



UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM TIMISOARA

"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH IN APPLIED LIFE SCIENCES"

13-14 November 2025



"Young people and multidisciplinary
research in applied life sciences"

ASSESSING MODERNIZATION AND STRUCTURAL DYNAMICS IN THE VEGETAL SECTOR OF ROMANIA. A COMPARATIVE STUDY WITH THE EUROPEAN UNION COUNTRIES

Gabriel FÎRȚALĂ
Universitatea "Alexandru Ioan Cuza din Iași"

Abstract: The modernization of agriculture represents a key dimension of Romania's economic transformation and convergence within the European Union. This paper analyzes the structural and performance dynamics of the Romanian vegetal agricultural sector during the last two decades, compared to selected EU countries. Using official statistical data provided by the National Institute of Statistics, Eurostat, the study evaluates the evolution of agricultural areas, crop yields, production value, and gross value added in the vegetal subsector. Descriptive and comparative methods were applied to highlight the main structural changes and modernization trends influencing productivity and economic efficiency. The results indicate that, although Romania has maintained a strong position in cereal production, significant gaps persist in mechanization, technological input, and value creation compared to the EU average. The analysis reveals a gradual convergence process supported by investment programs and Common Agricultural Policy measures, contributing to improved structural performance and resource use. The findings underline the ongoing transition of the Romanian vegetal agricultural sector from an extensive production model toward a more competitive and technology-driven structure, illustrating the broader process of agricultural modernization in Eastern Europe.

Key words: modernization, vegetal agriculture, structural transformation, productivity, Romania, European Union.

• Introduction

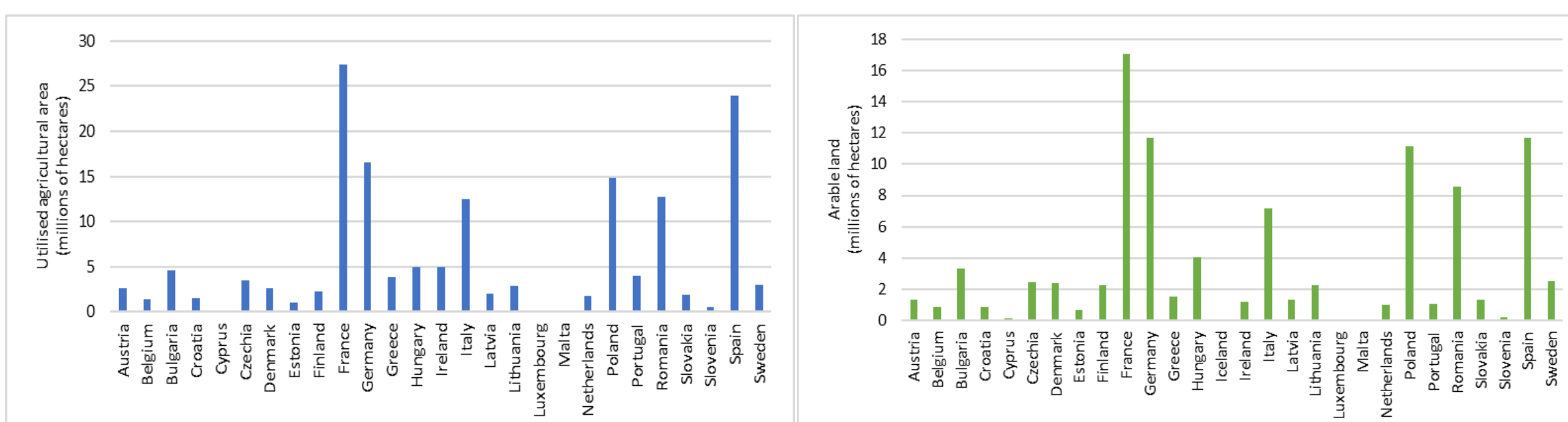
The modernization of agriculture is a key factor for sustainable economic growth and for strengthening competitiveness within the European Union. In Romania, the crop sector has undergone significant structural transformations over the past decades, driven by technological progress, policy reforms, and integration into the European market. This study aims to assess the degree of modernization and the structural dynamics of Romania's crop sector, highlighting its evolution in comparison with other EU member states.

