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ORGANIC AGRICULTURE IN EUROPE: A COMPARATIVE ANALYSIS OF AGRICULTURAL LAND DISTRIBUTION, PRODUCERS, AND TERRITORIAL DISPARITIES IN 2024

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Abstract: The study conducted a comparative assessment of organic farming in Europe based on 2024 statistical data from the Research Institute of Organic Agriculture (FiBL) database. The analysis covered 46 countries and territories regarding the indicator for organic agricultural area and 44 regarding the number of organic producers. The methodology included descriptive statistical indicators, analysis of distributions and territorial concentration, correlation and regression analysis, and exploratory multivariate analysis techniques. The results highlighted significant regional differences, with Spain, France, and Italy occupying the top positions in terms of organic acreage, while Italy recorded the highest number of producers. Romania ranked seventh in terms of area (781,397 ha) and tenth in terms of the number of producers (14,643 operators). The relationship between these two indicators was strong and positive (r = 0.893), indicating a significant association between the size of the organic sector and producer participation at the European level. The study provided a comparative perspective on the structure of European organic farming and highlighted the specific characteristics of Romania's positioning within this context.

• Introduction

Organic farming represents a key direction in the transformation of contemporary agri-food systems, being associated with the need to reduce the environmental pressures exerted by agricultural activities, conserve natural resources, and develop production models compatible with sustainability principles [1], [14]. From an agroecological perspective, organic farming systems aim to harness natural biological processes, improve soil fertility, diversify crop rotations, and reduce reliance on synthetic mineral fertilizers and chemical pesticides, thereby providing ecosystem benefits [8], [16]. At the European Union level, organic farming has become a key component of policies regarding the sustainability of the agri-food system. The Farm to Fork Strategy and the EU Biodiversity Strategy have set a target for at least 25% of the European Union's agricultural land to be managed under organic farming systems by 2030. The strategic framework highlighted the importance of the statistical monitoring of organic agricultural areas and the operators involved, both at Community level and at the level of each Member State [3], [4].

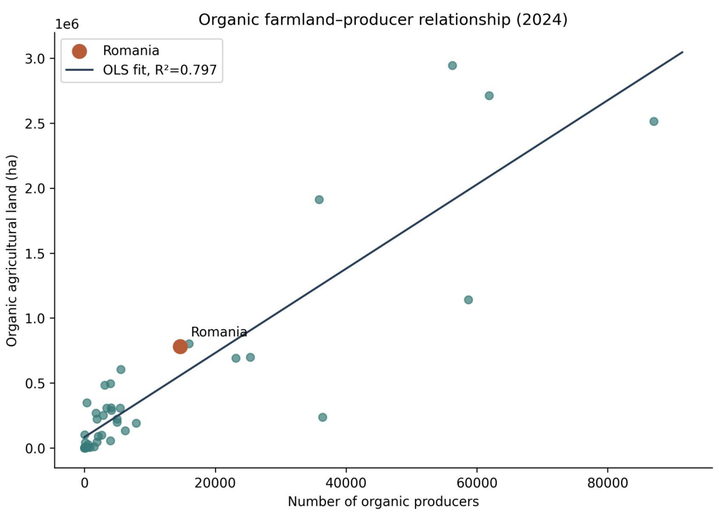
• Material and method

The study was conducted based on statistical data regarding organic farming in Europe for the year 2024, published in 2026 by the Research Institute of Organic Agriculture [5] in collaboration with IFOAM – Organics International [18]. The research was observational, cross-sectional, and comparative in nature, with the statistical unit being each country or territory included in the dataset.

