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Comprehensive assessment of the agricultural sector in the South-West Oltenia development region and its impact on economic growth

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COMPREHENSIVE ASSESSMENT OF THE AGRICULTURAL SECTOR IN THE SOUTH-WEST OLTENIA DEVELOPMENT REGION AND ITS IMPACT ON ECONOMIC GROWTH

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Abstract: *In the era of globalization, the importance of the integrated analysis of the agricultural sector is justified, because it allows a more efficient adaptation of this sector to the conditions and requirements of the global market, while ensuring economic and food sustainability. Thus, this analysis allows the understanding of how each component contributes to the overall economic development and allows the identification of those strategic interventions that can maximize the potential of agriculture to stimulate economic growth, improve food security and ensure long-term ecological sustainability. The choice of the South West Oltenia Region for the case study is motivated by its economic relevance, demographic challenges and regional disparities. The case study used different statistical methods of data processing published in national and regional statistics with the aim of determining the importance of each of the component counties in obtaining agricultural performance, but also to determine their economic diversity. The statistical data were collected, processed and analyzed, so that, based on the resulting conclusions, they can be used to formulate relevant proposals that lead to the economic growth of this region. What we found was that although the total value of agricultural production has increased considerably at the regional level, the disparities between counties and sectors underline the need for well-oriented regional agricultural policies to ensure sustainable and equitable development*

Key words: agricultural sector, South West Oltenia Region, economic development

JEL Clasificassion: Q0

INTRODUCTION

Amid globalization, a comprehensive examination of the agricultural sector gains significance, as agriculture no longer operates independently but is intricately connected to global markets, international trade policies, and global supply chains. (Tudor V. et al, 2022). Globalization has intensified competition among agricultural producers worldwide, making it crucial to develop a deeper understanding of the sector's dynamics to remain competitive and ensure long-term sustainability. Consequently, an integrated analysis of the agricultural sector is vital, particularly for grasping its complex role in contributing to the economic development of a country or region (Oppenkowski, M. V., 2019). This type of analysis involves all agricultural sub-sectors, from plant production to animal production and agricultural services, precisely to assess how each component contributes to economic growth, employment and food stability (Chiritescu, V. et al., 2014). By using an integrated approach, it becomes possible to gain a thorough understanding of how different elements of the agricultural sector connect and affect each other, which is essential for shaping effective policies. (Bran, M. et al, 2012). The European trend is to reduce the areas cultivated with corn and replace it with rape or sunflower, more profitable crops (Tudor, V. et al, 2017).

The importance of the subject is given by the role of each of these sectors. Thus, plant production, which includes cereal crops, vegetables, fruits and other cultivated plants, is

fundamental for ensuring food security and generating income in many economies, as it not only provides essential food products, but also supports other sectors such as the food industry and biofuel production. The different factors facing the modern world, such as climate change, access to water resources and modern agricultural technologies, significantly influence the yield and sustainability of vegetable production, which is why the analysis is more current (Constantin, E. et al, 2008; Chedea, V. S. et al, 2021). On the other hand, animal production also plays an important role in the agricultural economy, contributing to food diversification and exports. Animal products such as meat, milk and eggs are essential to the population's diet and contribute significantly to agricultural GDP (Marcuta L. et al, 2013). In addition, the livestock sector is closely linked to crop production through the need for feed, thus creating a synergy that can increase overall agricultural efficiency and productivity. In turn, agricultural services, which include activities such as irrigation, agricultural consultancy, processing and distribution of agricultural products, have an essential role in supporting production and increasing the added value of agricultural products, because they contribute to the modernization of the agricultural sector, facilitating the transition towards more sustainable and productive agricultural practices.

The integration of the analysis of these three subsectors allows an integrated understanding of agriculture as an economic engine, given that agriculture not only provides food, but also creates jobs, stimulates exports and contributes to rural development (Marcuta L. et al, 2013). Thus, a developed agricultural sector can serve as the basis for sustainable economic growth, reduce poverty and improve the quality of life in rural communities, this being particularly important for developing economies where agriculture remains a key pillar of the economy.

MATERIALS AND METHODS

The research methodology assumed the collection, analysis and interpretation of information provided by national and county databases and assumed, on the one hand, the analysis of the total value of plant and animal production, as well as that of related services, as the main indicators that measure the value of these productions, providing a clear perspective on the growth or decline of the agricultural sector.

