon • Interest in EU markets (Greece).	• Demographic crisis & outmigration • Most negative assessment of labour availability • Neighbours' influence is decisive for organic conversion.	• Very low access to advanced tech • Precision tech limited to large farms • Connectivity gaps in remote areas.	• Restrictions in protected areas (e.g., mowing bans) cause discontent • Land consolidation success rated insufficient	• Highest rated negative climate impact • Recurrent summer droughts & fire risks • 100% agreement on need for water infrastructure • Soil nutritional/compaction issues.

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S P A I N	• Strong regional support (decentralized) • CAP viewed positively • Local policies supporting native breeds, and organic certification are rated positively. • Demand of short chain policies	• High export potential • Structural farm duality • Stable land rental prices • Resilient livestock sector	• Weakest generational renewal among the analysed. • Highly cooperative country (improves competitiveness) • Organic abandonment driven by yield loss.	• Leadership in irrigation technology • Old machinery stock	• High bureaucratic complexity • Land consolidation efforts rated very positively. • Rising regulatory pressure	• Acute climate vulnerability (desertification) • Demand for new hydrological plans. • Moderate climate change impact rating
I R E L A N D	• Strong institutional support • Pressure on livestock emissions • CAP rated clearly positive. • No effective local/regional policies identified.	• Export-oriented livestock model • High land (pasture) & labour costs • Efficient contractor networks maintain competitiveness • Low loan dependence	• Weak generational renewal • Highly cooperative dairy sector (improves competitiveness) • Organic abandonment driven by yield loss. • Labour is hard to find, but services are easy to hire.	• Leader in dairy digitalization • High digital tool use • Machinery cost is main barrier	• Bureaucracy serious but better than BG/ES	• Dependence on imported inputs (like feed) • Lowest climate impact rating (neutral-low) • Nutrient runoff (water quality) issues. • Infra improvements deemed "not useful".
L I T H U A N I A	• Highly influential public policies • Perception of unfair 3rd country competition • Local policy impact limited to school food. • Unbalanced public support • Low domestic demand of organic products	• Tech/machinery limits competitiveness most. • Rising land rental costs • Low consumption and CAP dependence	• Rural outmigration and ageing • Declining female participation	• Detailed machinery registry • Limited precision tech adoption • Service companies difficult to find • Low cooperative membership	• High bureaucracy for organic farmers • Land consolidation success rated very low.	• Localised agricultural pollution • Notably high climate impact rating • Water infrastructure demanded by 100% as common need

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P O L A N D	• "RHD" framework (on-farm processing) highly valued • High EU fund dependence • Past sector instability	• Highly fragmented farm structure • High land prices • Limited international competitiveness • Extremely low domestic organic consumption.	• Low organic value perception • Resistance to change and cooperation • Widening youth gender gap	• Aged machinery fleet • Strong neighbor (environment) influence on organic conversion • Cultural resistance to cooperation (0% in coops)	• RHD framework supports direct sales legally • Land consolidation efforts rated poorly. • Obsolete cooperative framework	• High climate impact rating • Alternating droughts and floods • Need for both drainage and retention infrastructure.
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Table 1. A PESTLE analysis summarizing the most relevant points for each country (BG, ES, IE, LT, PL) and their commonalities.

7. SWOT ANALYSIS (BG, ES, IE, LT, PL)

7.1 SWOT Analysis EU Single Market

7.1.1. Strengths

- ✓ Established agricultural base, endowed with accumulated technical knowledge and significant productive capacity.
- ✓ Reinforced by full integration into the EU's Common Agricultural Policy (CAP), which provides crucial financial stability and dedicated support mechanisms for both organic conversion and long-term maintenance.
- ✓ Market integrity and consumer trust are further ensured by the robust and harmonized EU regulatory framework, specifically Regulation (EU) 2018/848.
- ✓ Forward-looking dynamism is secured through growing investment in agro-ecological research & development and knowledge transfer networks, as exemplified by initiatives like the OH-FINE project.
- ✓ Favorable attitude toward technological innovation has been observed. Despite access difficulties, farmers in all countries consider that new technologies can clearly improve yields and, to a lesser extent, product quality.
- ✓ Basic adoption of digital tools in all countries which forms a foundation upon which to scale up digitalization.

7.1.2. Weaknesses

- ✓ Severe demographic challenge: an ageing farming population and insufficient generational renewal.
- ✓ Structural fragmentation and small scale of most holdings (except IE), limiting economies of scale, investment capacity, and bargaining power.
- ✓ Low profitability and high dependence on CAP subsidies, making the sector vulnerable to policy changes.
- ✓ Uneven adoption of digital and precision agriculture technologies due to high costs, connectivity gaps, and a lack of specialized training.
- ✓ Underdeveloped cooperative structures and collective marketing in most countries, hindering value addition.
- ✓ Persistent and, in some cases, widening gender gap in farm management, especially among younger generations.
- ✓ Elevated bureaucratic complexity that stifles small producers.
- ✓ Soil-related problems in all countries
- ✓ Unfair competition and the importation of products that do not comply with the same regulations as European producers.

7.1.3. Opportunities

- ✓ Growing consumer demand for sustainable, healthy, and local products, supporting market expansion and price premiums.
- ✓ Potential for efficiency gains and cost reduction through the adoption of transferable technologies (e.g., digitalization, AI, precision irrigation, biological control) in agriculture.
- ✓ Potential impact of technological innovation, consistent with farmers' expectations.
- ✓ Development of short supply chains and direct sales.
- ✓ Land consolidation programs.
- ✓ Implementation of new technologies, such as the use of drones, GPS collars, virtual fencing, and others, to reduce workload and make livestock farming more attractive.
- ✓ Using the CAP and national frameworks as levers for change.

7.1.4. Threats

- ✓ High volatility and rising costs of energy and agricultural inputs, compressing profit margins.
- ✓ Increasing cost of land access, particularly rising rental prices, threatens economic viability for new and existing farms.
- ✓ Stagnation of the domestic organic market in most countries, constrained by inflation and lower disposable income.
- ✓ Risk of abandonment (or failure to consolidate) of organic production due to lack of incentives and lack of differentiated prices.
- ✓ Increasing climate risks, affecting yield stability and production costs.
- ✓ Policy uncertainty and instability of national incentives, delaying farmer investment and conversion decisions.
- ✓ Structural tension between the need for investment and costly access to technology and machinery.

7.2 SWOT Analysis for Bulgaria

7.2.1. Strengths

- Experience in extensive cereal and oilseed production.
- Partial modernization and growing machinery adoption among medium-sized operators.
- A livestock base with potential for ecological conversion.
- Recognition of the organic label and specialization in organic beekeeping and rose/lavender oil.