• Material and method

The research is based on a comparative analysis of key technical and economic indicators used to assess the degree of modernization and structural dynamics within Romania's vegetal sector, in relation to the European Union average. The data were sourced from official statistical institutions such as Eurostat and the National Institute of Statistics. The applied methods include descriptive statistical analysis, comparative assessment, and the interpretation of structural and performance trends at both national and European levels. The results provide an integrated overview of Romania's convergence potential and the specific challenges faced by its vegetal agriculture.

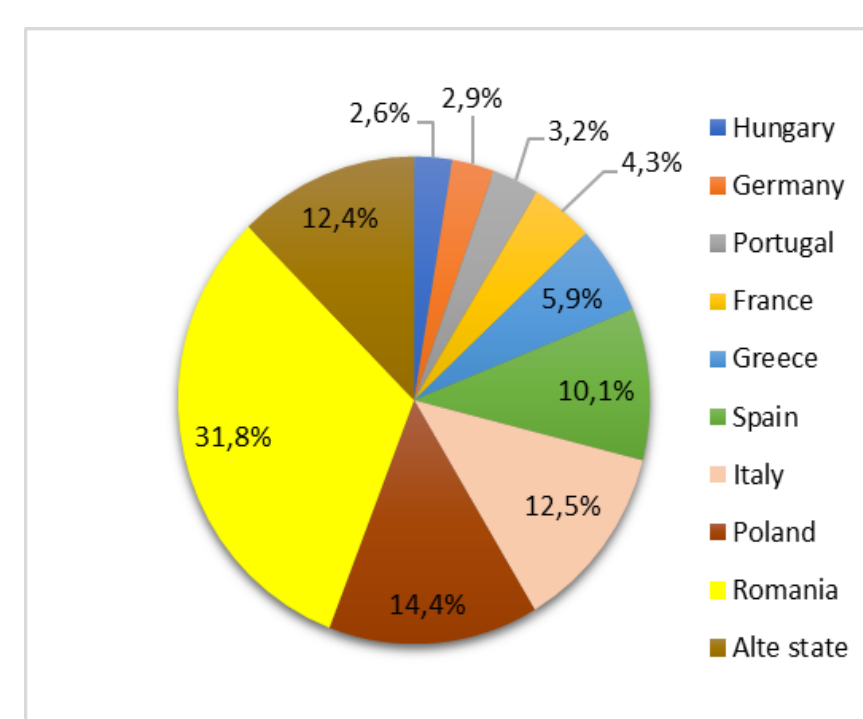
• Results and discussions

Romania ranks among the European Union member states with the largest agricultural areas, holding sixth place at EU level both in terms of utilized agricultural area (around 12.7 million hectares) and arable land (over 8.2 million hectares). According to data from the National Institute of Statistics (Agricultural Census 2020), arable land accounts for 67.2% of the total agricultural area, highlighting the predominantly crop-oriented nature of Romanian agriculture. Although the utilized agricultural area has slightly decreased compared to 2010 (-4.1%), the land structure has improved through the expansion of arable land and the reduction of pastures, thus enhancing the sector's productive potential.