Growth indices or growth rates were also determined, which is an essential tool in the analysis of data series, being used to measure the variation of economic indicators over a certain period (Constantin, S. et al, 2014). This index provides a clear perspective on growth or decline trends and is important for understanding the evolutionary dynamics of the analyzed variables, allowing the identification of moments of acceleration, stagnation or decline and serving as an essential tool in the strategic planning and decision-making process (Sibirskaya, E. V. et al., 2019). This approach enabled us to perform a comparative analysis across various time periods and sectors of activity, facilitating the identification of trends and the assessment of the effectiveness of the implemented economic and political measures. The index is calculated based on the following established formula:

$$I'_{t/t'} = \frac{y_t}{y_{t'}} \times 100,$$

where t' can be:

$t' = 1$ base period (first interval, first moment of the series)

$t' = t - 1$ previous period

Another calculated indicator was the average annual growth rate that shows the contribution of each county to the total value of agricultural services in the region each year, and which is determined as follows:

$$CAGR = \left(\frac{V_{final}}{V_{initial}} \right)^{1/n} - 1, \text{ where}$$

V_{final} is the final value (2022)

$V_{initial}$ is the initial value (2018),

n is the number of years

We also used the Economic Diversity Index, with the aim of analyzing the diversification of agricultural production in the South-West Oltenia region and which is calculated as follows:

$$ID = \frac{1}{2} \sum_{i=1}^n /p_i - \frac{1}{n}/, \text{ where}$$

p_i represents the proportion of each component in total output

n is the number of components

By using these indicators, the process of data comparison and interpretation was simplified, which allowed us to formulate some conclusions that would contribute to supporting the decision-making process in essential areas such as economic policy, regional development and strategic planning.

RESULTS AND DISCUSSIONS

The analysis of the integrated evolution of the agricultural sector was carried out for the South West Oltenia development region. The reason for choosing this region was that it has a diversified economic structure, which includes essential sectors such as agriculture, extractive industry and energy production, sectors with a significant impact on the local and national economy, which gave us the opportunity to understand economic developments global and national.

Also, the Southwest Oltenia Region is one that faces major demographic challenges, such as depopulation and population aging, that is, phenomena that have direct consequences on the labor market, infrastructure and public services in the region. Studying this region allows a detailed exploration of how population dynamics influence economic and social development, thus providing valuable lessons for other similar regions in Romania and Eastern Europe. South-West Oltenia stands out as a region of interest due to its regional disparities, particularly the stark contrast between rural and urban areas, which highlights significant differences in economic development and resource access—key factors for both regional and national policies. In this region, agricultural production increased from 10,656 million lei in 2018 to 13,576 million lei in 2022, marking a 27.4% growth. This growth reflects the strengthening of the agricultural sector, driven by investments in technology, expansion of cultivated areas, and improvements in agricultural management. Strengthening the agricultural

sector in South-West Oltenia could lead to substantial economic gains, enhancing regional competitiveness and help stabilize the rural population. However, to ensure lasting benefits, it is crucial to prioritize natural resource management and adopt sustainable practices, safeguarding the environment while balancing economic growth with ecological preservation.

