

Ursu, Ana

Conference Paper

Trends and outlook for Romanian agricultural markets for wheat, sunflowers and sugar beet

Provided in Cooperation with:

The Research Institute for Agriculture Economy and Rural Development (ICEADR), Bucharest

Suggested Citation: Ursu, Ana (2024) : Trends and outlook for Romanian agricultural markets for wheat, sunflowers and sugar beet, In: Rodino, Steliana Dragomir, Vili (Ed.): Agrarian Economy and Rural Development - Trends and Challenges. International Symposium. 15th Edition, The Research Institute for Agricultural Economy and Rural Development (ICEADR), Bucharest, pp. 65-75

This Version is available at:

<https://hdl.handle.net/10419/319507>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

TRENDS AND OUTLOOK FOR ROMANIAN AGRICULTURAL MARKETS FOR WHEAT, SUNFLOWERS AND SUGAR BEET

Ana URSU

Research Institute for Agricultural Economics and Rural Development – Bucharest

Corresponding author e-mail: ursu.ana@iceadr.ro

Abstract: *Transformations in agri-food systems are driven by changes and adaptations in the way agricultural products are produced, distributed and consumed to respond to current economic, social and environmental challenges. These transformations are influenced by various factors such as climate change, increasing demand for sustainability, technological innovations of precision and automation in production and logistics, as well as the influence of trade policies on the production and trade of wheat, sunflower and sugar beet, etc. The study analyzes trends and prospects of agricultural markets for the three agri-food products and has as its main objective to examine production trends, price fluctuations and determinants influencing these markets. The research methodology is based on the use of the methods: analysis, synthesis and comparison. The results obtained contribute to the formulation of recommendations for adapting producers to new market conditions and trends.*

Keywords: *agriculture, market, production, trade, sustainability*

JEL classification: O52, Q1, Q17, R1

INTRODUCTION

Food systems are undergoing a number of significant transformations in response to technological, economic, social and environmental changes. Transformations related to increased productivity, specialisation of farming systems, optimisation of resources, automation of farming operations, changes in supply chains, changes in consumer preferences, the impact of climate change on agri-food systems, etc. all influence the production, demand, prices and marketing of agricultural products. The adaptation of supply to market stimuli takes place in several stages. In the very short term, when market demand increases, supply remains rigid. In the medium term, supply increases, but rather slowly, as more variable factors (raw materials, longer working hours, etc.) are added, while fixed factors remain unchanged. (Alexandri, C., Davidescu I., Gavrilescu D., 2004)

At the global level, agricultural markets are influenced by numerous trends and factors related to climate change, population growth, technological innovation and trade policy. From this point of view, there was a need for a study on the trends and prospects of the agricultural markets for wheat, sunflower and sugar beet in Romania.

MATERIALS AND METHODS

Taking into account the above-mentioned problems, the following indicators were analysed in order to assess the trends and prospects of the agricultural markets for wheat, sunflower and sugar beet: cultivated areas, production yields, exports, imports, export value, import value, trade balance, producer prices. The research methodology is based on the use of analysis, synthesis and comparison methods. The data used to carry out the study come from

the National Institute of Statistics (NSI) and the Food and Agriculture Statistics Organisation (FAOSTAT). In terms of descriptive statistics, the quantitative values of the indicators were calculated based on the functions: minimum, maximum, mean, standard deviation, coefficient of variability, annual growth rate. (Excel, 2016). The interpretation of the coefficient of variability was based on the course *Descriptive Statistics 1. Central tendency - arithmetic mean, 2. variability*. (Maniu D., 2024).

RESULTS AND DISSCUSION

The supply of products on the market consists of domestic production, stocks and imports. (Țimiraș L. C., 2012). The demand for agricultural products is determined by domestic consumption, which consists of human consumption, intermediate consumption (seed consumption, fodder consumption, industrial processing, industrial processing), etc. (Hotărăre 154, 2002). Given that the aim of this paper is to highlight the trends and prospects of the agricultural markets for wheat, sunflower and sugar beet, we will present some of the indicators that contribute to the formation of these components from a supply and demand point of view.