7.2.2. Weaknesses

- Aged structure and significant rural outmigration.

- Predominance of small-scale, low-diversification farms.
- Contained profitability and high dependence on subsidies.
- Technological and digital gap; cooperatives with governance problems.
- Extreme difficulty in finding labour.
- Highly fragmented land structure.
- High bureaucratic complexity.
- Low penetration of agricultural insurance.
- Underdeveloped agricultural cooperatives.

7.2.3. Opportunities

- CAP levers for investment in efficient irrigation, soil management, and precision agriculture.
- Potential for extensive organic livestock based on pastures.
- Valorization of rotations and protein crops in organic systems.
- Development of laws and programs that promote direct sales and the shortening of the value chain.
- Development of hydraulic infrastructure that mitigates the effects of drought.

7.2.4. Threats

- Summer droughts, soil erosion, and high climate vulnerability.
- Volatility of international prices for raw materials.
- Perceived uncertainty in incentives.
- Weak domestic organic consumption and pressure from imports.
- An increase in the perception that competition is unfair.

7.3 SWOT Analysis for Spain

7.3.1. Strengths

- EU leader in total organic area (2.99 million ha).
- Potent and diversified agri-industrial and export structure (horticulture, olive, wine, pork).
- Dynamic domestic organic market.
- Leadership in localized irrigation and sensor technology.

- Land consolidation in Spain, while not implemented nationwide, enjoys good popularity and has successfully created larger farm holdings.
- Established and well-developed cooperative network with a clear perception that cooperatives improve competitiveness.

7.3.2. Weaknesses

- Very pronounced ageing of the rural population.
- Highly insufficient generational renewal, coupled with a high perception of low profitability and a lack of services in rural areas.
- Difficulties in finding labour and a significant need for external agricultural services, which are difficult to hire in some areas.
- Structural duality between technified intensive farms and small family holdings with narrow margins.
- Territorial heterogeneity in policy execution.
- High bureaucratic complexity that drains time and energy from farm managers, diverting them from their core duties.
- Unfair competition and the importation of products that do not comply with the same regulations as Spanish producers.

7.3.3. Opportunities

- Differentiation based on quality, origin, and sustainability.
- Expansion of efficient irrigation models.
- Access to new markets for the sale of high-quality organic products.
- Providing consumers with more information about meat production systems (labels, certifications...) to enable extensive livestock farmers, who represent a very significant part of the total in Spain, to differentiate themselves.
- Development of laws and programs that promote direct sales and the shortening of the value chain.

7.3.4. Threats

- Water stress and high risk of desertification, especially in the southeast.
- Pressure from energy and input costs.
- International competition in price-sensitive segments.
- Increasing regulatory demands that may strain small and medium enterprises without adequate support.

- Increase in difficulties for hiring labour and contracting service companies.

7.4 SWOT Analysis for Ireland

7.4.1. Strengths

- Highly competitive and export-oriented dairy and beef sector.
- Stable and homogeneous political framework; well-implemented eco-schemes.
- Adequate machinery fleet and widespread access to mechanisation via contractors.
- Advanced digitalization in dairy chains; a professional base with relatively better generational continuity.
- Larger and more consolidated farms.
- Low intensity of soil problems (especially O.M. content).

7.4.2. Weaknesses

- Low female representation in farm management.
- Dependence on external markets and exposure to demand cycles.
- High land rental costs that increase the cost of the land base.
- Insufficient generational renewal, according to the surveyed farmers, due to a lack of profitability.
- Difficulties in accessing labour

7.4.3. Opportunities

- Development of high-value extensive/pastoral organic livestock.
- Opportunities in premium traceability and certifications.
- Diversification into higher-value-added organic dairy (like cheese) and meat products.
- Implementation of new technologies, such as the use of drones, GPS collars, virtual fencing, and others, to reduce workload and make livestock farming more attractive.

7.4.4. Threats

- Pressure on emissions (methane, nitrates) and risk of stricter regulations.
- Volatility of international prices.

- Extreme weather events and degradation of peatlands.
- Increases in land and energy costs.

7.5 SWOT Analysis for Lithuania

7.5.1. Strengths

- Significant modernization in cereals and dairy.
- Improvement of machinery fleets in recent years and growing digitalization.
- Comparatively higher female participation (though declining in youth).

7.5.2. Weaknesses

- Low profitability on small holdings.
- Recent sharp increase in land rentals.
- Limited cooperative culture.
- Rural outmigration and ageing.
- Difficulty in finding labour and contracting third-party services.
- Adoption of precision technology restricted by financing and training.
- Significant presence of soil problems (acidification, degradation of drained peat/organic soils, excess soil moisture linked to insufficient or deteriorating drainage systems).

7.5.3. Opportunities

- CAP investment programs for scaling up precision and soil management.
- Potential in organic rotation crops and valorization of restored peatlands.
- Gradual expansion of the domestic market.

7.5.4. Threats

- Increase in production costs.
- Reduced domestic organic consumption.
- Potential competitive pressure from imports and conventional producers.
- High cost of machinery and financing difficulties for investments
- Insufficient generational renewal, according to surveyed farmers constrained by profitability, urban attraction, rural services, and opportunities for women.

7.6 SWOT Analysis for Poland

7.6.1. Strengths

- Leading EU dairy and poultry sectors with a dynamic export base.
- A network of rural communities that sustains activity.
- A large, though ageing, machinery fleet with an inertia of modernization.
- Experience in fruit growing and sugar beet cultivation.
- Laws that facilitate direct sales, such as Rolniczy Handel Detaliczny (RHD).

7.6.2. Weaknesses

- High fragmentation and small scale of farms.
- Aged and low-power machinery fleet; weak rural digital connectivity.
- Obsolete cooperative framework and cultural resistance to Producer Organisations.
- Widening gender gap among the youth.
- Insufficient generational renewal
- Unfair competition and the importation of products from non EU countries that do not comply with the same regulations as European producers.

7.6.3. Opportunities

- Gradual expansion of the domestic market.
- Investment programs for renewal and digitalization.
- Differentiation in organic fruit growing and processed products.

7.6.4. Threats

- Alternating floods and droughts; water pollution and soil degradation risks.
- Rising costs and input volatility.
- Very low domestic organic consumption (0.57% market share).
- Perceived administrative uncertainty and regulatory inertia slowing cooperative projects.