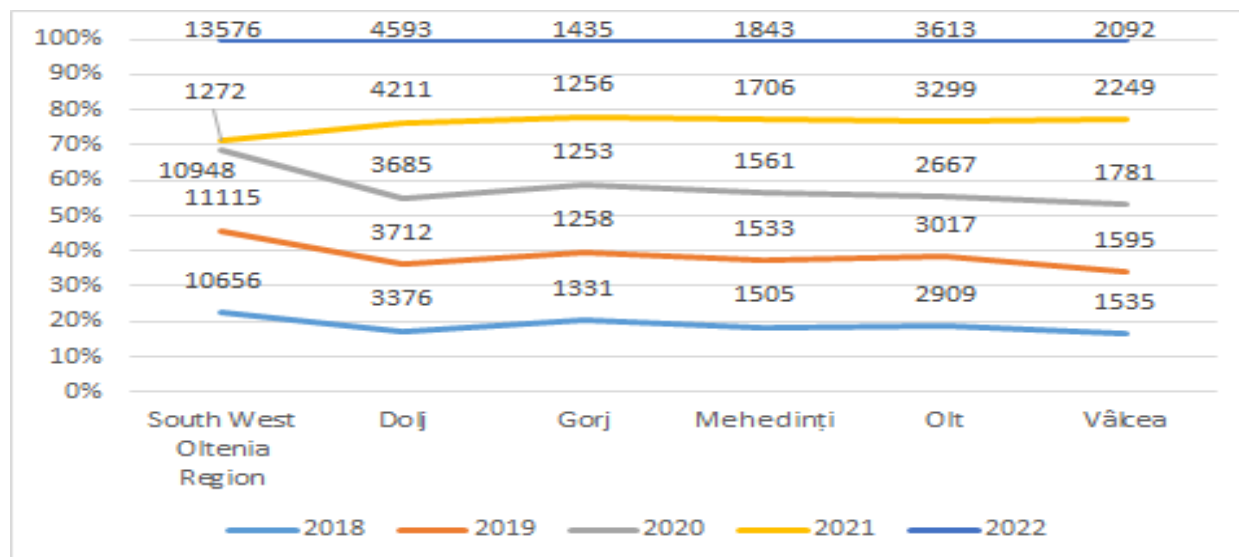


Figure 1. Evolution of agricultural production value in the South-West Oltenia region (2018-2022) (million lei)

Source: INSSE, Own calculations/processing

The analysis of the data provided by the national and county statistical databases highlighted the fact that the County with the greatest contribution to the agricultural production of the region is Dolj, with an increase of 36.04% between 2018 and 2022, reaching this year's level a value of 4,593 million lei. This development indicates a strong development of agriculture in Dolj, supported by well-developed agricultural infrastructure. By contrast, Gorj county registered a reduced growth, of only 7.81%, from 1,331 million lei in 2018 to 1,435 million lei in 2022, which was due to both structural and economic limitations specific to agriculture, i.e. greater dependence compared to climatic factors, but also to a less developed agricultural infrastructure.

Mehedinți County had an increase of 22.45%, reaching a value of 1,843 million lei in 2022, which demonstrates the improvement of agricultural performance, which is the result of the expansion of cultivated areas, but also of the adoption of more efficient agricultural practices.

Agricultural production in Olt County saw a 24.2% increase, reaching 3,613 million lei in 2022. Despite this notable growth, production fluctuations in 2020 were influenced by unfavorable weather conditions and other external factors that impacted overall output. In Vâlcea County, agricultural production increased by 36.28%, rising from 1,535 million lei in 2018 to 2,092 million lei in 2022. This represents the highest percentage growth in the region, attributed to both the diversification of production and the optimization of agricultural land use. Thus, the growth in the value of agricultural production in the South-West Oltenia region indicates a strengthening of the agricultural sector; however, it is important to highlight the

existing disparities between counties. While Dolj and Vâlcea counties demonstrate higher performance, Gorj county stands out as one that requires targeted interventions to promote balanced agricultural development across the region. This emphasizes the need for agricultural development strategies tailored to the unique characteristics of each county to fully harness the region's agricultural potential.

