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Sustainable Agricultural Development in the Southeast Region of Romania

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ABSTRACT

The Southeast Region of Romania, which includes the counties of Constanța, Tulcea, Brăila, Buzău, Vrancea, and Galați, represents an area with a strong agricultural sector that is essential for the local economy. Agriculture is an essential sector of the economy in the region, especially due to fertile land and a long-standing tradition in cereal, legume, and sunflower cultivation, as well as livestock farming. The Southeast region of Romania plays an important role in national agricultural production, contributing significantly to wheat, corn, and sunflower crops. In the context of an increasingly volatile global economic climate, sustainable agricultural development and technological modernization have become imperatives for ensuring a prosperous and environmentally friendly future for the region.

1. Introduction

The region stands out with its diversified agricultural landscape, where cereal, legume, and sunflower crops dominate production, while livestock farming complements the economic activities of local farmers. However, the agricultural sector in this area faces major challenges such as climate change, inadequate infrastructure, and the forced migration of young people from rural areas. The adoption of innovative solutions in agricultural technologies, natural resource management, and the promotion of sustainable practices not only improves farm efficiency and competitiveness but also protects the surrounding environment. This article aims to explore these aspects by analysing how agriculture in the Southeast region of Romania can benefit from modernization and sustainability considering the current challenges.

2. Literature review

For the creation of this article, we consulted a variety of relevant sources in the field of sustainable agriculture and modern technologies applied to the agricultural sector. Key sources include reports from the United Nations Food and Agriculture Organization (FAO), which detail the impact of climate change on agriculture and sustainable solutions for adaptation. Additionally, we consulted recent studies on precision agriculture and the use of modern technologies such as drones and sensors to improve agricultural efficiency.

Studies conducted by Ionescu (2018) and Popescu (2017) highlighted that the implementation of sustainable agricultural techniques, such as crop rotation and the use of organic fertilizers, can

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significantly contribute to increasing soil fertility and reducing pesticide use. In the context of Romania, the study conducted by Mihăilescu (2019) suggests that access to European funds has been essential in promoting these practices, but many farmers have faced barriers related to information and ongoing training.

Official documents, such as those related to the National Rural Development Program (PNDR) and the European Union's strategies for sustainable agriculture, provided an essential framework for understanding the policies and European funds that support farmers in the Southeast region of Romania. We also included reports from Romania's Ministry of Agriculture and Rural Development, which emphasize the need for modernization and sustainability in national agriculture.

Radu and Dima (2020) emphasize that the demographic structure and the workforce in rural areas of Romania are key factors in adopting sustainable development measures. Additionally, Popa and Ion (2018) demonstrated that in the counties of the south-eastern part of the country, there is an increasing interest among farmers to adopt ecological agricultural practices, especially when these are supported by external funding. In a comparative study, Zdravkovic and Georgiev (2020) analyse sustainable agriculture in Southeastern Europe and identify common challenges faced in the implementation of ecological practices.

3. Results

The aim of this research was to assess the impact of applying sustainable agricultural practices in the southeastern region of Romania, particularly in the counties of Brăila, Buzău, Constanța, Galați, Tulcea, and Vrancea. The analysis of demographic data showed a balanced distribution of the population by gender in the studied regions. However, in the counties of Constanța and Brăila, the proportion of the population employed in agriculture remains significant, suggesting a high potential for the implementation of sustainable agricultural practices. Additionally, data on residence averages indicate a higher concentration of the population in rural areas, which could facilitate the adoption of sustainable development measures tailored to local needs.

As for employment in agriculture, the counties of Tulcea and Brăila have a significant proportion of the active population working in the agricultural sector, which could represent an advantage in promoting sustainable development measures. However, for these practices to be successfully implemented, it is essential that farmers receive adequate training and benefit from support in accessing European funds dedicated to sustainability. Although the analysis of the available data was useful in understanding the general context of the region, there was a lack of detailed quantitative data that would allow for an accurate assessment of the direct impact of sustainable agricultural practices. This is largely due to the difficulty of collecting data from local and regional sources, as well as the fact that the study focused on demographic and employment data at the macro level. Future research could benefit from a more in-depth collection of data at the farm level, which would allow for a clearer assessment of the impact of these practices.

In the analysed counties, there is growing interest among farmers in sustainable development projects, especially those funded by European funds. However, some barriers related to the accessibility of funds and limited agricultural education may affect the large-scale implementation of these measures.

