

THE ROLE OF AGRICULTURE IN ROMANIA'S ECONOMY IN THE PERIOD 2013-2022

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Abstract

The purpose of the study was to analyze the main indicators carried out in agriculture for assessing the contribution of agriculture to the economic development in Romania in the period 2013-2022 based on the data provided by National Institute of Statistics. The data were processed using fixed and structural indices, regression equations, determination coefficient, graphical illustrations and comparisons. The results highlighted that in the studied period, Romania's Gross Domestic Product (GDP) increased 2.21 times reaching Lei 1,409 Billion in 2022. Agriculture produced Lei 63.04 Billion GDP in 2022, and its contribution to Romania's GDP is 4.5%. Gross Value Added (GVA) increased 2.28 times in the economy accounting for Lei 1,282.3 Billion in 2022. Despite that GVA raised by 118.6% in agriculture, accounting for Lei 58.98 Billion in 2022, agriculture's contribution was only 4.6%. Gross Fixed Capital Formation (GFCF) raised in the economy by +131.55% accounting for Lei 377,2 Billion in 2022, but in agriculture it was very small, only Lei 2.65 Billion. Net Investment Rate (NIR) was 27.4% in 2022, but in agriculture only 4.5%. A decline by 8.7% in the number of employees was noticed in the economy, employment reaching 7,806 thousand persons in 2022, but in agriculture the reduction was 65.7% remaining only 878 thousand employees. Despite that both export and import value increased, the trade balance was a negative one, the deficit at the end of 2022 being EUR -34,101 Million. The agro-food export value raised by +126.32% and reached EUR 11,960 Million in 2022, which means that agriculture contributes by about 13% to Romania's exports, while the contribution to imports raised by +167.54%, accounting for EUR 13,248.6 Million. The deficit in the agro-food trade balance accounted for EUR -1,288.6 Million, Romania being a net importing country. Despite of its increased contribution to GDP and GVA, agriculture is facing a gap versus industry and services in GFCF and NIR. Without a better technical endowment and higher investment, agriculture cannot apply modern technologies to increase production and sustain internal market and export and to diminish imports.

Key words: agriculture, importance in economy, GDP, GVA, GFCF, NIR, agro-food trade, Romania

INTRODUCTION

Agriculture represents the basic economic branch in the economy and has a complex and multiple role to sustain the economic development of a country.

In the case of Romania, an important series of transformations, reforms and strategies were applied after Romania's entry in the EU, aiming to align its policy concerning the agriculture development according to CAP.

Agriculture and food industry play the key role in supplying raw products and food of high quality to ensure food security and safety [7].

Also, agriculture, being the main activity in the rural areas, must be much more involved is sustaining the rural development, contributing to poverty reduction, food

security, nutrition, biodiversity, and environmental sustainability [2].

Bioeconomy and circular economy must strengthen agriculture and sustain it to contribute to the reduction of pollution, the maintaining of a health environment, biodiversity preservation and reduction of food waste.

Organic agriculture, new production technologies adapted to climate changes, reduction of fertilizers and chemical substances used in plant protection, new soil tillage methods aiming to preserve humus content into the soil, to incorporate carbon by means of crop cultures and capture the Nitrogen from the atmosphere will enable agriculture to sustain Green Economy and provide high quality and healthy food to the population as specified in the EU Green Deal

for the 2040-2050 horizon when Europe has to be a continent with zero Carbon [4, 8, 9].

Moreover, production technologies should be optimised and digitalisation should be used to sustain modelling and finding the best solutions for increasing production, reducing costs, improving crops and animal structures, increasing farmers' income and profitability of their businesses [12, 13, 14].

Better technologies will enhance agricultural production and agriculture's contribution to GDP [15].

The period of the pandemic Covid-19 has reduced the expenditures of the households "for food away from home" [3], which led to the increased e-commerce for food supply and stimulating the short food chains [5, 38].

GDP, as the key macroeconomic indicator, reflects much better the increase of the market value of all the commodities achieved by all the economic branches of a country in a year.

Agriculture's contribution to GDP growth must be intensified as volume, as at present in Romania, it is still smaller compared to industry and services. In this respect, not to forget, that GDP value is conditioned by its factors of influence: consumption (C), investment (In), exports (E) and imports (I), according to the formula: $GDP = C + In + E - I$. As this formula shows, consumption, investment and export have a positive impact, while import diminishes GDP value [19].

GDP value differs from a country to another depending on the level of its determinant factors. In 2022, the EU carried out Euro 15.9 Trillion GDP, compared to Euro 11.5 Trillion in 2013, meaning by 38.26% higher. Agriculture 's contribution to the EU GDP was 1.4% in 2022 [16].

Some studies analyzed the dynamics of GDP created in Romania and its relationship with employment and unemployment [20], also the regional convergence based on GDP [21], the influence of final consumption on GDP [24], the contribution of agriculture to Romania's GDP [25], the relationship between GDP, fixed assets and employment [27], the relationship between GDP and its resources [29], the concentration of GDP in Romania [30], also the correlation existing between

economic growth and unemployment and employment [28].

In Latin America and Caribbean, De Sormeaux (2011) studied the factors which influence contribution of agriculture to GDP [6].

Paz et al (2009) measured the performance of GDP achieved in agriculture [18].

However, it is recognized that that agriculture has the lowest contribution to GDP compared to other economic branches [35].