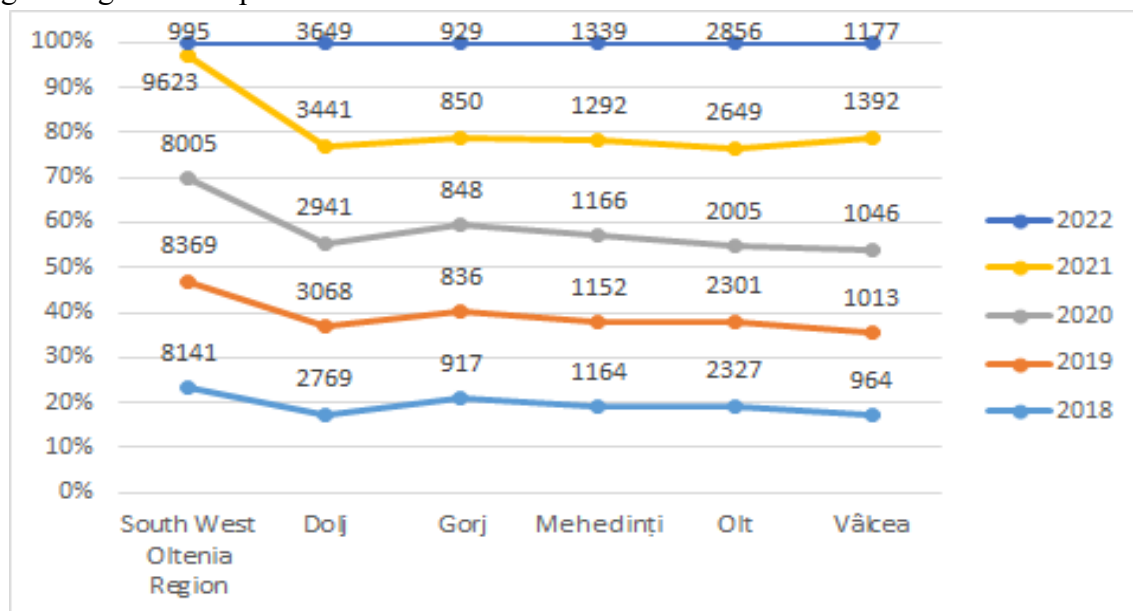


Figure 2. Trends in the value of vegetable agricultural production in the South-West Oltenia region (2018-2022)- (millions of lei)

Source: Source: INSSE, Own calculations/processing

An analysis of the data on the value of agricultural vegetable production in the South-West Oltenia region reveals a significant decline, dropping from 8,141 million lei in 2018 to just 995 million lei in 2022, representing a sharp decrease of 87.77%. Among the counties within this region, Dolj County experienced consistent growth, reaching 3,649 million lei in 2022, a 31.78% increase compared to 2018. Gorj County saw a minimal rise of only 1.3%, with production values remaining almost stagnant, while Mehedinți County registered a moderate increase of 15.03%. Notable increases were observed in Olt and Vâlcea Counties, with growth rates of 22.73% and 22.09%, respectively. Therefore, although the South-West Oltenia region had a sharp decrease in the value of vegetable production, some counties managed to improve their value, which indicated a significant variation in agricultural performance at the local level. This disparity between counties was influenced by several factors, including local climatic conditions, the agricultural policies implemented, and access to resources. Given these conditions, the compound annual growth rate (CAGR) was -40.87%.

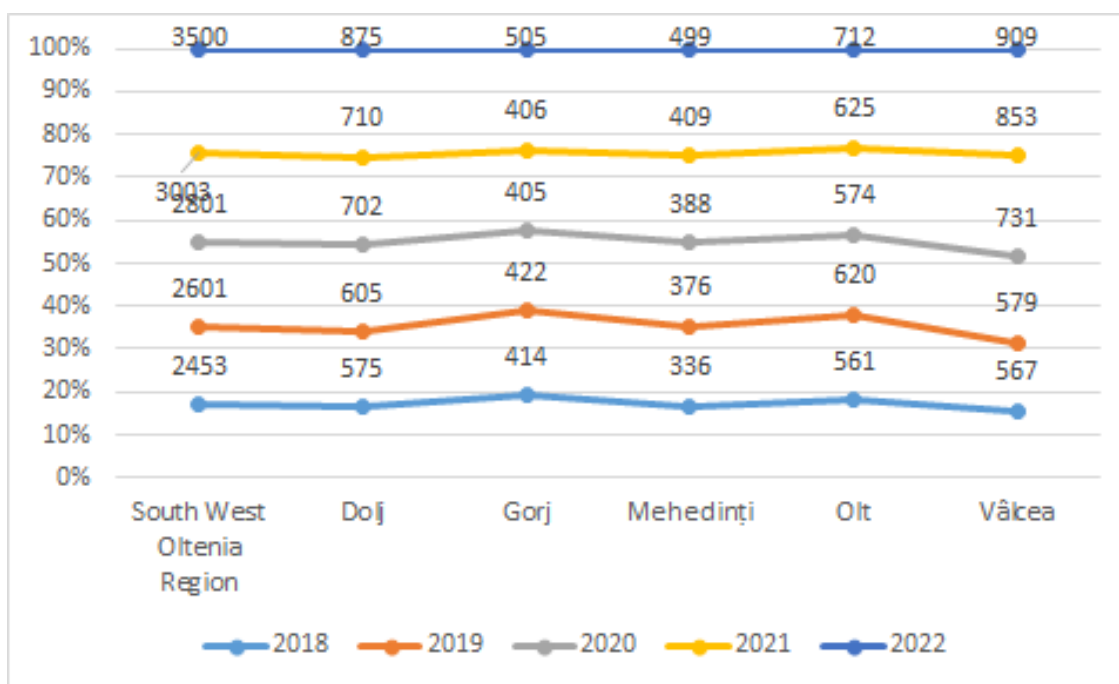


Figure 3. Trends in the value of agricultural animal production in the South-West Oltenia region (2018-2022) - (millions of lei)