The results suggest that, although there is significant potential for the development of sustainable agriculture in the southeastern region of Romania, its implementation depends on a few factors, including access to information, education, and European funds. Given the demographic structure and the concentration of the workforce in agriculture, the studied regions could benefit from sustainable initiatives, if farmers receive adequate support.

The collected data were processed using descriptive analysis to highlight the main characteristics of the population and the workforce employed in agriculture. Additionally, comparative analyses were used to examine the differences between the studied counties regarding the adoption of sustainable agricultural techniques and access to European funds. Data analysis was carried out using Microsoft Excel, and for statistical comparisons, the chi-square test was applied to evaluate the significance of differences between groups.

4. Labor force in agriculture

Agriculture is not only an important source of income for farmers in this region but also a crucial factor in maintaining local economic stability. Many of the inhabitants of these counties directly depend on agricultural activities, and both subsistence and commercial farming are vital for the daily life of rural communities. Additionally, the agricultural industry supports a wide range of related economic activities, including food processing, transportation, and marketing of products. In recent years, the agricultural sector in Romania's southeastern region has become increasingly important for the national economy, having a significant impact on agricultural exports, especially within the European Union. However, rural areas in this region also face challenges related to insufficient agricultural infrastructure, the forced migration of young labour forces, and vulnerability to climate change. Another important issue is the migration of young labour forces from rural areas, a phenomenon that affects the number of available workers for agricultural activities. This leads to depopulation of villages and a decrease in the human resources needed for the sustainable development of the agricultural sector.

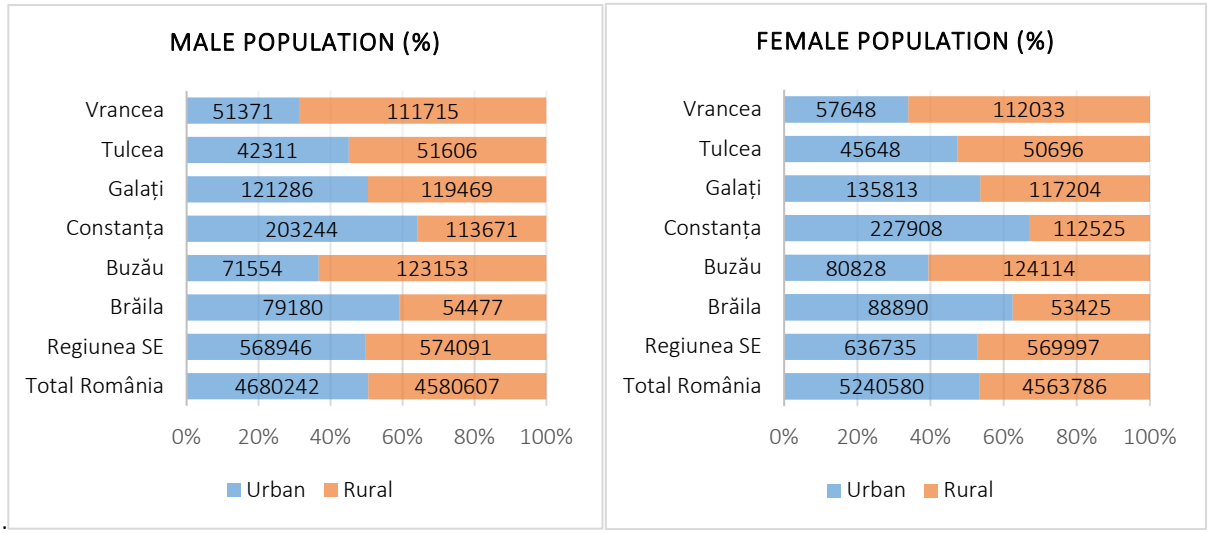

Figure 1. Resident population by type of residence and sex in 2023 (%)

Source: Authors by using (Institutul National de Statistica, 2025)

Observing the Distribution of the Population by Residence, we find that the urban population is predominant in more developed cities due to the phenomenon of migration from rural to urban areas in search of employment opportunities. From a gender distribution perspective, we observe that the female population is more predominant in both types of residence environments, as well as in the total population of Romania. The structure of the population in the region by age groups is influenced by the ongoing process of population aging.