But, van Arendonk (2015) analyzed how to grow the share of agriculture in GDP and employment [41].

Gross Value Added (GVA) is another important macroeconomic indicator which reflects the differences between GDP plus Subsidies on products minus Taxes on products. Therefore, after deducting the intermediate consumption value from the produced output we could calculate GVA.

The EU has a well-developed agriculture, as proved by high GVA in its agricultural industry which in 2022 accounted for Euro 220.7 billion [10].

Agriculture has a major importance in the rural areas, where it is the main job for the local population, to whom it assures income and the living standard.

Agriculture valorises natural, material and human resources existing in the rural areas, sustaining the families and communities to develop agri-business and small industry and services like agro-tourism, ecotourism and rural tourism [36, 37, 39, 40].

Agriculture is a job beneficial for the local population, even though employment is expected to be reduced when the modern technologies assisted by IT and AI tools will be extended.

Age structure of the population and youth's migration to the cities looking for better paid jobs are present features in the EU rural areas and that its why special funding Programmes are implemented for enhancing young farmers and encourage the development of the rural areas [31, 32, 33].

The diversification of the activities in the rural space could bring additional incomes besides the ones from agriculture. It creates the

premises for developing investment in new modern farms, for improving training level of the rural population and farmers and diminishing poverty [11].

In the EU, Romania and Bulgaria have the highest poverty level, accounting for 55% and, respectively, 51.4% in the weak populated areas, 31% and 41.5% in the semi-urban areas and 27.9% and 30 % in the areas with a high density of the population [1].

From an economic point of view, besides the other economic branches, agriculture contributes to the development of the country's trade on the international markets, by its two components: export and import, whose dynamics as volume and value could lead to a positive or negative trade balance.

Romania has a high deficit in its trade balance, not only for all the commercialized goods, but also for agro-food products. The import rate exceeds the export rate, which makes the internal market to be dominated by imported products, situation which affects the local producers. But imports are justified for ensuring the population's requirements.

The main trade partner for Romania is the EU, which has a share of about 80% in imports and about 70% in exports [22, 23, 26, 34].

In this context, the goal of this study to analyze the dynamics of GDP and of some other factors of influence in Romania in order to identify the main trends in the last decade, 2013-2022. The examined indicators are:

Gross Domestic Product (GDP), Gross Value Added (GVA), Gross Fixed Capital Formation (GFCF), Net Investment rate (NIR), Employment (Em), Romania's external trade (T) and its external agri-food trade (AFT), involving: Export (E), Import (I) and trade balance (TB).

MATERIALS AND METHODS

For this research, the data from the National Institute of Statistics and Eurostat were used for the following selected macroeconomic indicators from national economic accounts reflecting the role of agriculture in Romania's economy: GDP, GVA, GFCF, NIR, Em, T, AFT, E, I, TB.

The period of references was the last decade 2013-2022.

The methodology used involved: Fixed basis index, Structural index, Average growth rate, regression linear and polynomial equations, coefficient of determination, comparisons, graphical illustrations and the connected comments of the obtained results.

RESULTS AND DISCUSSIONS

Gross Domestic Product (GDP)

In the period 2013-2022, Romania's GDP increased 2.21 times from Lei 637.5 Billion in 2013 to Lei 1,409 Billion in 2022 (Fig. 1).

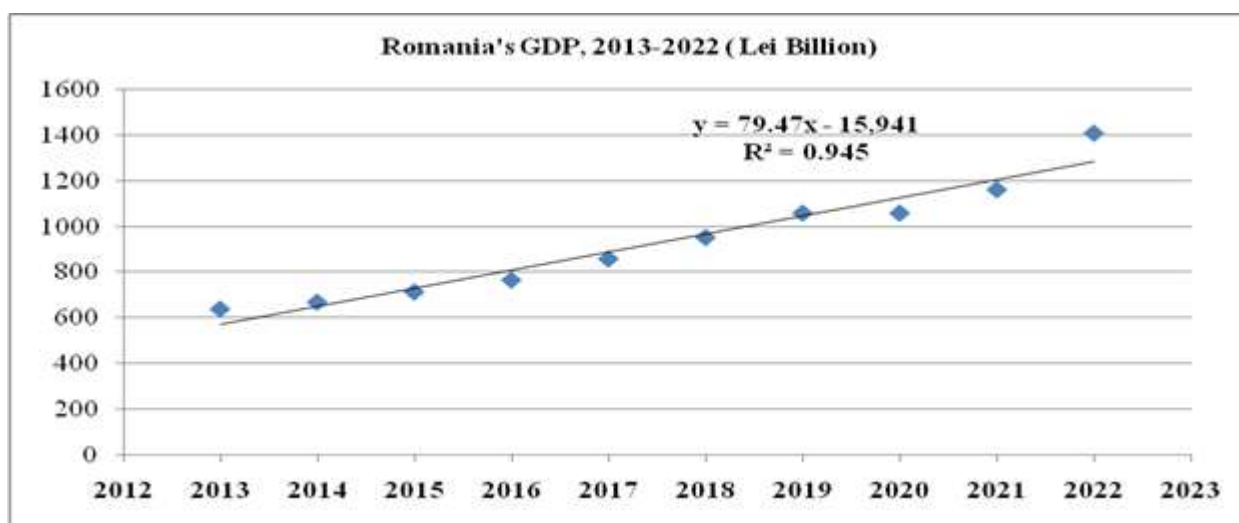


Fig. 1. Evolution of Romania's GDP, 2013-2022 (Lei Billion)
Source: Own design based on the data from NIS, 2023 [17].