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	Strengths	Weaknesses	Opportunities	Threats
C o m m o n A n a l y s i s	• Established Agricultural Base • EU CAP Support • Trusted Regulatory Framework • Investment in R&D and knowledge transfer • Positive farmer attitude towards technology • Existing digitalization baseline	• Ageing Farmer Population • Small-Scale Fragmentation • Low Profitability • Uneven Technology Adoption • Weak development of Producer Organisations • Persistent Gender Gap • Elevated bureaucratic complexity • Soil-related problems • Unfair competition and the importation of products that do not comply with European regulations	• Growing Consumer Demand • Efficiency Through Technology • Development of short supply chains and direct sales. • Land consolidation programs • Implementation of new technologies • Using the CAP and national frameworks as levers for change.	• Input Cost Volatility • Rising Land Costs • Stagnant Domestic Markets • Climate risks • Impacts Policy Uncertainty • Risk of abandonment (or failure to consolidate) of organic production • Costly access to technology
B U L G A R I A	• Extensive Crop Experience • Partial Modernization of machinery fleet • Livestock Reconversion Potential • Organic Label Recognition	• Aged Structure dependence • Small-Scale Dominance • Contained profitability • Subsidy Dependence • Technology Gap • Extreme difficulty in finding labour • Highly fragmented land structure • High bureaucratic complexity • Low penetration of agricultural insurance • Underdeveloped Producer Groups	• CAP Investment Levers • Extensive Livestock Potential • Valorizing Rotations • Development of laws and programs that promote direct sales • Development of hydraulic infrastructure	• Droughts & Erosion • International Price Volatility • Unstable Incentives • Weak Domestic Consumption • An increase in the perception of unfair competition

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S P A I N	• EU Organic Leader • Diversified Export Powerhouse • Dynamic Domestic Market • Irrigation Technology Leadership • Land Consolidation Success • Strong Cooperative Network	• Severe Ageing • Scarcity of labour • Territorial Heterogeneity • Structural Duality • Uneven Execution • Labour & Service Shortage • Unfair Import Competition	• Quality Differentiation • Efficient Irrigation Expansion • Growing Exports • Direct Sales & Short Chain Laws • Meat Production Labeling • Regulations	• Droughts & Erosion • Cost Pressures technology • International Competition • Regulatory Burden • Desertification Risk
I R E L A N D	• Competitive Livestock Exports • Stable Policy Framework • Strong Mechanisation • Advanced Digitalization • Contractor Network Efficiency • Well-implemented Eco-schemes • Low Organic Matter Problems	• Low Female Representation • Export Market Dependence • High Land Costs • Drones, GPS & Virtual Fencing • High-value Dairy (Cheese)	• Premium Organic Livestock • Efficiency Technologies • Traceability Opportunities • Product Diversification • Peatland Degradation • Nitrates/Water Quality Regulations	• Emissions Pressure • Price Volatility • Extreme Weather • Rising Costs
L I T H U A N I A	• Sector Modernization • Modern Professional Fleets • Higher Female Participation	• Low Smallholder Profitability • Rising land rental costs • Soil Degradation (Peat/Acidification) • Service Contracting Difficulty • Limited Cooperation • Rural Outmigration	• Precision Farming Scale-Up • Organic Crop Potential • Expansion of domestic market • Restored Peatlands Valorization • Joint Marketing	• High Production Costs • Low Domestic Consumption • Import Pressure • Machinery Cost
P O L A N D	• Leading Dairy & Poultry • Strong Rural Communities • Modernization Inertia • Horticultural Experience • RHD Law (Direct Sales)	• High Farm Fragmentation • Aged Machinery Fleet • Obsolete Cooperative Framework • Widening Gender Gap • Unfair Non-EU Competition • Low-Power Machinery	• Renewal & Digitalization Investment • Gaining Commercial Scale • Fruit Sector Differentiation	• Flood-Drought Alternation • Input Cost Volatility • Minimal Organic Consumption • Administrative Inertia

Table 2: A SWOT analysis summarizing the most relevant points for each country (BG, ES, IE, LT, PL) and their commonalities.

8. STRATEGIC PRIORITIES FOR IMPROVING COMPETITIVENESS

8.1 Key Improvement Areas Identified on the Farms

The analysis of the surveyed farms across the five participating countries reveals several common and critical areas requiring targeted interventions to enhance the competitiveness and sustainability of organic holdings:

8.1.1. Business Management & Economic Viability

There is a widespread lack of advanced business planning, cost-control mechanisms, and financial management skills. Many farmers face persistent profitability challenges and remain highly dependent on subsidies, lacking effective strategies to increase value capture, improve cash flow, and strengthen their long-term economic resilience.

8.1.2. Technical & Agronomic Knowledge

Significant knowledge gaps persist in organic agronomy, particularly in the management of pests and diseases, maintenance of soil fertility without synthetic inputs, and the design of efficient crop rotations and mixed farming systems adapted to local agroecological conditions.

8.1.3. Marketing & Value Chain Integration

Farmers often demonstrate limited capacity for direct marketing, collective sales, and product differentiation. Weak market linkages and limited negotiation power restrict access to premium markets and reduce their ability to capture added value. Strengthening local processing and marketing networks is essential to improve farmers' position within the value chain.

8.1.4. Technological & Digital Adoption

A considerable digital divide remains across farms, although with differences between countries. Adoption of precision agriculture and digital tools (e.g., farm management software, sensors, variable-rate technologies) is still limited due to perceived high costs, lack of evidence of their benefits, and insufficient digital literacy among farmers and advisors.

8.1.4. Cooperative Governance & Collective Action

Existing cooperatives and producer organisations frequently face weaknesses in internal governance, professional management, and strategic vision. These issues constrain their ability to aggregate supply, reduce costs, and strengthen members' market power. Reinforcing leadership, transparency, and

professionalization within cooperatives is a key step toward improved competitiveness.

There may be significant room for improvement in the management of cooperatives to enhance the competitiveness of farmer members, especially in Eastern European countries.

8.1.5. Strategic Planning & Generational Renewal

A critical challenge is the lack of succession planning and the low attractiveness of farming for young people and new entrants. Without active strategies for generational renewal and improved working conditions, the demographic imbalance will continue to threaten the long-term sustainability of the sector.

8.1.6. Labor Shortage Mitigation through Technology

The severe difficulty in finding labor is a cross-cutting structural weakness identified across all hubs. To address this, the strategy must focus on adopting technologies that specifically facilitate farming activities and reduce physical workload. The integration of automation and digital tools should be prioritized not only for yield efficiency but as a critical adaptation strategy to cope with the demographic crisis and workforce scarcity.