Table 1: Evolution of wheat production indicators

Indicators	2015	2016	2017	2018	2019	2020	2021	2022	2023	Average	Stdev	CV %
Area	2107	2138	2053	2116	2168	2155	2175	2169	2318	2155	72,3	3,4
Total prod.	7962	8431	10035	10144	10297	6392	10434	8684	9624	9112	1355	14,9
Average prod.	3780	3944	4888	4793	4749	2966	4797	4004	4152	4230	640	15,1

Source: own calculations based on NSI data, Tempo Online (thousand ha; thousand tons; kg/ha)

Table 1 shows the evolution of the indicators in terms of area (thousand ha), total production (thousand tonnes) and average production (kg/ha) of wheat. The three indicators do not show significant variations. In the nine years of production, wheat production exceeded 10 million tonnes for three consecutive years, in 2017, 2018 and 2019. Total wheat production was also influenced by the average yield. The best production year for wheat in the whole period analysed was 2021, with 10.4 million tonnes, with an increase in area (2175 thousand ha compared to 2155 thousand ha cultivated in 2020) and average yield (4797 kg/ha compared to 2966 kg/ha) compared to 2020.

Table 2: Evolution of sunflower production indicators

Indicators	2015	2016	2017	2018	2019	2020	2021	2022	2023	Average	Stdev	CV %
Area	1012	1040	998	1007	1283	1143	1124	1093	1078	1086	90,2	8,8
Total prod.	1786	2032	2913	3063	3569	2123	2844	2107	2016	2495	613,2	24,6
Average prod.	1765	1955	2917	3041	2783	1858	2530	1927	1870	2294	517	22,5

Source: own calculations based on NSI data, Tempo Online (thousand ha; thousand tons; kg/ha)

Table 2 shows the evolution of the indicators in terms of area (thousand ha), total production (thousand tonnes) and average production (kg/ha) of sunflower. The three indicators do not show significant variations in terms of area (CV is 8.8%), but the data for total and average production are relatively homogeneous statistically. The representative years for the total production indicators are 2018 and 2019, although the average production in 2019 decreased compared to the previous year (2783 kg/ha compared to 3041 kg/ha). The maximum total sunflower production of 3.56 million tonnes was achieved against the background of an increase in the area under sunflower (1.2 million ha in 2019 compared to 1.0 million ha in 2018).

Table 3: Evolution of sugar beet production indicators

Indicators	2015	2016	2017	2018	2019	2020	2021	2022	2023	Average	Stdev	CV%
Area	26596	24924	28204	25723	22729	21326	19639	8888	12446	21164	6572	31,1
Total prod.	1040827	1012186	1174502	978266	917163	718483	783534	281331	403672	812218	300093	36,9
Average p.	39135	40611	41643	38031	40351	33691	39896	31655	32434	37494	3841	10,2

Source: own calculations based on NSI data, Tempo Online (ha; tons; kg/ha)

The technical production indicators for sugar beet show the most significant changes. The area decreased on average by 9.06%/year, the total production by 11.7%/year and the average yield by 2.32%/year. The best production results were achieved in 2017, when the total production increased to 1.17 million tonnes against the background of the expansion of the area from 26 thousand ha in 2016 to 28 thousand ha in 2017, and the average production from 40.6 tonnes in 2016 to 41.6 tonnes in 2017. Unfavourable results are found in 2022. The cultivated area reaches 8.8 thousand ha compared to 19.6 thousand ha cultivated in 2021, which reduces the total production and the average production. Table 3.