GDP created in agriculture has also increased, but only by +83.14%, from Lei 34.42 Billion in 2013 to Lei 63.04 Billion in 2022 (Fig. 2).

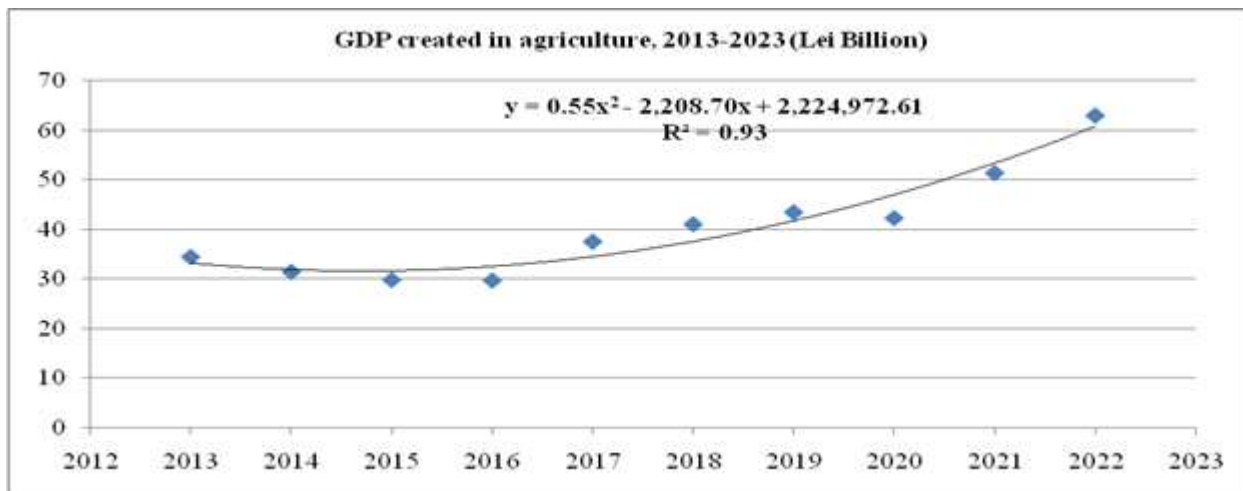


Fig. 2. Evolution of GDP created in Romania's agriculture, 2013-2022 (Lei Billion)
 Source: Own design based on the data from NIS, 2023 [17].

As the growth rate of GDP created in agriculture was lower compared to Romania's GDP growth rate, the percentage contribution of agriculture to Romania's GDP recorded a decreasing trend from 5.4% in 2013 to 4.5% in 2022, meaning -0.9 pp.

Compared to other economic sectors like industry, services and constructions, in agriculture it is the smallest GDP. On the top position is the sector of services, followed by industry, constructions and agriculture which comes on the 4th position, both in the year 2013 and in 2022 (Fig. 3 and Fig. 4).

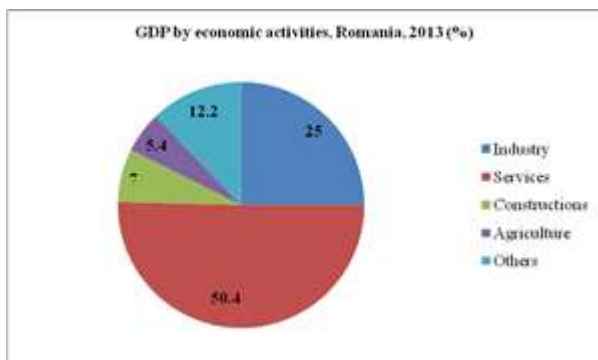


Fig. 3. Romania's GDP by activity, 2013 (%)
 Source: Own calculation based on NIS data, 2023 [17].

GDP of Romania is not as large in other EU countries and to make a comparison, usually it is considered GDP/inhabitant in PPS (purchasing power standard).

In the EU-27, the average GDP accounted for Euro 35,200 in the year 2022. Compared to This means that Romania's GDP/capita represents only 77.27%, and compared to the other EU member states, Romania is ranked 22nd, like Portugal.

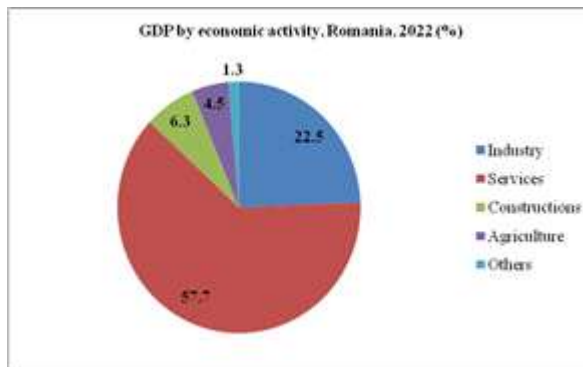


Fig. 4. Romania's GDP by activity, 2022 (%)
 Source: Own calculation based on NIS data, 2023 [17].

A number of 11 countries have a higher GDP/capita than the EU mean: Luxembourg, Ireland, Denmark, Netherlands, Austria, Belgium, Sweden, Germany, Finland, Malta and France (Fig.5).