8.1.7. Water Management

The surveys revealed the need for large-scale water infrastructure (reservoirs, ponds, and efficient irrigation systems) in almost all countries (BG, ES, LT, PL) due to recurrent problems with drought or drainage. To enhance competitiveness, training must focus on advanced water management practices. This includes maximizing soil water retention, implementing water-saving techniques, and selecting the most beneficial agronomic practices to effectively manage water availability and minimize climate risks for the farms.

8.2 General Action Themes for OH-FINE activities

The following directions of future actions are proposed to guide the design of the activities planned within the framework of the OH-FINE project (training, workshops, field trials, collaborations, creation of networks and hubs, etc.).

While these action themes are derived from the Analysis of the Economic Competitiveness of Organic Agribusiness in the case studies, they are integrated into the broader strategic framework of the project. This framework also incorporates the complementary findings from the OH-FINE Knowledge Needs survey and the AKIS Analysis, which identify action themes from the perspectives of technical training requirements and innovation system dynamics, respectively. The findings of all 3 analyses will help to shape the actions within the project.

Specifically, the economic competitiveness analysis (and especially the survey) contributes by proposing the actions listed in the following sections:

8.2.1. Strengthening Business Competence and Economic Resilience

In order to improve the competitiveness of farms, it is essential to have a good understanding of the expenses incurred by farms, their income, and various key indicators for improving farm profitability. It is advisable to:

- Develop training modules on farm business planning, accounting, and cost-benefit analysis tailored to organic systems.
- Promote the use of financial management tools and benchmarking indicators to support evidence-based decision-making. Digital tools can help producers in the day-to-day management of the farm, as well as in managing the legal requirements of organic production.
- Encourage the integration of diversification strategies to enhance profitability and reduce dependency on subsidies.
- It is advisable to analyse the cost-benefit ratio of agricultural insurance, especially considering the current climate change scenario.
- The reduction in yields is perceived as a significant problem, especially in Poland. It is advisable to closely monitor other projects aimed at reducing the difference in yields between conventional and organic farming.
- Strategies for efficient management of bureaucracy: Since bureaucratic complexity is considered high in all countries, training should include practical strategies for managing administrative burdens. This involves promoting digital tools that are useful in reducing administrative workload and in the optimal management of the digital notebook and other tools already used by many farmers.

8.2.2. Improving Marketing Skills and Value Chain Integration

There is interest among organic farmers (with the exception of Poland, where interest is moderate), in opening new markets. The interest in selling directly to the final consumer is high in all countries (except for Lithuania, where there is more moderate interest). It is advisable:

- Explore different avenues and learn about successful experiences that have been carried out and can serve as inspiration, both nationally and in other countries.
- Provide practical training in branding, market analysis, and contract negotiation to improve farmers' market positioning. Design actions to improve knowledge of marketing and adapting supply to demand in order to achieve a higher price for organic products (In Lithuania, Poland and Ireland for example, respondents report that the price difference between conventional and organic products is currently low).
- Support the creation of collective marketing initiatives and short supply chains that enhance value capture for producers.

- Associationism is key to grouping supply, increasing bargaining power and improving access to new markets. Therefore, it is recommended to include seminars on the different forms of associationism and the advantages of this associationism in training activities and/or workshops, especially in Bulgaria, Polonia and Lithuania.
- Promote the development of value-added products (processing, labeling, certification) to access premium and export markets.

8.2.3. Reinforcing Producers' Associations Governance and Collective Action

In Bulgaria, Lithuania and Poland, participants' feeling regarding cooperatives is that they are not contributing enough or to a large extent to improving the competitiveness of the farms. In Ireland, membership of a cooperative is not high. Therefore, it is considered essential to make an effort to include the associations' technicians and managers in the training and networking activities of the OH-FINE project. It is strongly recommended not only to include ecological associations, but also conventional ones, so that they can acquire knowledge about ecological production and the advantages it offers their members and improve their management skills.

In Spain, however, the role of these associations is more highly valued.

The following actions are recommended:

- Bulgaria, Lithuania and Poland: Include producers' associations (e.g. cooperatives) managers, technicians and board members in the training and capacity activities of the project, as well as in the knowledge exchange network created in OH-FINE. Training activities for advisers may include aspects related to governance, strategic planning, and financial control. In this way, they can increase their knowledge and improve their competitiveness.
- Publicise successful experiences of different types of associationism and their advantages and share experiences between countries on the management and organisation of cooperatives, so that those that are most highly valued (Spain) can share their management system, how they have dealt with potential problems, how they have opened up new markets, etc. with other countries (Bulgaria, Lithuania, Poland).
- In Spain, although most producers believe that being part of an association improves the competitiveness of their farms, reflecting their satisfaction with how they are managed, it may be advisable to invite association technicians to participate in the OH-FINE network and in the planned training courses and workshops, so that they can continue to improve their services and access to new markets with the help of experts. It would be advisable also in Ireland.
- Encourage the creation and consolidation of producer groups and inter-association networks to enhance bargaining power and reduce transaction costs.

8.2.4. Accelerating Technological and Digital Adoption

- In terms of technologies and machinery, it is advisable to show producers and advisors the main options available to them and how they work, possible sources of funding and grants, and provide them with a clear cost-benefit analysis of each one, so that they can make more informed investment decisions.
- In Spain and Ireland, some farmers are more familiar with certain technologies. It may be advisable to include a session related to technologies, in which producers share their experiences and potential opportunities that are currently not being exploited can be identified.
- In Spain and Ireland some farmers indicate that the machines or tools do not fit the type of farm or crops they have. It is worth exploring this issue further to see if there is a possible solution on the market, foster collaboration with agri-tech providers to adapt existing digital solutions to organic and small-scale contexts or even explore the possibility of promoting a project that attempts to solve these problems.
- In the case of technologies and machinery where it would be appropriate to see how they work in the field, field demonstrations could be combined with demonstrations in collaboration with companies, where appropriate, or they could be shown in the meetings between producers (if any of these producers use a specific technology or machinery and can demonstrate to the rest how it works) or in the training activities.
- Implement capacity-building programs focused on digital literacy, data interpretation, and technology cost-benefit assessment.

8.2.5. Enhancing Technical and Agronomic Knowledge

There are common issues of interest to producers in all countries. By country, it would be advisable to improve training for producers and advisors on the following topics:

- Bulgaria:
 - Improve water collection and retention in the soil, as this is perceived as the most limiting input.
 - Fertilization strategies that improve soil fertility and increase organic matter content while minimizing environmental impact. Also, how to prevent soil compaction.
 - Crop protection: reinforce integrated and organic-compatible approaches for pest and disease management, including monitoring, prevention and decision-making tools.
 - How to improve the access to and management of organic seeds
 - How to make high-quality compost and manure.