Source: Source: INSSE, Own calculations/processing

The correct data on livestock production in the South-West Oltenia region for the period 2018-2022 shows an increase of 42.68%, from 2,453 million lei in 2018 to 3,500 million lei in 2022, which was due to increases in each of the component counties. Thus, Dolj county registered one of the largest increases, this being 52.17%, and due to an increase in the production value from 575 million lei in 2018 to 875 million lei in 2022. Gorj county had an increase of 21.98%, and Mehedinți county registered an increase of 48.51% because of the increase in production value from 336 million lei in 2018 to 499 million lei in 2022. In Olt County the increase was 26.91%, while at the level of Vâlcea county, the highest percentage increase was noted, this being 60.31%.

The factors that contributed to these increases were: the modernization of farms and the adoption of advanced technologies in animal husbandry that significantly contributed to improving productivity favorable agricultural policies, including subsidies and government support, which encouraged the development of the livestock sector relatively favorable climatic conditions and improved access to markets sales stimulated production growth. In some counties, such as Vâlcea and Dolj, local initiatives and investments in agricultural infrastructure have had a major impact, leading to more pronounced growth in these areas. All these factors combined have played a significant role in fostering the sustainable development and growth of livestock production in the region, resulting in a Compound Annual Growth Rate (CAGR) of 9.29%.

Data on the value of agricultural services in the South-West Oltenia region, provided by the National Institute of Statistics and the Ministry of Agriculture and Rural Development, indicate growth both at the regional level and in most of the counties within the region. If at the global level there was an increase of 102.56% in 2022 compared to 2018, due to the value

of agricultural services of 1,262 million lei in 2022, we note that it was due to increases of 115.24% due to Dolj county, of 108.37% owed to Olt County, 63.88% owed to Valcea county and 24.48% owed to Mehedinți county. In Gorj county, there were no significant changes in the value of agricultural services. However, this overall growth at the regional level suggests a substantial expansion of the agricultural sector.