Gross Value Added (GVA)

GVA is another important macro economic indicator, which showed an ascending trend from Lei 561.5 Billion in 2013 to Lei 1,282.3 Billion in 2022, when it was 2.28 higher than in the 1st year of analysis (Fig. 6).

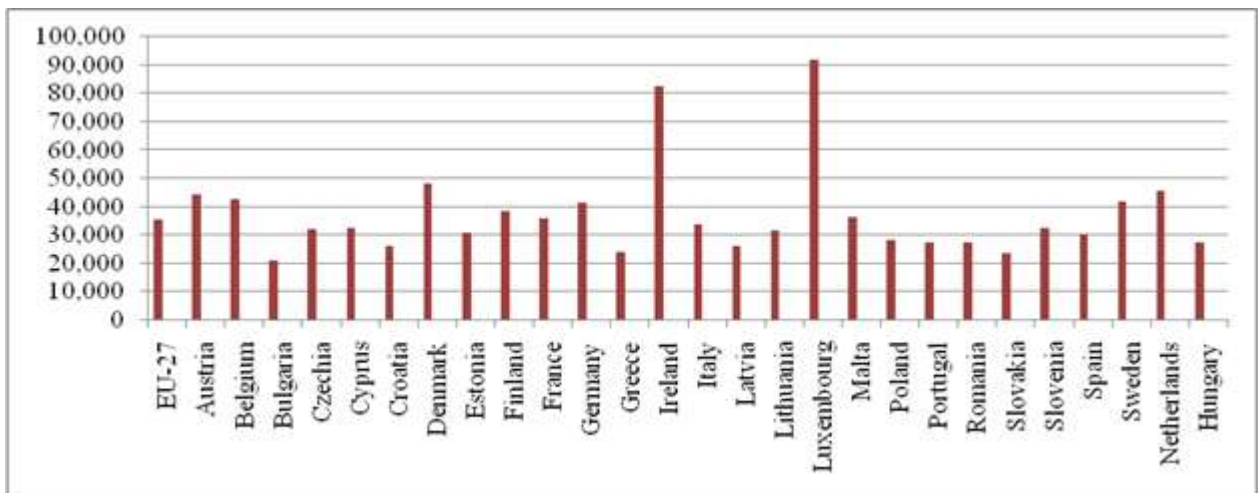


Fig. 5. GDP/capita in the EU-27 (Euro)
 Source: Eurostat, 2023 [10].



Fig. 6. Evolution of GVA in Romania's economy, 2013-2022 (Lei Billion)
 Source: Own design based on the data from NIS, 2023 [17].

GVA produced in agriculture is much smaller, but it also carried out an increasing trend from Lei 26.98 Billion in 2013 to Lei 58.98 Billion

in 2022, when it was by 118.6% higher than in the 1st year of the study (Fig. 7).

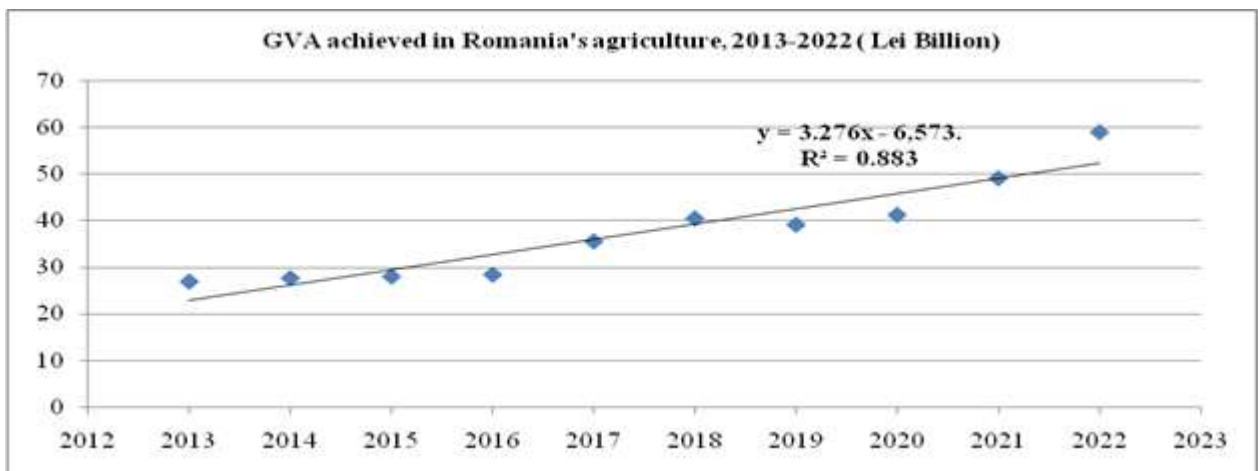


Fig. 7. Evolution of GVA in Romania's agriculture, 2013-2022 (Lei Billion)
 Source: Own design based on the data from NIS, 2023 [17].

The share of GVA achieved in agriculture in Romania's GVA varied from 4.8% in 2013 and 4.6% in 2022, which reflects that its level is very small than in the field of services, industry and constructions.

The share of GVA in Romania's GDP followed an ascending tendency from 88% in 2013 to 90.9 % in 2022, while the share of GVA produced in agriculture in GDP of agriculture also increased from 78.3% in 2013 to 93.5% in 2022.