- Livestock farming: provide knowledge on how to optimally manage grazing resources and feed planning to strengthen farm resilience and reduce dependency on external feed where relevant.
- Spain:
 - Fertilization strategies that improve soil fertility and increase organic matter content while minimizing environmental impact. Also, how to prevent soil compaction.
 - Improve water collection and retention in the soil, and broader water-management planning, alongside adaptation practices
 - Crop protection: reinforce integrated and organic-compatible approaches for pest and disease management, including monitoring, prevention and decision-making tools.
 - Given that there are many differences between livestock farmers in terms of feeding, it may be a good idea to discuss this in group activities, so that the knowledge and experience of some producers can help others and, in addition, possible common training needs in this area can be identified.
- Ireland:
 - Integrated strategies for pest and diseases management and best practices for producing high-quality compost and manure. The perception as a group of these aspects as a problem is moderate. However, it would be advisable to take into account the diversity of farms, with a view to developing specific training modules for those producers who are interested in any of these topics but which are not of interest to the group as a whole, given that they have other production orientations.
 - It is worth studying from a technical point of view whether there are any aspects of production that could be negatively affected by climate change in the future and, if so, whether there are any adaptation practices that should be disseminated.
- Lithuania:
 - Fertilization strategies that improve soil fertility and increase organic matter content while minimizing environmental impact.
 - Crop protection: reinforce integrated and organic-compatible approaches for pest and disease management, including monitoring, prevention and decision-making tools.
 - Water management with emphasis on drainage planning and practices, given the widespread concern about drainage needs.
 - How to improve the access to and management of organic seeds
- Poland:
 - Water management: Strengthen knowledge on water-risk management, including water collection and retention in the soil and drainage-oriented

approaches when relevant, given the high climate impact and the reported need for both drainage and retention infrastructures.

- Fertilization strategies that improve soil fertility and increase organic matter content while minimizing environmental impact.
- In the field of livestock farming, it is important to provide knowledge on how to optimally manage grazing resources in order to optimize own resources and minimize the farm's dependence on external feed.
- Crop protection: Advanced, integrated pest and disease management training (prevention, resistant varieties, rotation design, monitoring and thresholds).

In some cases, knowledge sharing among producers could be very useful. For example, in Spain, Poland and Bulgaria with a view to training producers in pest and disease management, it is important that organic producers share their experience with conventional and in conversion producers.

It is advisable to seek cooperation with other projects that are working on these issues.

8.2.6. Integrate regional and local policy makers into the networks created in the project

In general, there is a lack of awareness about the measures implemented at regional and local level that promotes organic production (e.g. grants to encourage certain practices, to promote short marketing channels or the consumption of organic products in public institutions, etc.).

This means that either they do not exist or they are not sufficiently known or appreciated by producers.

It is recommended to try to integrate regional and local policy makers into the knowledge network created and into the activities planned by OH-FINE. This will enable policy makers to gain a better understanding of the organic sector, the advantages it offers to society in economic, social and environmental terms, its potential, and the problems and limitations it faces.

This will facilitate the design and implementation of measures that can benefit the organic sector and allow producers' experience and knowledge to be taken into account in the design of the measures to be implemented.

Beyond the role that policies and support from policy makers may play, there are other issues that can affect the profitability of all types of farms, including organic ones. With regard to policy recommendations, it is worth exploring some issues that have been raised in the surveys.

➤ Bulgaria:

- Duration of rural leases, as if they are too short, this can pose a problem for producers converting to organic farming
- Requirements of environmentally protected areas: there are practices that producers perceive as harmful and risky for their farms, such as the

ban on mowing pastures until well into the summer. It is advisable to promote a study of the possible positive and negative impacts that the measure may have, in order to justify it in a reasoned manner to producers, or to modify these measures or maybe compensate producers if it is shown that the negative impacts may outweigh the positive ones.

➤ Lithuania:

- There is widespread concern about the need for drainage systems. Given that drainage works on one property can affect others, it is advisable to consider making policy recommendations in this area, so that public authorities can draw up local drainage plans.

➤ Poland:

- There is widespread concern about the need for drainage systems. Given that drainage works on one property can affect others, it is advisable to consider making policy recommendations in this area, so that public authorities can draw up local drainage plans.
- Requirements of environmentally protected areas: there are practices that producers perceive as negative for their farms. It is advisable to promote a study of the possible positive and negative impacts that the measures may have, in order to justify it in a reasoned manner to producers, or to modify these measures or maybe compensate producers if it is shown that the negative impacts may outweigh the positive ones.

➤ Spain:

- Most producers do not identify any policies aimed at shortening the value chain. One producer indicates that measures exist (e.g. mobile slaughterhouses) but that they are very difficult to implement. This may be an issue to be analysed within the project network in order to assess whether it is advisable to make recommendations to the competent authorities to facilitate the implementation of these policies without compromising health guarantees. Knowledge sharing between countries can be beneficial.
- Requirements of environmentally protected areas: there are practices that producers perceive as negative for their farms. It is advisable to include policy makers in the network to facilitate knowledge exchange so that they can justify these measures in a reasoned manner to producers, or to modify these measures or maybe compensate producers if it is shown that the negative impacts may outweigh the positive ones.

➤ Ireland:

- Requirements of environmentally protected areas: answers are unclear regarding producers' perception of these measures. It could be advisable to include policy makers in the network to facilitate knowledge exchange so that they can justify these measures in a reasoned manner to producers, or to modify these measures or maybe compensate

producers if it is shown that the negative impacts may outweigh the positive ones.

8.2.7. Fostering Generational Renewal

Generational renewal is a problem at European level. One of the causes cited is the low competitiveness of the agricultural sector. In this regard, organic production and the knowledge exchange networks created in the project can be ways to promote greater competitiveness among farms.

It is advisable:

- Highlight success stories that present farming as a viable, innovative, and socially valuable career path. Organic farmers can play a key role as role models in encouraging other producers (especially in Bulgaria and Spain) to convert to organic farming, so it can be very valuable for them to participate by sharing their experience in activities open to the public, such as workshops.
- Integrate young people in the project's networks and activities.
- Include intergenerational knowledge transfer activities within workshops to ensure continuity and revitalization of rural communities.
- Seek the support of public administrations in order to maintain these networks in the long term and possibly establish programmes that promote the increase of young people's knowledge (e.g. mentoring and entrepreneurship programmes).
- Exchange knowledge between different countries on initiatives that promote the incorporation of young people and women into the agricultural sector and can be promoted in some way (talks, platform, policy recommendations, etc.) in the project.