Table 4: Evolution of producer prices (RON/tonne)

Product	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average	Stdev	CV %
Wheat	760	750	640	660	690	730	800	960	1500	832	268	32,1
Sunflower	1290	1510	1530	1380	1330	1310	1520	2010	2900	1642	520	31,7
Sugar beet	160	160	130	130	130	140	140	130	190	146	21	14,2

Source: own calculations based on NSI data, Tempo Online

Prices vary considerably for wheat and sunflower, with a coefficient of variability of 32.1% for wheat and 31.7% for sunflower, and much more stable for sugar beet (14.2%). In bumper years, prices are lower than in years with lower yields. It can be said that prices mechanically drive a corresponding variation in output. There is a mismatch between when production is obtained and when it is brought to market, which creates a mismatch between biological rhythms and price fluctuations, leading to production cycles. Production decisions are influenced by past prices. (Alexandri, C., Davidescu I., Gavrilescu D., 2004)

Analysing production yields

Agricultural supply is determined by natural factors. Climatic factors, diseases and pests affect plant growth and production. The production yield per hectare depends on the type

of seed used, the application of fertiliser, the availability of agricultural machinery and the availability of irrigation (Wik, M., Pingali, P. and Brocai, S., 2008). By analysing and monitoring yields, production technologies can be adapted to cope with climate change and ensure their stability. Variations in the production yields of wheat, sunflower and sugar beet are indicated by the coefficient of variability (CV), which is determined by expressing the standard deviation from the mean for the period 2015-2023. Wheat has a CV of 15.1%, indicating that there is year-to-year variation in wheat yield, the data are relatively statistically homogeneous, and the sample is representative of the mean. The dispersion of the data around the mean (4230 kg) is 640 kg. The exception is the year 2020 when the yield was 2966 kg/ha, 29.9% below the mean. Sunflower has a coefficient of variability of 22.5%, the dispersion of the data around the mean (2294 kg) is 517 kg.

The highest yield stability is found for sugar beet. The coefficient of variability is 10.2%, with a deviation from the mean of 3841 kg. "Yield affects food security. Increased production yields ensure domestic needs and surplus production is exported, reducing import dependency. Production yields play an important role in the achievement of the *Sustainable Development Goal SDG 2: ZERO Hunger*, namely the achievement of the 2030 target: 'Doubling the share of agriculture in Romania's GDP, compared to 2018'. (INS, 2023). The increase in agricultural yields is one of the additional indicators contributing to the achievement of this goal.

Market and supply chains for cereals, sunflowers and sugar beet

The distribution and marketing of wheat, sunflowers and sugar beet involves agricultural producers, transporters/warehouse, processors, distributors, regulators and government agencies, consumers, etc., all of whom play an important role in the supply chain from production to consumer. Each of the three markets has its own challenges in terms of logistical requirements and obstacles that supply chain actors need to overcome in order to be profitable. Logistical bottlenecks can be caused by inadequate warehousing and poor transport infrastructure in some parts of the country.

Table 5: Storage capacity - total authorised capacity (tonnes)

Total authorised capacity (tonnes)	Silo (tonnes)	Storage (tonnes)	Number of operators
17363926	8453844	8910082	3714
100%	48,7	51,3	

Source: Ministry of Agriculture and Rural Development

According to MADR data, storage capacities are distributed throughout the country, which can be correlated with the production potential for cereals and oilseeds. The total storage capacity is over 17.3 million tonnes, of which 48.7% (8.5 million tonnes) can be stored in silos and 51.3% (8.9 million tonnes) in warehouses. Table 5.

Romania's main modes of transport are rail, road, inland waterways and sea. In this context, we can say that exports require complex infrastructures such as ports and properly equipped logistics terminals. Coordination between producers, distributors, transporters, etc. is necessary to reach the market on time. Logistics prices are directly influenced by fuel prices

and transport demand, which affects the competitiveness of agricultural products. The most developed mode of transport in Romania is road transport. Figure 1.