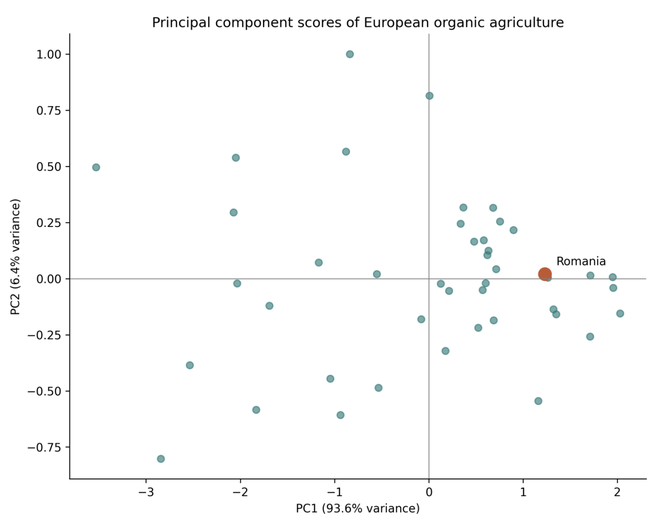
• Results and discussions

The 46 countries and territories included in the statistical records accounted for a total of 19,580,087 hectares of organic agricultural land. The mean area was 425,654 hectares, while the median was 194,499 hectares. The standard deviation of 714,247 hectares and the coefficient of variation (CV = 167.80%) indicated a highly heterogeneous distribution, dominated by a small group of countries with extensive land areas. Spain, France, Italy, Germany, and Greece accounted for 57.33% of the total area analyzed (Table 1). The Herfindahl–Hirschman index, calculated based on fractional shares, was 0.0816, indicating significant concentration relative to a uniform distribution across the 46 territorial units.

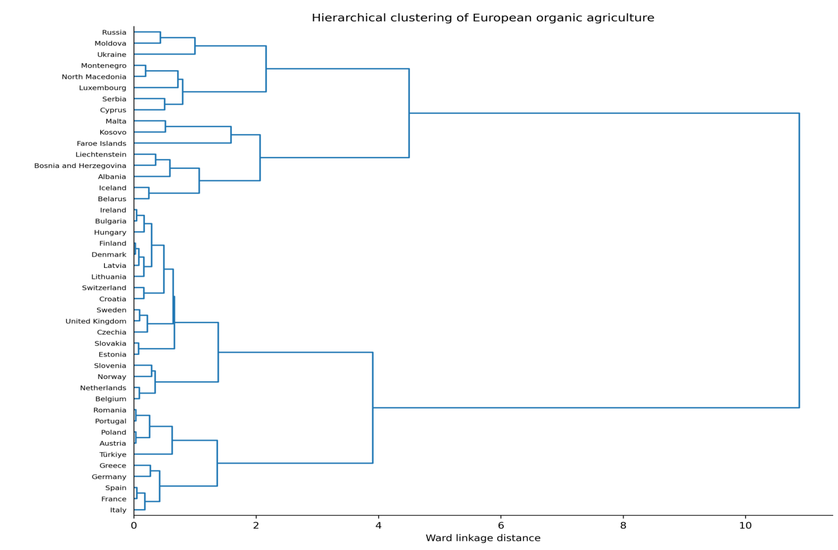
The analysis of the 44 countries and territories for which both variables were available revealed a strong positive association between organic land area and the number of producers ($r = 0.893$; $p < 0.001$). The Spearman correlation was also high ($\rho = 0.864$; $p < 0.001$), indicating the maintenance of a monotonic association between the ranks of the two variables. The simple linear regression model, with area (ha) as the dependent variable, is $A = 83{,}681.6 + 32.402 \times N$ ($R^2 = 0.797$). The coefficient expressed the descriptive association between the variables, without implying a causal relationship. The scatter plot and the regression line are shown in Figure 1. Principal component analysis applied to the standardized logarithms of the two variables yielded a first component (PC1) that explained 93.55% of the total variance and a second component (PC2) that explained 6.45%. PC1 captured the common dimension of the organic sector, while PC2 contrasted the two standardized variables (Figure 3). Ward's hierarchical clustering was performed on the same log-transformed and standardized variables. A comparison of solutions ranging from 2 to 6 clusters using the silhouette coefficient indicated a maximum value for 2 clusters (silhouette = 0.579) (Figure 4). The groups represent exploratory statistical typologies rather than official levels of organic farming development.



Ecological farmland – producers relationship (2024)



Principal component score of European organic agriculture



Cluster dendrogram

Acknowledgement:

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• Conclusions

A comparative analysis of European organic farming, using 2024 FiBL data, revealed an uneven geographical distribution regarding both organic agricultural land area and the number of producers. The significant differences between states are confirmed by coefficients of variation of 167.80% and 179.02%, respectively. Territorial concentration was evident: the top five countries by organic area accounted for 57.33% of the analyzed total, while the top five countries by number of producers represented 61.20% of the reported total. Romania ranked seventh among the 46 countries and territories analyzed in terms of organic area (781,397 ha; 3.99% of the total) and tenth among the 44 units in terms of the number of producers (14,643; 2.98% of the total). The national ratio of 53.36 ha per producer suggested a relatively higher proportion of area relative to producers, but this should not be confused with the average farm size.