8.3 Key Findings by Country (BG, ES, IE, LT, PL)

Bulgaria

Bulgaria's organic sector is the most volatile and vulnerable among the five. Its growth is almost entirely policy-driven rather than market-driven, leading to significant boom-and-bust cycles tied to subsidy availability (e.g., the sharp decline post-2016). The sector is characterized by a "raw material trap", exporting bulk organic cereals and oilseeds only to re-import finished products, capturing minimal value. While there is potential in niche sectors like organic beekeeping and rose oil, the overarching challenges of an ageing workforce, deep-seated distrust in cooperatives, and climate vulnerability (droughts, erosion) make its transition to a resilient, market-oriented organic sector the most precarious.

Spain

Spain is an organic production giant with a critical weakness: a lack of strategic coordination. It leads the EU in organic area thanks to a powerful, export-oriented agri-industrial sector and a mature cooperative system. However, this success is not underpinned by a binding national target, leading to a patchwork of regional policies and a reactive rather than strategic growth model. Its most significant long-term threat is the worst generational renewal crisis in the study (only 3.9% of farm managers under 34), which jeopardizes the entire sector's future. Spain must leverage its technological prowess in irrigation and its strong market position to create a cohesive national strategy that addresses this demographic time bomb.

Ireland

Ireland presents the most defined structural contradiction. It possesses a highly efficient, export-focused livestock sector, a stable policy framework, and advanced digitalization. However, this very model—based on intensive pasture production—is fundamentally at odds with the environmental targets of the EU Green Deal and the principles of organic conversion. The high cost of land creates a major barrier to entry. Ireland's strategic challenge is not just adopting organic methods, but fundamentally re-engineering its high-input production system to be less emissive and more ecologically integrated, without sacrificing its hard-won export competitiveness.

Lithuania

Lithuania has successfully modernized its productive capacity but struggles to monetize it. The country demonstrates a clear disconnect between input and output competitiveness. It has a relatively modern machinery fleet and a decent share of organic land, but it suffers from one of the lowest levels of domestic market development and poor value-chain integration. This results in organic production being a structural potential rather than an economic driver. The opportunity lies in using its well-administered systems and EU funds to aggressively build cooperative marketing structures and stimulate local demand, thereby closing the profitability gap that currently limits the sector's appeal.

Poland

Poland is a tale of two agricultures: a highly competitive, export-oriented dairy and poultry sector coexists with a sea of small, fragmented, and technologically lagging family farms. This duality is the core of its organic challenge. The dramatic post-2014 decline in organic area highlights a sector highly sensitive to policy instability and a lack of farmer trust. The outdated cooperative framework and a lingering cultural aversion to collectivization prevent smallholders from achieving the scale needed to compete. Poland's path forward depends on

creating stable, long-term policies and modernizing its institutional infrastructure to build trust and enable its vast number of small farms to participate profitably in the organic value chain.

8.4 Conclusions

The analysis conducted in Deliverable 2.4 provides an integrated overview of the economic competitiveness of organic agribusiness across five European countries—Bulgaria, Spain, Ireland, Lithuania, and Poland.

By combining quantitative indicators with farmer-level surveys and contextual PESTLE and SWOT assessments, the study offers a comprehensive picture of both the internal and external factors shaping the performance of organic farms within the OH-FINE network.

The findings confirm that, despite the diversity of national contexts, the organic sector in all participating countries faces a common set of structural and managerial challenges. These include limited business and financial planning capacity, low profitability, insufficient integration into value chains, and persistent demographic and technological gaps. The dependence on public support schemes, particularly CAP subsidies, remains high which reduces resilience to policy changes.

At the same time, the analysis reveals considerable potential for competitiveness improvement. Organic farmers demonstrate a strong environmental commitment, an openness to innovation, and growing awareness of market opportunities linked to sustainability, traceability, and local quality. Where well-established cooperative networks exist, particularly in countries such as Spain and Ireland, they represent strategic assets that could be further strengthened and leveraged to accelerate this transformation.

From a technical standpoint, the results highlight the need for a new generation of training and support services capable of combining agronomic innovation with business intelligence. Strengthening the link between research and practice through demonstration farms, knowledge hubs, and farmer-to-farmer learning, will be essential to disseminate solutions in areas such as biological pest control, soil fertility management, and digital monitoring. Equally important is fostering the adoption of technologies compatible with organic principles, ensuring that digitalization becomes an enabler rather than a barrier to inclusion.

Demographic renewal emerges as a cross-cutting priority. The ageing of the farming population and the limited attractiveness of agriculture for younger generations threaten the long-term sustainability of rural areas. Addressing this issue requires not only targeted incentives and training but also a cultural shift, reframing farming as a modern, innovative, and impactful profession connected to the green transition and rural well-being.

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At policy level, the findings call for a more holistic approach to competitiveness, one that integrates economic, environmental, and social dimensions. Public support should promote innovation, cooperation, and market participation. Strengthening local value chains, cooperative governance, and digital infrastructure will be critical to ensuring that organic and regenerative models become both economically viable and socially inclusive.

Finally, Deliverable 2.4 provides an empirical foundation for the next stages of the OH-FINE project. The key improvement areas identified herein should inform the design of the activities under subsequent Work Packages. By translating diagnostic insights into concrete actions, OH-FINE can contribute to building a more competitive, resilient, and equitable organic farming sector in Europe.

9. ANNEXES

9.1 OFISET Questionnaire

Political Framework

1. How influential are public policies (local, national or EU) on your farming activity?

(1: No impact - 5: Very influential)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

2. How do you evaluate the effect of the Common Agricultural Policy on your agricultural activity?

(1: Very negative - 5: Very positive)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

3. How do you evaluate the effect of agricultural policies implemented by regional and local public administrations on your agricultural activity?

(1: Very negative - 5: Very positive)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

4. Have any local or regional policies had a notably positive effect on your farm? If so, could you please specify which one?