Gross Fixed Capital Formation (GFCF)

GFCF is a component of the expenditure on GDP which reflects how much of new value added is invested than consumed. It measures the value of the fixed assets either existing or new bought by government, business sector and households minus fixed assets availability.

GFCF in Romania raised from Lei 162.9 Billion in 2013 to Lei 377,2 Billion in 2022, meaning a surplus of +131.55% in the whole interval (Fig. 8).

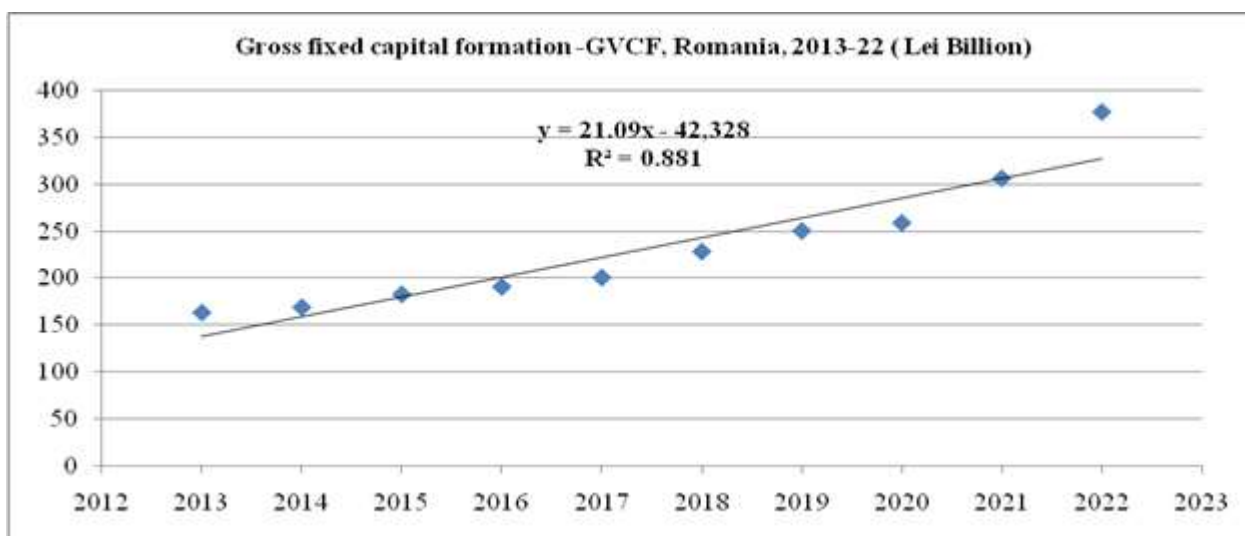


Fig. 8. Evolution of GFCF in Romania's economy, 2013-2022 (Lei Billion)
 Source: Own design based on the data from NIS, 2023 [17].

In agriculture, GFCF is very small, but it also recorded an upward trend from Lei 1.43

Billion in 2013 to Lei 2.65 Billion in 2022 (Fig. 9).

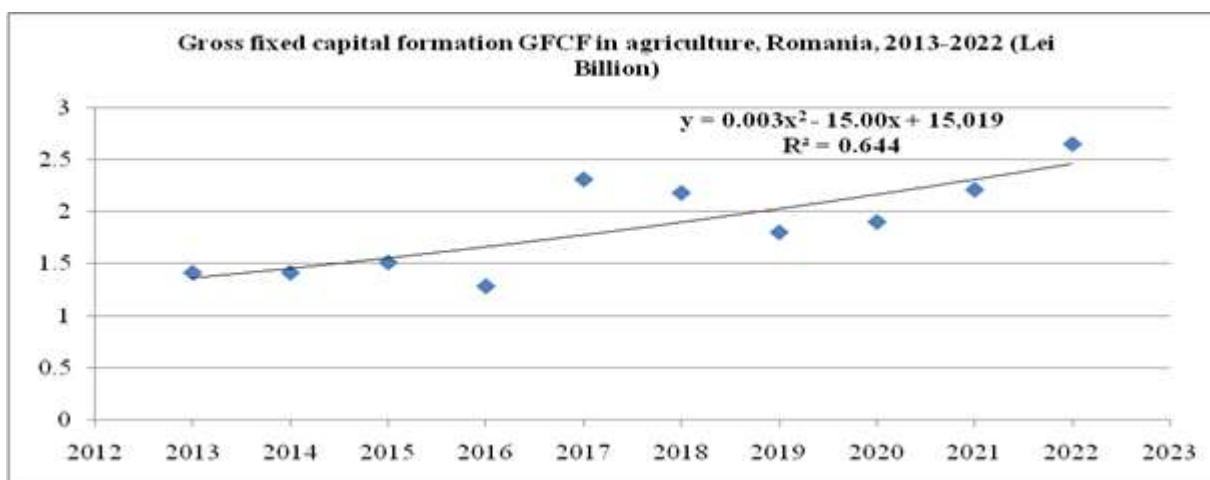


Fig. 9. Evolution of GFCF in Romania's agriculture, 2013-2022 (Lei Billion)
 Source: Own design based on the data from NIS, 2023 [17].

The share of GFCF belonging to agriculture in GFCF in the national economy is very small

and ranged between 0.87% in 2013 to 0.70% in 2022.