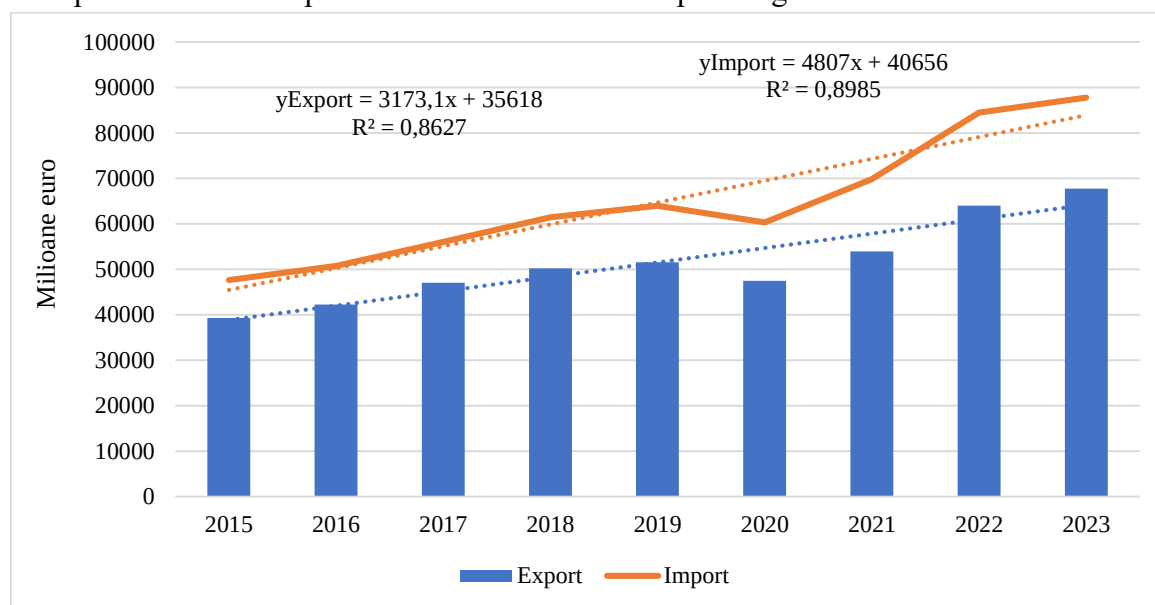


Figure 1: Exports (FOB) and imports (CIF) by road

Source: INS data, Tempo Online

Wheat production per inhabitant shows some stability, with a deviation from the mean (470 kg/inhabitant) of 71 kg, giving a stability of 15.2%, and an average annual increase of 2.90%. Sunflower production per inhabitant varies more widely, from 90.1 kg/inhabitant to 184 kg/inhabitant, with a dispersion of 32 kg/inhabitant around the mean (129 kg), which does not give stability, the data sample being relatively homogeneous from a statistical point of view. The average annual growth is 2.02%/year for the period analysed. Sugar beet has a coefficient of variability of 36.1%, with per capita production varying from 52.5 kg/capita in 2015 to 21.2 kg/capita in 2023, with a negative annual growth rate of -10.72%/year on average. Figure 2, Table 6.

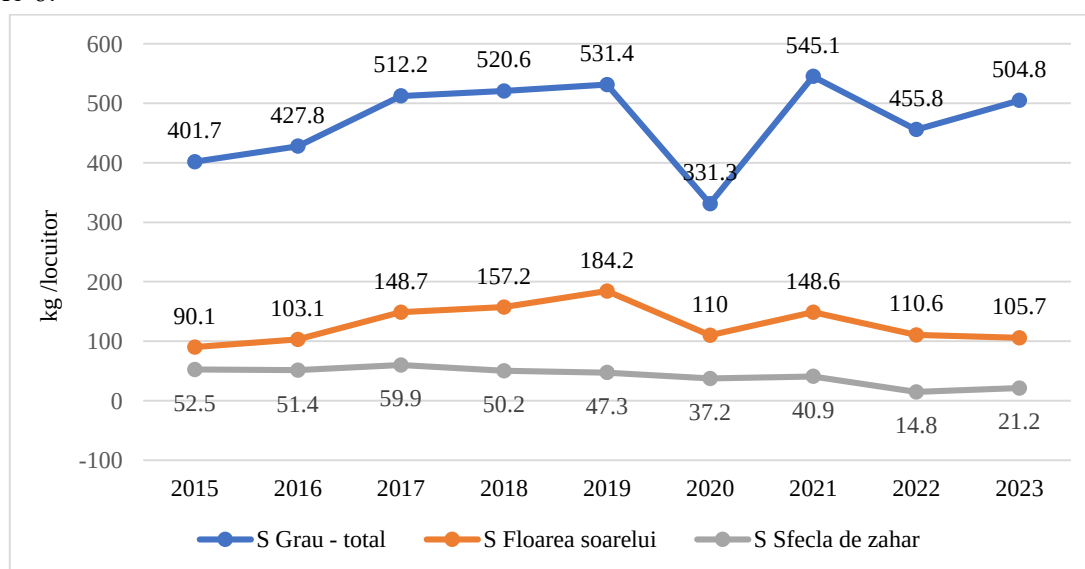


Figure 2: Wheat, sunflower and sugar beet production/population

Source: INS data, Tempo Online

Table 6: Descriptive statistics indicators of output per capita (kg)