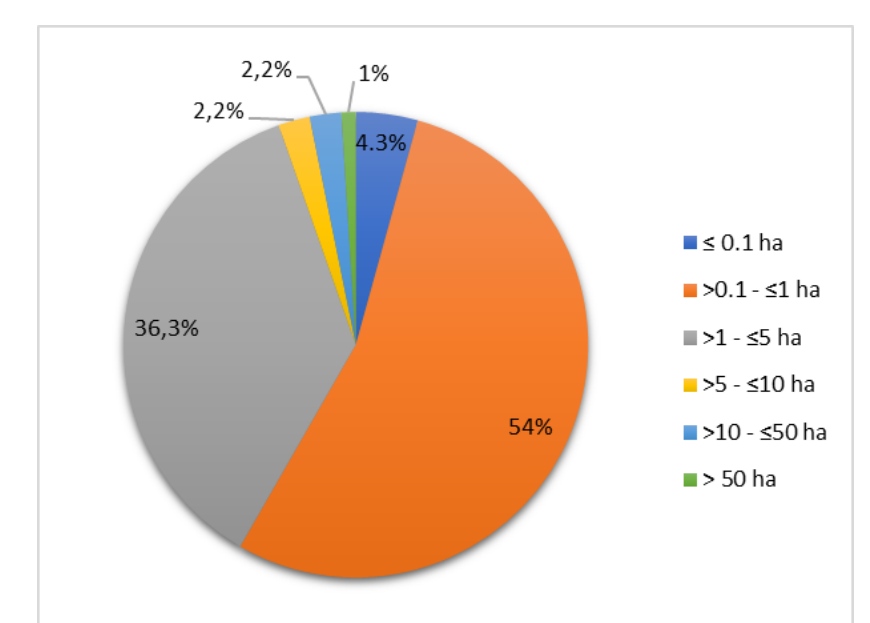


This availability of arable land, combined with fertile soils (such as the chernozems found in the southern, southeastern, and northeastern regions), provides a clear structural advantage for crop production. Moreover, the available agricultural area per capita (approximately 0.41 ha/person) is almost double the EU average (around 0.21 ha/person), indicating a relatively extensive land base in relation to the population size. These factors — the large size of the utilized agricultural area, the high share of arable land, and favorable land conditions — give Romania a competitive potential in the crop sector, both for the production of cereals and oilseeds and for exports in this segment.

Romania has the largest number of agricultural holdings in the European Union — approximately 2.9 million (31.8%). This aspect highlights a high degree of land fragmentation. The vast majority are non-legal entities and small-scale farms, with more than half covering less than one hectare, according to data from the National Institute of Statistics (Agricultural Census 2020).



This polarized structure, dominated by subsistence family farms, limits access to investment, modern technologies, and mechanization. Consequently, although Romania possesses significant agricultural potential, land fragmentation remains the main obstacle to the modernization and improved performance of the crop sector.