Net Investment Rate (NIR)

This indicator reflects how much money were spent on capital assets minus costs of the depreciation for those assets.

It reflects the efficiency of GVA as its calculation formula is the ratio between GFCF and GVA. At the national level, NIR was 28.1% in 2013 and 27.4% in 2022, with the

lowest level of 23.5% registered in 2018 (Fig. 10).

In agriculture, NIR is very small and varied between 4.3% in 2013 and 4.5% in 2022. In industry NIR is 6 times higher, while in the field of services it is 12.1 times higher that the level registered in agriculture.

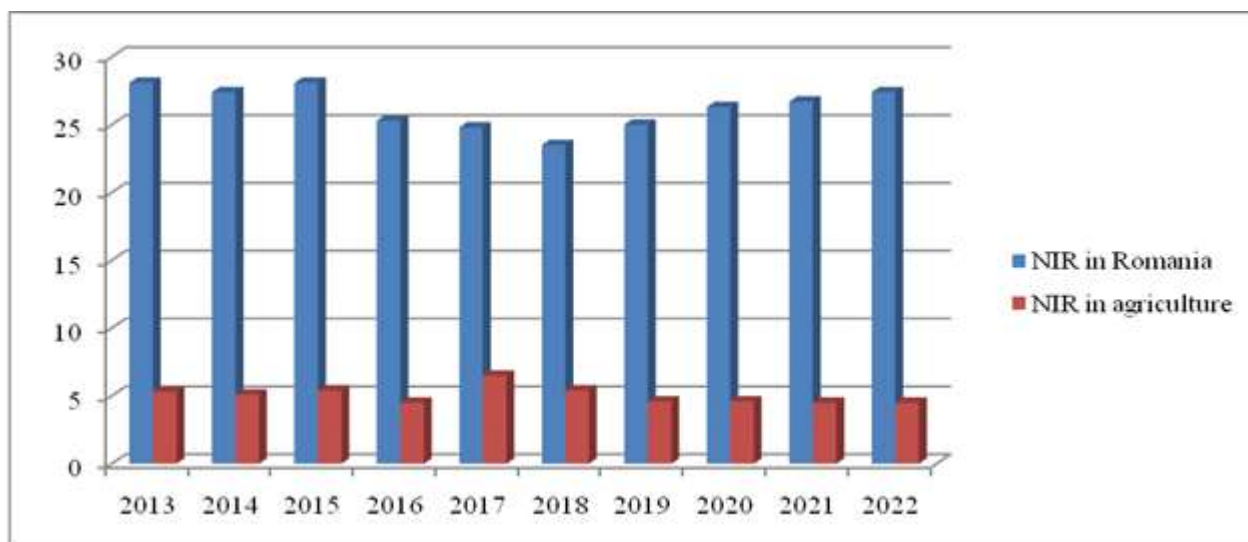


Fig. 10. Net Investment Rate, NIR in Romania and in its agriculture, 2013-2022 (%)
 Source: Own calculation based on NIS data, 2023 [17].

Employment

The number of employees in Romania's economy registered an important decline from 8,549 thousand persons in 2013 to 7,806 thousand persons in 2022, meaning a reduction by 8.7%.

In agriculture, the number of employees suffered a more severe decrease, accounting for 65.7%, from 2,557 thousand persons in 2013 to 878 thousand persons in 2022 (Fig. 11).

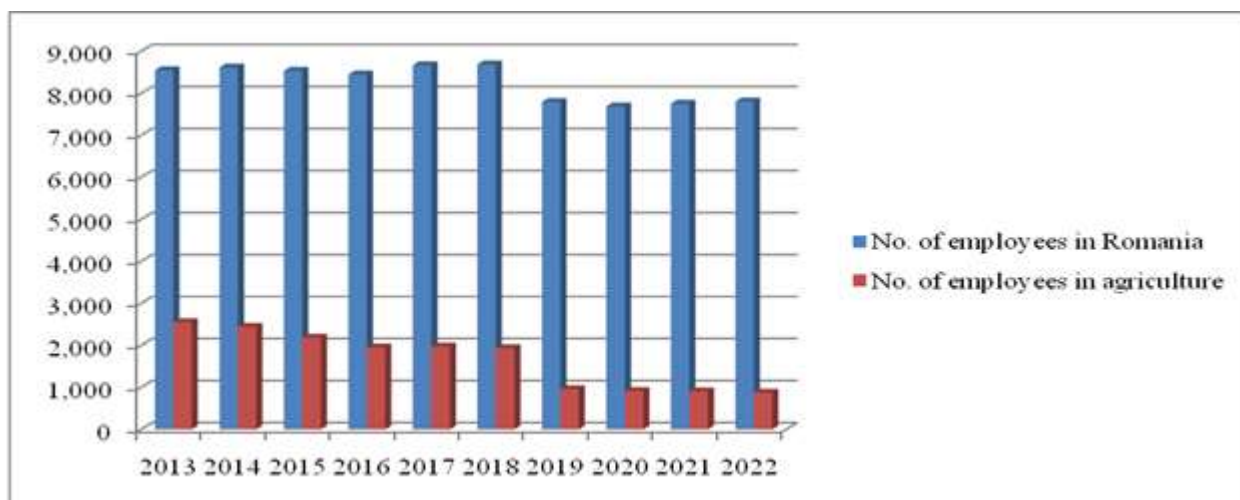


Fig. 11. Evolution of the number of employees in Romania's economy and in its agriculture, 2013-2022 (Thousand persons)
 Source: Own design based on NIS data, 2023 [17].