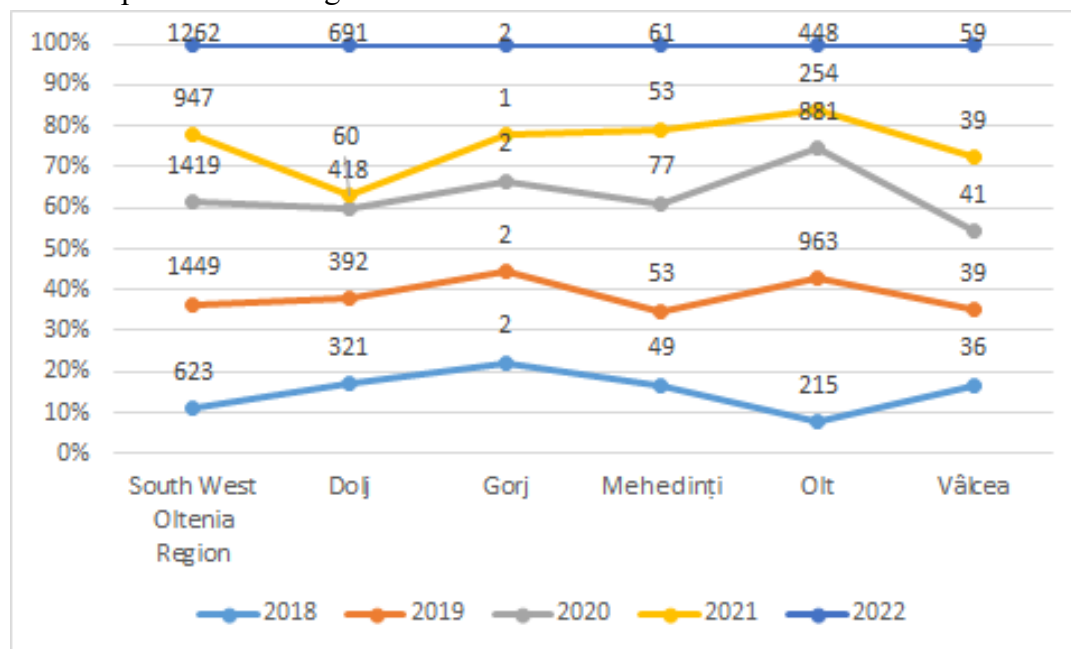


Figure 4. Evolution of the value of agricultural services in the South-West Oltenia region (2018-2022) - (Million Lei)

Source: Source: INSSE, Own calculations/processing

The Compound Annual Growth Rate (CAGR) of the value of agricultural services in the South-West Oltenia region between 2018 and 2022 is approximately 19.30%. This indicates that the sector is expanding, likely driven by investments, technological advancements, and an increased demand for agricultural services within the region. A high CAGR value, like that of agricultural services, makes the sector much more attractive to investors, as it can determine a return on investment in this sector. However, the growth rate must be supported by appropriate agricultural policies, continuous investment and infrastructure improvements to ensure long-term development. In the context of disparities between counties, rapid growth in some areas will accentuate regional differences, thus requiring a more equitable distribution of resources and opportunities.

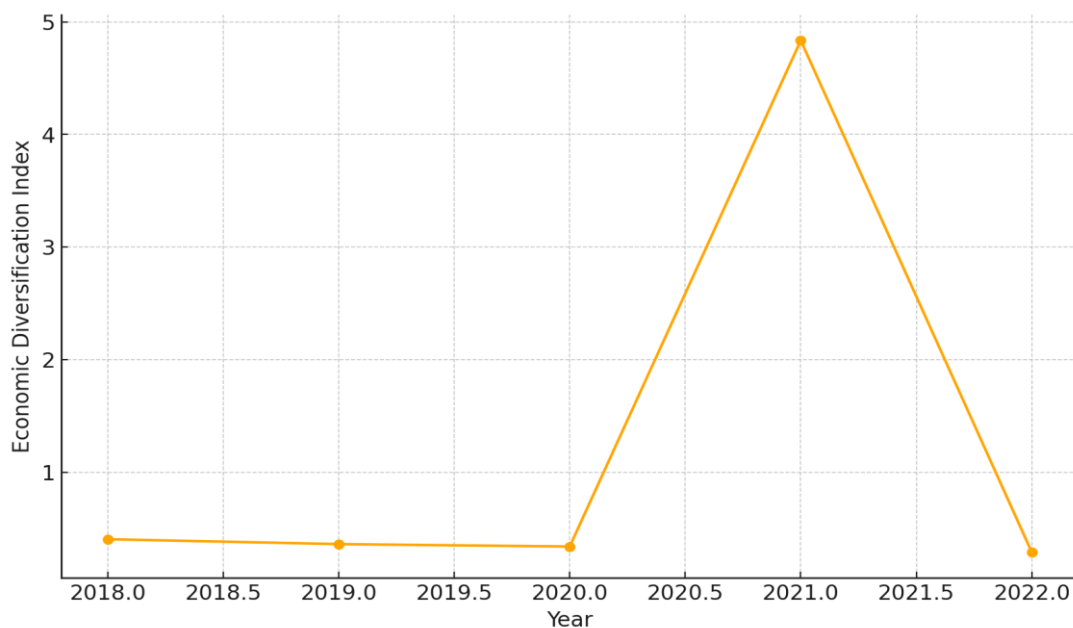


Figure 5. Economic diversification index in the South-West Oltenia Region

Source: Own calculations/processing

The Economic Diversification Index is an essential tool for understanding economic dynamics, assessing risks and developing sustainable economic strategies. The values calculated for the analyzed region vary, indicating fluctuations in its economic diversification. In 2021, the index reached a significant peak of 4.8353, signaling a major disruption in the structure of agricultural production. This was primarily due to a decrease in total production value, driven by an agricultural year characterized by unfavorable weather conditions. In the remaining years analyzed, the index remained at lower values, reflecting a much more balanced diversification. Thus, although the region had a relatively diversified agricultural structure in most years, the year 2021 was a special one, with a significant deviation. By calculating this index, imbalances in the structure of economic production can be identified and public policy and investment decisions can be guided.