Nr. crt.	The product	Minim	Maxim	Average	Stdev	Coefficient of variability (%)	Annual growth rate (%)
0	1	2	3	4	5	6	7
1	Wheat	331	545	470	71	15,2	2,90
2	Sunflower	90	184	129	32	24,6	2,02
3	Sugar beet	15	60	42	15	36,1	-10,72

Source: own calculations based on NSI data, Tempo Online

Foreign trade

Romania's foreign trade is influenced by climatic conditions, by annual fluctuations in the import and export of cereals and by the lack of export infrastructure accessible to some producers, taking into account their geographical distribution. A characteristic feature of trade in cereals and oilseeds is the difficulty in securing qualitatively homogeneous quantities for international transactions (Zahiu, L., et al., 2010).

Romania trades with both intra-EU and extra-EU countries. Imports and exports are statistically valued at FOB (Free on Board) prices, and imports at CIF (Cost, Insurance, Freight) prices. For exports, the FOB value represents the value at which the goods were sold by the exporter, including transport, insurance and other costs for bringing the goods on the means of transport to the Romanian border. For imports, the CIF value represents the value at which the goods are purchased by the importer, including transport and insurance costs for bringing the goods to the Romanian border. (Gheorghe F., 2014)

Exports of wheat and sunflower have given farmers access to international markets, with the benefits of increasing their incomes, exporting to more markets and protecting them from fluctuations in demand and prices on the domestic market. However, the external market also has to respond to challenges in terms of higher transport costs, compliance with international regulations, risks associated with global international market conditions (economic conditions, trade policies and tariffs) (NSI, 2024).

Table 7: Wheat exports/imports (million tons)

	2015	2016	2017	2018	2019	2020	2021	2022	Average	Stdev	CV %
Export	3,56	6,99	5,77	5,88	6,10	4,30	6,91	5,68	5,65	1,18	21,0
Import	0,65	2,16	1,31	0,69	0,86	1,21	0,95	1,05	1,11	0,48	43,4
Balance +	2,90	4,84	4,46	5,19	5,25	3,09	5,95	4,64	4,54	1,06	23,3

Source: FAOSTAT

Between 2015 and 2022, an average of 5.65 million tonnes will be exported, with significant quantities in 2019 and 2021 (6.10 million tonnes in 2019 and 6.91 million tonnes in 2021). Small quantities of wheat will be exported in 2015 (3.56 million tonnes) and 2020 (4.30 million tonnes). The quantities imported have a high coefficient of variability of 43.3%, which means that the quantities imported in the period under review differ significantly from the

average of the analysed interval (1.11 million tonnes). The quantitative export-import balance is in favour of exports, also with a variation of 23.3%. Table 7. The trade balance indicates a competitive economy in wheat exports.

Table 8: Wheat export/import (billion USD)

	2015	2016	2017	2018	2019	2020	2021	2022	Average	Stdev	CV %
Export	0,77	1,26	1,12	1,23	1,26	0,96	1,80	2,08	1,31	0,43	32,7
Import	0,13	0,37	0,25	0,14	0,18	0,25	0,26	0,32	0,24	0,08	35,5
Balance +	0,64	0,90	0,88	1,09	1,08	0,71	1,54	1,76	1,07	0,39	36,5

Source: FAOSTAT

As the world wheat supply remained at a high level during the period analysed, the international prices remained uncompetitive for the domestic producers, except in 2021, when Romania obtained USD 1.54 million from wheat exports, and in 2022, when it obtained USD 2.08 million. From a value point of view, both wheat exports and imports vary significantly, the CV being 32.7% for export value and 35.5% for import value, and the CV for trade balance being 36.5%, which means that the values are relatively statistically heterogeneous. Table 8. Regarding the exchange rate for trade transactions, it can be seen that exporting at a favourable exchange rate makes products more competitive in foreign markets, but increases the cost of imports.