In the face of these challenges, agricultural modernization and the implementation of sustainable solutions become essential for ensuring a prosperous future for the region. Technological modernization in the agricultural sector involves the adoption of new technologies that help farmers improve productivity, reduce production costs, and minimize environmental impact. Additionally, sustainable agriculture is a concept that promises to protect natural resources, ensure healthy food, and reduce carbon emissions.

4. Challenges of Agriculture in the Southeast Region

Climate change is one of the biggest challenges facing agriculture in the Southeast region of Romania. The region is in an area more vulnerable to extreme weather phenomena, such as prolonged droughts, high summer temperatures, and sudden temperature fluctuations. These conditions directly affect crops, especially cereal and legume crops that depend on an optimal amount of water and stable climatic conditions for development.

In recent decades, droughts have become more frequent, and the lack of an efficient irrigation system makes farmers vulnerable to economic risks. Low cereal and vegetable yields have a direct impact on farmers' incomes and on the region's food security. Additionally, climate change can contribute to the emergence of new pests and diseases that affect crops, further increasing pressure on farmers. The absence of modern storage and processing facilities for agricultural products prevents farmers from optimally capitalizing on their crops. This leads to significant losses during harvest periods when demand for fresh products is higher, but there is insufficient storage space for them.

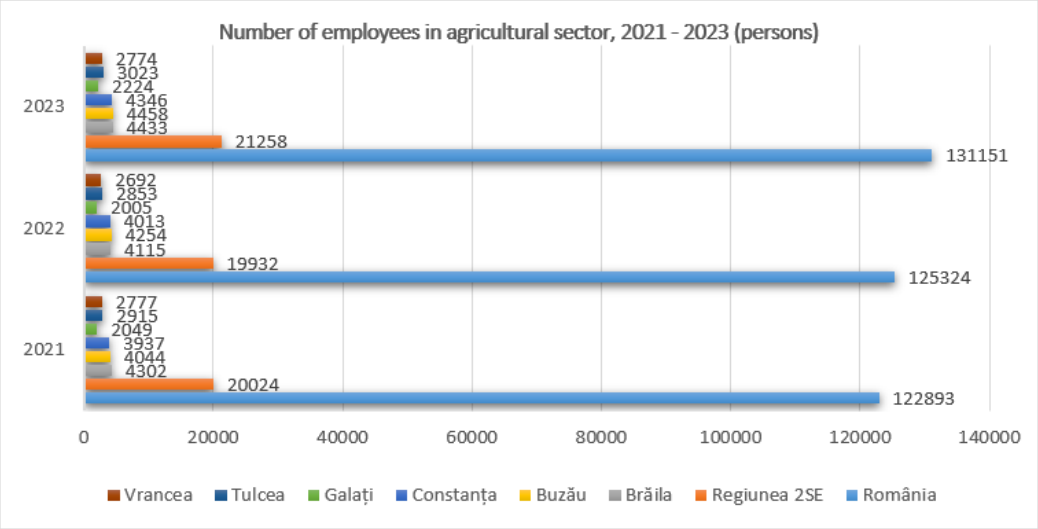

Figure 2. Number of employees in agricultural sector, 2021-2023

Source: Authors, by using (Institutul National de Statistica, 2025)

Although precision agriculture and other modern technologies are available on the market, many farmers lack the technical knowledge or financial resources to adopt them. Moreover, the lack of educational and continuous training programs for farmers in rural areas means they continue to rely on traditional, less efficient, and more costly practices. As a result, there is a significant gap between farmers who adopt modern technologies and those who still depend on traditional cultivation methods.

Modernizing agricultural infrastructure: European funds, particularly through the National Rural Development Program (PNDR), are used to support the modernization of agricultural infrastructure in southeastern Romania, including the construction and maintenance of irrigation systems. These funds can also be used for purchasing modern equipment such as tractors, combines, planting and harvesting machines, which contributes to increased productivity and sustainability in the sector.

Organic farming: In recent years, there has been an increase in interest in organic farming in this region. Growing organic products such as cereals, vegetables, and fruits can add value to agricultural products from southeastern Romania, and external demand for such products is constantly rising.

Support for young farmers: Through European funds, young farmers receive support to start agricultural activities. This support includes subsidies for purchasing land and equipment, as well as training and education, with the goal of attracting them to the agricultural sector and replacing the older generations.