As a result, the share of the number of employees in agriculture from the total number of employed persons in Romania declined from 29.9% in 2013 to 11.25 in 2022 (-18.7 pp).

The highest share of employees is in the field of services where it increased from 41.8% in 2013 to 56% in 2022. Also, in industry, the number of employees increased its share in total employees at the national level from 20.9% in 2013 to 23% in 2022.

In the field of constructions, the share of the number of employees is smaller than in the sectors mentioned above and it ranged between 7.3 % in 2013 to 9.8% in 2022, reflecting an increase of 2.5 percentage points.

Romania's external trade with commodities and agri-food trade

Export

Romania intensified its external trade on international market and especially with the EU.

The value of the all exported commodities increase in the analysed interval from Euro 49,562 Million in 2013 to Euro 91,953 Million in 2022, when it resulted a surplus of +85.53%.

At the same time, the agro-food export value raised by +126.32% from Euro 5,284.4 Million in 2013 to Euro 11,960 Million in 2022 (Fig. 12).

The share of agro-food export in total export registered an upward trend from 10.75 in 2013 to 13% in 2022, meaning +2.3 pp.

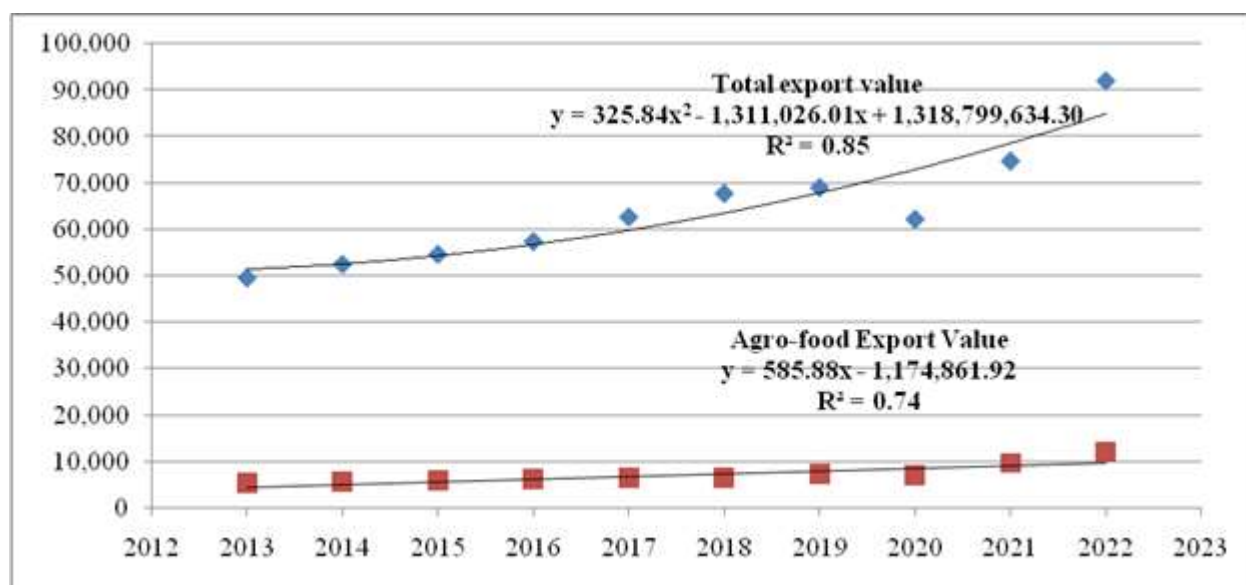


Fig. 12. Evolution of Romania's export value and of agro-food export value, 2013-2022 (Euro Million)
 Source: Own design based on NIS data, 2023 [17].

Import

Romania's total import value increased by +127.87% in the studied interval from Euro 55,317 Million in 2013 to Euro 126,054 Million in 2022.

At the same time, the value of agro-food import recorded an ascending trend from Euro 4,952 Million in 2013 to Euro 13,248.6 Million in 2022, meaning +167.54% (Fig. 13). Therefore, the share of agro-food import value in total import of Romania also went up from 8.9% in 2013 to 10.5% in 2022.

Trade balance

Romania's trade balance for all the commercialized goods registered a substantial decline, a deficit whose level was higher and higher by each year. In 2022, the deficit of the country trade balance accounted for Euro -34,191 Million, being 5.92 times higher than Euro -5,755 Million in 2013.

The balance of agro-food products was positive in the years 2013 and 2014, but since 2015, it started to register a deficit, whose value was Euro -137 Million in 2015 and at the end of the interval, in 2022, the deficit

accounted for Euro -1,288.6 Million (Table 1).