Table 9: Sunflower export/import (million tonnes)

	2015	2016	2017	2018	2019	2020	2021	2022	Average	Stdev	CV %
Export	1,10	1,18	1,33	1,70	2,05	1,48	1,45	1,45	1,47	0,30	20,4
Import	0,19	0,20	0,28	0,31	0,33	0,24	0,23	0,65	0,30	0,15	49,3
Balance +	0,91	0,99	1,06	1,39	1,72	1,24	1,21	0,80	1,17	0,30	25,4

Source: FAOSTAT

Romania is recognised on the international market as a net exporter of sunflower seeds, occupying the first place in sunflower seed exports. During the period analysed, the exported quantities maintain the same upward trend as the domestic production, reaching 2.05 million tons in 2019, due to the favourable weather conditions. The quantities exported vary relatively homogeneously around the average (1.47 million tonnes), with a coefficient of variability of 20.4%. **Table 9.**

Table 10: Sunflower exports/imports (billion USD)

	2015	2016	2017	2018	2019	2020	2021	2022	Average	Stdev	CV %
Export	0,50	0,54	0,59	0,76	0,84	0,69	0,99	1,17	0,76	0,23	30,3
Import	0,14	0,15	0,18	0,23	0,22	0,24	0,27	0,54	0,25	0,13	51,1
Balance +	0,36	0,39	0,41	0,53	0,62	0,45	0,72	0,63	0,51	0,13	25,5

Source: FAOSTAT

Compared to the quantities of sunflowers exported, the value indicators show greater variability. This is due to price variability. The coefficient of variability for export value is 30.3%, the value data are relatively statistically homogeneous, for import value 51.1%, the variability of export value data differs significantly from the average.

Table 11: Sugar beet export/import (thousand tons)

	2017	2018	2019	2020	2021	2022	2023	Average	Stdev	CV %
Export	67	59	46	53	32	45	121	60	29	48,3
Import	369	383	473	346	440	511	514	434	69	15,9
Balance -	-302	-324	-427	-293	-408	-466	-392	-373	67	-18,0

Source: Own calculations based on data from the Ministry of Agriculture and Rural Development, Agriculture, Field Crops

Foreign trade in sugar is characterised by a negative trade balance, as Romania is a net importer of raw and white sugar (Zahiu, L., et al., 2010). Romania still imports most of its sugar needs. In 2022 and 2023, more than 500 thousand tonnes will be imported. The imported quantities are statistically relatively homogeneous, the CV is 15.9% and the standard deviation (69 thousand tonnes) from the average (434 thousand tonnes) is relatively small. In 2023, Romania exported 121 thousand tonnes, contributing to the reduction of the trade balance to 392 thousand tonnes compared to 2022, when the balance was 466 thousand tonnes. Table 11.

Table 12 Sugar beet exports/imports (million euro)

	2017	2018	2019	2020	2021	2022	2023	Average	Stdev	CV %
Export	32	26	18	23	15	28	101	35	30	86,2
Import	169	146	169	140	186	292	360	209	84	40,0
Balance -	-138	-120	-151	-118	-171	-264	-259	-174	62	-35,7

Source: Own calculations based on data from the Ministry of Agriculture and Rural Development, Agriculture, Field Crops

In terms of value, both imports and exports differ significantly from the averages, with a coefficient of variability of 86.2% and a standard deviation of 30 million euro from the average. The value of imports has a variability of 40%, with a deviation of EUR 84 million from the average, contributing to an increase in the trade balance of 35.7%. The increase in the trade balance in favour of imports is reported in 2022 (€264 million) and 2023 (€259 million), compared with 2020 (€118 million) and compared with 2018 (€120 million). The increase in producer prices in the last years, 2022 and 2023, compared to 2017-2021, contributes to this increase. Table 12.