Access to agricultural education is an important factor in promoting sustainable farming techniques in southeastern Romania. According to available data, approximately 35% of farmers in the counties of Constanța, Tulcea, and Brăila have participated in agricultural training programs over the past 5 years, primarily to learn ecological techniques and access European funds for sustainability (INS, 2023). However, significant barriers exist regarding access to these courses, such as long distances and associated costs.

A SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) is an effective method for evaluating the current situation and identifying the key factors influencing the development of a region. In this case, we will analyse rural development in the South-East region of Romania, based on the labour force.

Table 1. SWOT Analysis - Rural Development in the South-East Region of Romania, Based on the Labor Force

STRENGHTS	WEAKNESSES
The South-East region of Romania benefits from a significant labour force in agriculture, with a strong tradition in land cultivation and livestock raising. Salaries in rural areas are generally lower than in urban areas, which can attract investments in agriculture and other sectors of the rural economy. A large portion of the rural population is familiar with traditional agricultural activities, which is an advantage in developing sustainable production techniques.	Many agricultural workers do not have access to education and continuous training programs, which limits the implementation of modern technologies and sustainable agricultural practices. Young people from rural areas migrate to cities or other countries in search of better job opportunities, leading to a labour force deficit in agriculture and other economic sectors. Many farmers in the South-East of Romania do not have access to advanced technology or modern

Access to European Union funds dedicated to rural development and agriculture supports professional training and infrastructure development in these regions.	equipment to increase productivity and implement sustainable practices. In many areas, agricultural and transport infrastructure is underdeveloped, which hinders farmers' access to markets and resources necessary for business development.
OPPORTUNITIES	THREATS
The region can benefit from European Union funds to support professional training, the implementation of ecological agricultural technologies, and the development of rural infrastructure. There is a global trend toward consuming organic products, and farmers in the South-East of Romania can seize this opportunity to diversify their activities and increase revenues. The South-East region, with its natural landscapes and cultural traditions, can develop rural tourism, which can provide additional jobs for the local population and stimulate the development of other economic sectors. Rural Infrastructure Development Initiatives: There are plans to improve transport and energy infrastructure in rural areas, which will facilitate economic activities and attract investments.	The South-East region is vulnerable to climate change, and extreme events such as droughts or floods can severely affect agricultural production and, consequently, jobs in this sector. Farmers in the South-East of Romania face stiff competition in the global market, especially from countries with more modernized agriculture, which can reduce income and jobs in agriculture. Young farmers often face difficulties in obtaining funding and support to start sustainable agricultural activities, which can lead to stagnation in rural development. Shortage of Skilled Labor: Even with the migration of youth, there is still a high demand for skilled workers in agriculture and other rural economy sectors, and this shortage can limit the sustainable development of the region.

Source: Authors, by using (European Commission, 2025)

Overall, rural development in the South-East of Romania based on the labour force has significant potential, given the strengths such as agricultural tradition and access to European Union funds. However, there are also significant challenges, such as the migration of young labour forces and the lack of continuous agricultural education.

5. Conclusions

Agriculture in the Southeast region of Romania is at a critical stage of development. The region, with a strong agricultural tradition and considerable natural potential, faces significant challenges that could jeopardize the long-term sustainability of the sector. The main difficulties identified include climate change, deficient agricultural infrastructure, forced migration of young labour forces, and dependence on agricultural subsidies. These problems affect both agricultural production yields and the competitiveness of local farmers in both domestic and international markets.

Despite these challenges, there are clear solutions for modernizing and sustainably developing the agricultural sector. Implementing innovative technologies, such as precision agriculture, the use of drones and sensors for crop monitoring, and improving irrigation systems, can significantly contribute to increasing efficiency and resilience in agriculture in this region. Additionally, investing in the continuous education of farmers and promoting best practices in natural resource management are essential to support the development of sustainable and ecological agriculture.

Furthermore, collaboration between local authorities, farmers, and the private sector is crucial for creating an environment favourable to the implementation of modern technologies and the development of sustainable agriculture. European funds and national programs, such as the National Rural Development Program (PNDR), can play an important role in supporting farmers to adopt innovative solutions and overcome financial and technical barriers.

In conclusion, the future of agriculture in the Southeast region of Romania depends on integrating a modern, sustainable, and technologically advanced vision for the sector. Only through investments in modern technologies, continuous education, and the protection of natural resources can the region become a successful example of a sustainable and high-performing agricultural model.

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