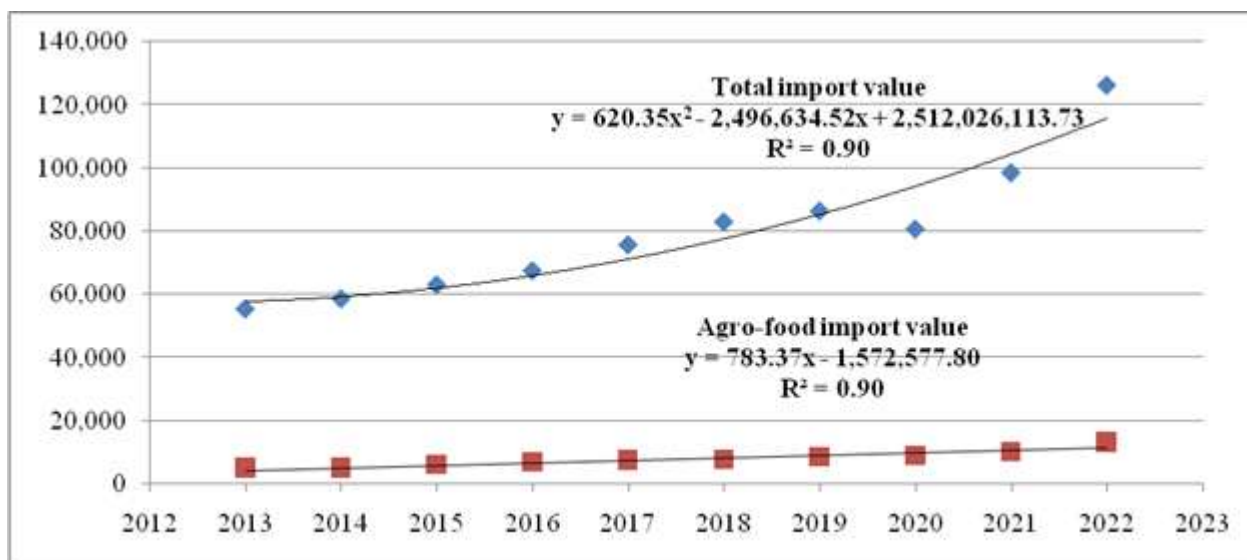


Fig. 13. Evolution of Romania' import value and of agro-food import value, 2013-2022 (Euro Million)
 Source: Own design based on NIS data, 2023 [17].

Table 1. Evolution of trade balance for all goods and for agro-food products, Romania, 2013-2022 (Euro Million)

	Total trade balance	Agro-food trade balance
2013	-5,755	332.4
2014	-6,056	456.0
2015	-8,361	-137
2016	-9,972	-619.9
2017	-12,960	-1,016.5
2018	-15,166	-1,133.5
2019	-17,295	-1,246.1
2020	-18,397	-1,938.4
2021	-23,700	-543.1
2022	-34,101	-1,288.6

Source: Own calculations based on NIS data, 2023 [17].

CONCLUSIONS

This study emphasized the role played by agriculture in Romania's economy based on the analysis of the main selected macroeconomic indicators mentioned in the national accounts systems.

In the period 2013-2022, Romania's had a 2.21 times higher GDP, which accounted for Lei 1,409 Billion in 2022.

Agriculture produced Lei 63.04 Billion GDP in 2022, when it was by +83.14% higher than in 2013.

The contribution of agriculture to Romania's GDP is smaller than in the field of services

and industry and declined from 5.4% in 2013 to 4.5% in 2022.

GVA increased 2.28 times in the economy from Lei 561.5 Billion in 2013 to Lei 1,282.3 Billion in 2022.

Agriculture produced a much smaller GVA, but it raised by 118.6% accounting for Lei 58.98 Billion in 2022. Agriculture contributed to GVA in the economy in a very small proportion, ranging between 4.8% in 2013 and 4.6% in 2022. GFCF raised in the economy by +131.55% accounting for Lei 377,2 Billion in 2022. In agriculture, GFCF is very small, but it also increased from Lei 1.43 Billion in 2013 to Lei 2.65 Billion in 2022.

At the national level, NIR was 28.1% in 2013 and 27.4% in 2022, while in agriculture it varied between 4.3% in 2013 and 4.5% in 2022, being much smaller than in the field of services and industry. The number of employees decreased substantially in the analysed decade, both at the national level and mainly in agriculture. In 2022, there were 7,806 thousand persons employed in the economy, by 8.7% less than in 2013, while in agriculture, remained just 878 thousand employees, the reduction being of 65.7% versus 2013. The causes of this situation are the period of the pandemic of Covid 19, which disturbed all the economic activities and in agriculture in addition to the migration

of rural young people to cities or abroad for better paid jobs. External trade of Romania was intensified, imports are higher than exports, resulting a negative trade balance which reflects that Romania is a net importing country.

In 2022, Romania's exports were by 85.53% higher in 2022, accounting for Euro 91,953 Million.

The agro-food export value raised by +126.32% and reached Euro 11,960 Million in 2022, which means that agriculture contributes by about 13% to Romania's exports.

Romania's total import value reached Euro 126,054 Million in 2022, while the contribution of agriculture increased by +167.54%, accounting for Euro 13,248.6 Million.

Taking into consideration the dynamics of export and import, the fact that the import value exceeded export value both in case of all commodities and in case of agri-food products, the trade balance was negative, recording a deficit higher and higher from a year to another, which in 2022 accounted for Euro -34,101 Million and, respectively for Euro -1,288.6 Million, Romania being a net importing country.

In conclusion, we may affirm that even though agriculture registered a better situation concerning its contribution to GDP and GVA, it has still gap regarding GFCF and net investment rate in comparison with industry and services. Without a better technical endowment and higher investment, agriculture cannot apply modern technologies to increase production and sustain internal market and export and to diminish imports.

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