Policies and subsidies to support cereal, sunflower and sugar beet producers

In general, wheat, sunflower and sugar beet are supported by the main forms of support: Basic Income Support for Sustainability (BISS), Complementary Redistributive Income Support for Sustainability (CRISS), Transitional National Aid 1 (ANT 1) - arable crops payment, and Complementary Income Support for Young Farmers (CYS). Environmental and

climate related eco-schemes are payments to farmers to partially compensate for additional costs and income losses. As application for the eco-schemes is voluntary, producers of wheat, sunflowers and sugar beet can apply for intervention PD-04 (agri-environmental measures) and small farms and traditional households can apply for intervention PD-5 (environmentally friendly farming practices). In addition, sugar beet benefits from ANT-6 and coupled income support (intervention PD-16). (APIA, 2024). The amount of coupled aid is an indicative planning amount of 900 euro/ha for a planned area of 20,000 hectares in 2023. Sugar beet is an important crop both economically and socially, as well as in terms of environmental benefits: the well-developed foliage apparatus provides very good ground cover and thus contributes to soil carbon storage. (PNS, 2023-2027).

Agricultural market trends and outlook

The study *Agricultural and food markets: Trends and prospects* highlights the main projections for consumption, production, trade and prices for 25 agricultural commodities for the period 2022-2031. According to the study, agricultural demand is expected to slow down over the next decade. International trade will remain essential for food security in food-importing countries and for rural livelihoods in food-importing countries. Changes to this outlook will be caused by weather variability, plant and animal diseases, changing input prices, macroeconomic developments and other uncertainties, etc. (OECD-FAO, 2024).

The European Commission's report *"Short-term outlook of agricultural markets: gradual but fragile return to stability"* states that agricultural markets are showing signs of stabilising: food inflation has fallen, the fertiliser market is stabilising, trade flows have returned to normal, domestic production is showing signs of recovery, and so on. EU cereal production in 2024/2025 is estimated at 260.9 million tonnes, about 7% below the 5-year average and the lowest production in the last decade; oilseed production is estimated at 29.7 million tonnes (-8% y/y) due to a reduction in rapeseed area and unfavourable weather conditions for sunflowers; EU sugar production in 2024/2025 is estimated to increase by up to 1 million tonnes compared to 2023 (European Commission, 2024).

CONCLUSIONS

The trends and prospects of the agricultural markets for wheat, sunflower and sugar beet have generally followed the main indicators that contribute to the supply and demand of these products. The average share of cultivated area in Romania's arable land is 25.9% for wheat, 13.1% for sunflower and 0.3% for sugar beet. The trends for wheat and sunflower areas would be to maintain these percentages rather than to reduce or increase them. Sugar beet is one of the crops for which financial support is available to increase its area to 20 000 ha. The total production of the three crops is determined on the one hand by the area cultivated and on the other hand by the production yield. The increase in yield per hectare is determined by the technology used, the availability of irrigation water, etc. From this perspective, investment is needed to acquire precision technologies for better management and resource efficiency.

Wheat and sunflower provide sufficient raw material for domestic needs. Sugar beet is imported at an average rate of 86% (373 thousand tonnes). The National Strategic Plan 2023-2027 foresees support measures to avoid the risk of sugar beet abandonment and restructuring of processing units.

In terms of wheat and sunflower exports and imports, Romania is among the top 10 countries in the world, the trade balances are in favour of wheat and sunflower exports in both quantity and value, and in terms of international market prices, Romania is 16th for wheat prices (average USD 197/t) and 11th for sunflower prices (average USD 396/t).

For sugar beet, the trade balance is negative in both quantity and value. With an average of 60 000 tonnes exported and 7.2 times as many imported (434 000 tonnes), the trade balance in value terms is on average -174 million euro.