Based on this data we were able to determine the Slope Coefficient, which indicates that over the years the Economic Diversification Index tends to increase slightly with an average of about 0.4242 units per year. The coefficient of determination (R^2), with a value of 0.1116, indicates that only about 11.16% of the variation in the economic diversification index is explained by the variation over the years. This suggests that other factors are also influencing the index. Therefore, in the long term, the linear regression indicates a slight upward trend in the diversification index, which demonstrates the further increase in the diversification of the agricultural economy in the Southwest Oltenia region.

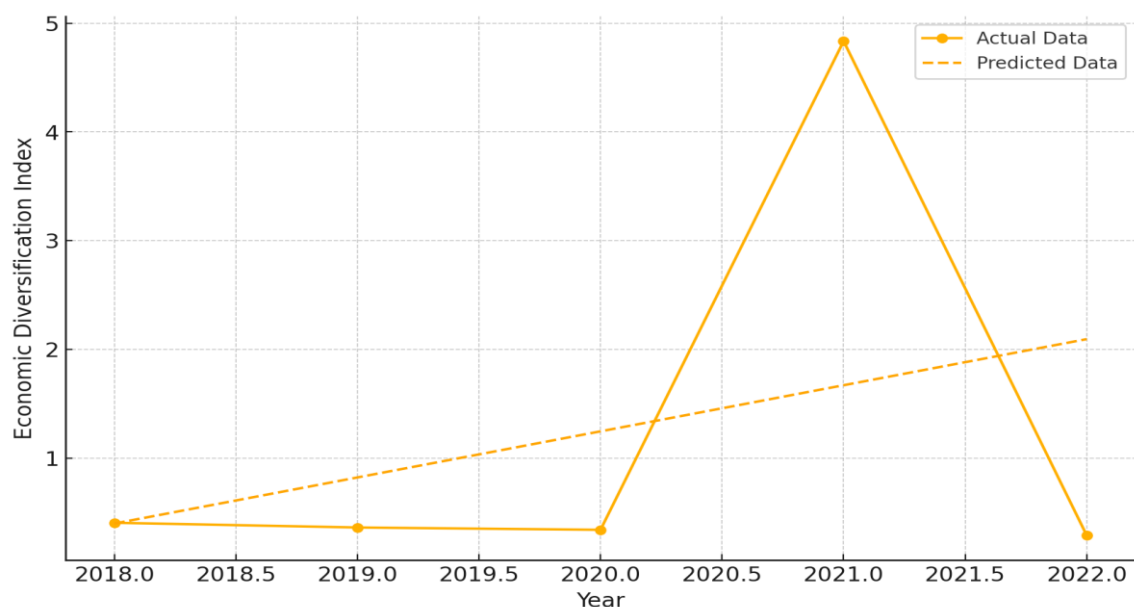


Figure. 6. Actual vs Predicted Economic Diversification Index

Source: Own calculations/processing

CONCLUSIONS

A comprehensive analysis of the agricultural sector within the framework of globalization is vital for shaping policies that facilitate its modernization and integration into the global economy. Additionally, food security emerges as a global concern, influenced by factors such as climate change, economic crises, and geopolitical conflicts, all of which can disrupt supply chains and directly affect food availability and accessibility. By thoroughly analyzing the agricultural sector, policymakers can craft resilience strategies to protect food security in the face of global challenges. The assessment of agricultural production in the Southwest Oltenia Region from 2018 to 2022 reveals substantial growth, though this increase has been unevenly spread across different sectors and counties in the region. While the vegetable sector stood out through important increases, exceeding the national average and consolidating as the main pillar of the regional agricultural economy, the evolution of the livestock sector and agricultural services was more diversified. Counties such as Dolj and Vâlcea recorded outstanding performances, but Gorj and Mehedinți counties faced significant challenges. Although the total value of agricultural production has increased considerably at the regional level, disparities between counties and sectors underline the need for well-oriented regional agricultural policies to ensure sustainable and equitable development in all fields and areas, reducing vulnerabilities and maximizing the agricultural potential of the region.

In an agricultural economy, such as the case of South-West Oltenia, diversification between plant, animal production and agricultural services can reduce the risks associated with climatic factors, market price variations or other unforeseen events.

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