☐ Yes / ☐ No

[Space to answer]

5. Do you think you compete under equal conditions with other producers?

(1: Not at all - 5: Completely)

Within the EU: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Outside the EU: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

6. Would you like to access new markets?

(1: Not interested - 5: Very interested)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

7. If you are interested, please indicate which markets:

Economic Factors

8. How is the land you currently farm accessed or managed?

- ☐ I own most of it
- ☐ I rent most of it
- ☐ A mix of owned and rented land
- ☐ I farm land through family or informal arrangements
- ☐ Other (please specify):

9. If you own land, how did you come to farm it?

- ☐ Through family inheritance or gifts
- ☐ Through a land purchase or investment
- ☐ Through government or public programs
- ☐ Other (please specify):

10. Regarding rented land: how was it acquired?

- ☐ Municipal land auction (___% of rented land)
- ☐ Private contract (___%)
- ☐ Other (specify):

11. What are the average land sale prices (€/ha) in your area?

- ☐ Dryland

[Space to answer]

- ☐ Irrigated

[Space to answer]

- ☐ Grasslands

[Space to answer]

- ☐ Pastures

[Space to answer]

12. What are the average land rental prices (€/ha) in your area?

- ☐ Dryland

[Space to answer]

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☐ Irrigated

[Space to answer]

☐ Grasslands

[Space to answer]

☐ Pastures

[Space to answer]

13. Which input most limits your competitiveness?

☐ Fertilizers

☐ Seeds

☐ Pesticides

☐ Labour

☐ Energy

☐ Water

☐ Transport and logistics

☐ Technology and machinery

☐ Other (specify):

14. How accessible is financing or state support for your farming activity?

(1: Not accessible - 5: Very accessible)

[] 1 [] 2 [] 3 [] 4 [] 5

15. If you received an incentive to convert to organic during the first year, would you be willing to do so?

(1: Not willing - 5: Very willing)

[] 1 [] 2 [] 3 [] 4 [] 5

16. Do you think the length of the value chain is appropriate?

(1: Not at all - 5: Very much)

[] 1 [] 2 [] 3 [] 4 [] 5

17. Would you like to sell directly to final consumers?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

18. Are you aware of any EU or national policies aimed at shortening the value chain? If so, could you please specify?

☐ Yes ☐ No [Space to answer]

19. Is it easy to find labour?

(1: Not at all - 5: Very easy)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

20. Is it easy to find service companies to carry out the agricultural tasks?

(1: Not at all - 5: Very easy)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

21. Are you part of any cooperative or producer group?

☐ Yes / ☐ No

22. Has this improved your competitiveness?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Agronomic Factors

23. How problematic are the following soil-related issues on your farm?

(1: Not problematic - 5: Very problematic)

Organic matter deficiency: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Salinity: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Soil compaction: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Nutrient status: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

24. How difficult is it to manage pests and diseases in your crops?

(1: Easy - 5: Very difficult)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

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25. If switching to organic farming, do you think you could manage pests and diseases adequately?

(1: Easy - 5: Very difficult)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

26. To what extent does your farm depend on external financing (e.g., loans)?

(1: Not dependent - 5: Fully dependent)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Legal Factors

27. How complex is the bureaucracy for obtaining subsidies or meeting legal requirements?

(1: Not complex - 5: Very complex)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Technological Factors

28. How accessible are advanced technologies (automatic irrigation, livestock monitoring, variable-rate fertilization, etc.)?

(1: Not accessible - 5: Very accessible)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

29. How beneficial would new technologies be to improve your yields and product quality?

(1: Not beneficial - 5: Very beneficial)

Yields: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Quality: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

30. How difficult would it be to mechanize tasks for which you currently hire labour?

(1: Not difficult - 5: Very difficult)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

31. Which factors make mechanisation more difficult?

☐ Limited knowledge or training to use machines (technological skills)

☐ Poor access to machinery or tools

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- ☐ High cost of machinery or equipment
- ☐ Machines or tools don't fit the type of farm or crops
- ☐ Fear of / reluctance to adopt new technologies

32. If you haven't mechanized due to cost, what's the main barrier?

- ☐ Initial investment
- ☐ Maintenance

33. Do you use digital tools to manage your farm?

- ☐ Yes / ☐ No

Which ones?

(For example: farm management apps, GPS-guided tractors, soil moisture sensors, drones for crop monitoring, automated irrigation systems, mobile apps for weather or pest alerts, GPS tracking collars for livestock, digital notebooks or spreadsheets for planning and record-keeping)

Environmental Factors

34. Has climate change negatively impacted your farm?

(1: Not at all - 5: A lot)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

35. How useful would additional measures be to mitigate the environmental impact of your activity?

(1: Not useful - 5: Very useful)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

36. What about infrastructure improvements (drainage, storage ponds, irrigation canals, water plans)?

(1: Not useful - 5: Very useful)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

37. Which of those infrastructures is most needed? Do you think it's a common need in the rest of the country?

[Space to answer]

☐ Yes ☐ No

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38. Are any of your plots protected under environmental designations such as Natura 2000 or archeological designations? If yes, which one?

☐ Yes ☐ No [Space to answer]

39. What do you consider the most positive aspect of this protection?

40. Do you consider any aspect of the protection to be negative? Which one?

41. Do you consider the existing environmental protection to be beneficial to your farm?

(1: Not satisfied - 5: Very satisfied)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Social Factors

42. If your neighbors switched to organic, would you consider it too?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

43. Do you think generational renewal in agriculture is sufficient in your community?

(1: Not at all - 5: Absolutely)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

44. Which factor most hinders generational renewal?

- ☐ Lack of profitability
- ☐ Lack of services in rural areas
- ☐ Lack of job opportunities for women
- ☐ Greater attraction to urban life
- ☐ Other (please specify):

45. Have you or someone in your network practiced organic farming and then abandoned it?

- ☐ Yes, myself
- ☐ Yes, someone I know

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☐ No

46. If yes, what were the reasons for quitting?

- ☐ Incentives ended
- ☐ Input limitations
- ☐ Pesticide limitations
- ☐ Lower yields
- ☐ Same prices as conventional products
- ☐ Other (please specify):

Territorial Factors

47. Would your farm be more competitive with better transportation infrastructure in your area?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

48. Is it easy to access your farm?

(1: Not at all - 5: Very easy)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

49. Would improving access routes boost your farm's competitiveness?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

50. Is your farm made up of a single plot or scattered plots?

- ☐ Single plot
- ☐ Scattered plots

51. Would you like a farm consolidation service in your area?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

52. Do you know of any government efforts to consolidate farmland?

- ☐ Yes
- ☐ No

53. If yes, were those efforts successful?

(1: Not at all - 5: Very much)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

9.A. Specific Section - Crop and Mixed Farming Systems

54. Is your production insured?

☐ Yes

☐ No

55. Is it common in your area to have insurance?

☐ Yes

☐ No

56. How many times have you had to use your agricultural insurance in the past 7 years?

57. List the risks you have experienced, ranking them from most to least significant in terms of impact/damage.

58. Do you use herbicides? How many applications per season?

☐ Yes ☐ No

[Space to answer]