REFERENCES

1. Alexandri C., D. Gavrilesu, I. Davidovici (coordonatori), (2004). *Tratat de Economia Agriculturii*, Academia Română, Institutul de Economie Agrară, Editura Expert, pag. 239, pag. 242.
2. Gheorghe, F., (2014). *Statistici de comerț Internațional cu bunuri în concept comunitar. Colocviul BNR. Statistica sectorului extern în contextul noilor standarde metodologice*. Institutul Național de Statistică, pp. 3-6, bnro.ro
3. Maniu, D., (2024). BIOSTAT, Universitatea Babeș-Bolyai din Cluj Napoca, Statistica descriptivă. Tendința central – Deviația standard, <https://www.phys.ubbcluj.ro/~dana.maniu/BIOSTAT/C2.pdf>
4. Țimiraș L. C., (2012). Marketing agroalimentar – curs universitar, Universitatea Vasile Alecsandri din Bacău, Facultatea de Științe Economice, Departamentul de Marketing și Management, Specializarea Marketing, ISBN 978-606-527-182-1, pag. 20.. <https://cadredidactice.ub.ro/timirascatalina/files/2012/05/curs-marketing-agroalimentar-2012.pdf>
5. Wik, M., Pingali, P. and Brocai, S., (2008). Global agricultural performance: past trends and future prospects, <https://openknowledge.worldbank.org/server/api/core/bitstreams/c130efa5-4ffa-5a25-bb9a-3c11c36360d6/content>
6. Zahiu, L., Toma, E., Dachin, A., Alexandri, C. (coord.), (2010). *Agricultura în economia României – între așteptări și realități*, Editura Ceres, București, pag. 65, pag 67, pag 73.
7. *** OECD iLibrary, (2024). Agricultural and food markets: Trends and prospects, <https://www.oecd-ilibrary.org/docserver/e4a3f0ec-en.pdf>
8. *** OECD-FAO Agricultural Outlook, (2024). *Agricultural and food markets: Trends and prospects*, <https://doi.org/10.1787/0ce5d1ed-en>, https://www.oecd-ilibrary.org/agriculture-and-food/oecd-fao-agricultural-outlook-2024-2033_0ce5d1ed-en
9. *** EU European Commission - Directorate-General for Agriculture and Rural Development, (2024). *Short term outlook of agricultural markets: gradual but fragile return to stability*, https://agriculture.ec.europa.eu/news/short-term-outlook-agricultural-markets-gradual-fragile-return-stability-2024-10-08_es
10. *** FAO (Food and Agriculture Organization), (2024). *Agricultural and food markets: Trends and prospects* <https://openknowledge.fao.org/server/api/core/bitstreams/5a8ff399-34bf-4cfe-b1a7-84b2359ed246/content>
11. *** MADR, (2024). Culturi de camp, <https://www.madr.ro/culturi-de-camp/plante-tehnice/sfecle-de-zahar.html>
12. *** INS - Institutul Național de Statistică, 2023. *Indicatori Naționali pentru Dezvoltare Durabilă, Orizont 2030*, pag. 209, Editura Institutului Național de Statistică, ISBN 978-606-8590-31-8, <https://insse.ro/cms/files/POCA/Raport-INDD-Orizont2030-27042023.pdf>
13. *** Hotărâre 154/2022. *Oferta și cererea la principalele produse agricole în anul 2002*, <https://lege5.ro/gratuit/gm3tonzx/oferta-si-cererea-la-principalele-produse-agricole-in-anul-2002-hotarare-154-2002?dp=gizdcmr4zte>
14. *** INS, 2024. Comerțul internațional, EXP101M - Exporturile (FOB), pe principalele moduri de transport, <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table>
15. *** Ministerul Agriculturii și Dezvoltării Rurale (MARD), <https://old.madr.ro/pages/depozite/alba-depozite-autorizate-2012.pdf>

16. ***Planul Național Strategic (PNS), 2023-2027, pag. 418, pag. 598.
17. ***Ministerul Agriculturii și Dezvoltării Rurale, *Lista spații autorizate pentru depozitarea produselor agricole*, <https://www.madr.ro/lista-spatii-autorizate-pentru-depozitarea-produselor-agricole.html>
18. ***APIA, (2024). Ghid informativ Plăți directe și ANT-2024, Ghid-informativ-plati-directe-si-ANT-2024.pdf
19. *** Excel, (2016). Asistență Microsoft