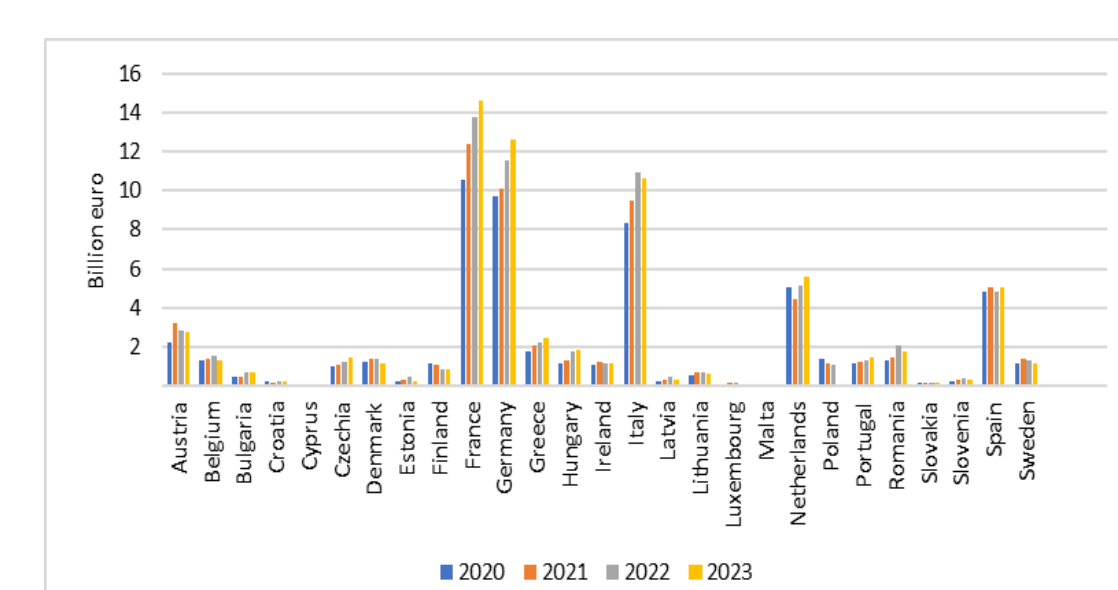


Despite its fragmented agricultural structure, Romania remains one of the EU's leading crop producers. Over the past five years, it has been the EU's top producer of sunflower by surface and production volume and a key maize producer—ranking first in cultivated area and among the top two or three in production. In 2023, maize output rose by 8.8% to about 8.7 million tons after the 2022 drought. Romania also ranks 4th–5th in wheat production (9.2 million tons in 2022) and among the top 6–8 EU producers of barley, contributing significantly to the EU's production recovery in 2023.

Between 2014 and 2024, Romania's average crop yields per hectare fluctuated notably due to climate variability and technological progress. Maize showed the widest range (2.8–7.6 t/ha), reflecting its sensitivity to drought, while wheat yields were relatively stable at about 4.3 t/ha. Barley yields rose slightly to 4.4–4.6 t/ha, and sunflower remained variable (1.2–3.0 t/ha) yet strategically important, with Romania leading the EU in cultivation area. Overall, despite weather-driven fluctuations, Romania's arable land continues to demonstrate strong productive potential, reinforcing its status as a major EU agricultural producer.

Year	Wheat (t/ha)	Maize (t/ha)	Barley (t/ha)	Oat (t/ha)	Rye (t/ha)	Sunflower (t/ha)	Rape (t/ha)	Soybeans (t/ha)	Sugar beet (t/ha)
2014	3.6	4.8	3.6	2.1	2.4	2.2	2.6	2.5	44.7
2015	3.8	3.5	4.0	2.0	2.5	1.8	2.5	2.0	39.1
2016	3.9	4.2	4.3	2.2	2.5	2.0	2.8	2.1	40.6
2017	4.9	6.0	4.7	2.5	2.9	2.9	2.8	2.4	41.6
2018	4.8	7.6	5.1	2.4	2.8	3.0	2.5	2.7	38.0
2019	4.7	6.5	4.7	2.2	2.8	2.8	2.3	2.6	40.4
2020	3.0	4.0	2.9	1.9	2.5	1.9	2.2	1.9	33.7
2021	4.8	5.8	4.8	2.4	2.9	2.5	3.1	2.5	39.9
2022	4.0	3.3	4.4	2.2	2.7	1.9	2.6	1.8	31.7
2023	4.2	4.0	4.3	2.0	2.8	1.9	2.8	2.1	32.4
2024	4.1	2.8	4.4	2.1	2.5	1.2	2.3	2.1	38.2

According to the chart below, Romania's agricultural investments remain among the lowest in the European Union, significantly limiting the modernization and efficiency of the crop sector. Insufficient funding for irrigation, mechanization, research, and green technologies keeps productivity below potential and increases dependence on weather conditions. At the same time, underinvestment constrains the adoption of sustainable practices and access to competitive European value chains. Despite its outstanding land and agroecological resources, Romania's agricultural performance and competitiveness are hindered by persistently low investment levels.



• Conclusions

Overall, the considerable size of Romania's agricultural land, the quality of its chernozem soils, and its climatic diversity provide significant natural advantages for the development of the crop sector. However, realizing this potential depends on accelerating technological modernization, expanding irrigation systems, and implementing land consolidation policies aimed at increasing the sector's efficiency and competitiveness at the European level.