59. How many insecticide or fungicide applications do you make?

Insecticides:

Fungicides:

60. What fertilizer do you usually use?

61. Approximate dosage per hectare?

62. What machinery do you use for soil preparation?

63. How many workers do you employ? Are they hired year-round?

9.B. Specific Section - Livestock Farmers and Mixed Farming Systems

64. How many LU does your farm have?

65. Do you operate under an integration system or as an independent farmer?

☐ Integration system

☐ Independent farmer

66. What type of livestock production system do you operate?

☐ Closed-cycle (Breeding, rearing, and fattening all take place on the same farm)

☐ Fattening (Animals are bought at a young age and raised for meat production)

☐ Sale at weaning (Animals are sold shortly after weaning)

☐ Other (please specify):

67. Do you know the average prolificacy of your herd? Please specify:

68. How many veterinary visits per season?

69. Do you know the feed conversion ratio of your animals (kilograms of feed required for the animal to gain one kilogram of body weight)?

70. What type of pasture management system do you use?

☐ Traditional (continuous grazing)

☐ Rotational grazing

☐ Regenerative grazing

☐ Other:

71. Is your farm self-sufficient in animal feed production?

☐ Yes

☐ Partially (%):

☐ No

72. What percentage of the total animal feed comes from external supplementation?

73. What percentage of your total farm expenses is due to external feed supplementation?

74. Do you use antibiotics on your livestock?

☐ No

☐ Yes → If yes, please indicate the purpose(s):

☐ Therapeutic use - To treat diagnosed diseases

☐ Metaphylaxis - To treat a group of animals when one or more are sick and the disease may spread

☐ Prophylaxis - Preventive use in exceptional cases and only under veterinary prescription

☐ Other (please specify): _____

9.2 Tables showing the evolution of the proportion of agricultural holdings by size (Source: own elaboration based on Eurostat data, 2025).

SPAIN	2005	2007	2010	2013	2016	2020	2023
0 ha	1.54	1.33	2.27	2.15	1.92	0.87	1.64
0-2 ha	27.47	26.32	27.31	26.26	25.28	28.73	24.93
2-4.9 ha	24.47	25.17	23.52	24.09	24.37	21.95	22.06
5-9.9 ha	15.28	15.06	14.33	14.59	14.87	14.42	14.44
10-19.9 ha	11.69	11.73	11.21	11.48	11.88	11.32	11.66
20-29.9 ha	5.33	5.67	5.36	5.34	5.31	5.51	5.99
30-49.9 ha	4.99	5.03	5.53	5.55	5.52	5.58	6.06
50-99.9 ha	4.64	4.80	5.30	5.18	5.34	5.52	6.08
100-249.9 ha	3.27	3.47	3.75	3.96	4.03	4.32	5.02
> 250 ha	1.32	1.42	1.42	1.41	1.47	1.78	2.11

BULGARIA	2005	2007	2010	2013	2016	2020	2023
0 ha	2.63	2.27	3.55	3.75	8.23	4.11	5.77
0-2 ha	85.41	84.64	79.62	72.19	64.54	43.13	40.94
2-4.9 ha	7.57	7.96	8.20	10.93	9.98	16.78	14.61
5-9.9 ha	1.95	2.04	2.90	4.28	4.79	9.21	8.26
10-19.9 ha	0.89	1.11	1.84	2.67	3.53	7.39	7.62
20-29.9 ha	0.29	0.39	0.80	1.26	1.94	4.29	4.93
30-49.9 ha	0.25	0.33	0.83	1.34	2.16	5.01	5.73
50-99.9 ha	0.28	0.40	0.79	1.16	1.79	4.32	5.17
100-249.9 ha	0.30	0.37	0.62	1.06	1.35	3.00	3.59
> 250 ha	0.42	0.49	0.86	1.36	1.69	2.75	3.38

IRELAND	2005	2007	2010	2013	2016	2020
0 ha	0.06	0.16	0.09	0.02		
0-2 ha	1.30	1.17	1.58	1.70	1.83	0.98
2-4.9 ha	5.61	5.22	5.28	5.29	5.55	4.68

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5-9.9 ha	13.94	12.66	11.26	11.18	11.65	12.23
10-19.9 ha	22.68	23.77	24.00	24.50	24.40	23.71
20-29.9 ha	16.97	18.79	17.65	17.60	17.66	17.66
30-49.9 ha	21.63	20.52	21.92	21.70	20.89	21.04
50-99.9 ha	14.79	14.21	14.84	14.58	14.44	15.18
100-249.9 ha	2.80	3.27	3.07	3.12	3.26	4.12
> 250 ha	0.23	0.26	0.31	0.30	0.31	0.41

POLAND	2005	2007	2010	2013	2016	2020
0 ha	0.43	0.45	0.53	0.52	0.39	0.32
0-2 ha	48.75	43.76	23.58	22.82	21.22	18.62
2-4.9 ha	21.52	24.27	31.08	31.09	32.72	33.35
5-9.9 ha	14.95	16.29	22.23	21.57	21.71	21.70
10-19.9 ha	9.61	10.01	14.50	14.62	14.34	14.79
20-29.9 ha	2.54	2.69	3.98	4.34	4.31	4.71
30-49.9 ha	1.37	1.55	2.34	2.83	2.86	3.41
50-99.9 ha	0.54	0.66	1.12	1.44	1.59	2.03
100-249.9 ha	0.17	0.20	0.42	0.54	0.63	0.81
> 250 ha	0.12	0.12	0.22	0.23	0.22	0.27

LITHUANIA	2005	2007	2010	2013	2016	2020	2023
0 ha	0.02	0.03	0.13	0.04	0.13	1.28	1.34
0-2 ha	10.46	13.78	16.16	14.12	14.85	18.18	17.27
2-4.9 ha	40.88	46.70	42.43	39.06	35.05	30.70	31.13
5-9.9 ha	26.04	20.15	19.96	22.38	21.80	19.90	19.58
10-19.9 ha	14.33	10.71	10.74	11.68	12.85	12.92	12.85
20-29.9 ha	3.57	3.27	3.32	3.80	4.58	4.66	4.29
30-49.9 ha	2.36	2.36	2.94	3.24	3.57	3.86	4.04
50-99.9 ha	1.36	1.70	2.42	2.97	3.65	4.10	4.55
100-249.9 ha	0.66	0.87	1.32	1.90	2.49	3.07	3.45
> 250 ha	0.31	0.42	0.59	0.83	1.03	1.32	1.50

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