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STUDY ON THE MAIN OILSEED PRODUCTION, PROCESSING AND STORAGE CAPACITIES IN ROMANIA

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Abstract: *The purpose of the work is to analyze the main production, processing and storage capacities of rapeseed, sunflower and soybean boxes in Romania, starting from general information such as cultivated areas, productions, the number and capacity of storage spaces, the analysis is based on statistical data from the period 2013-2022 collected from INS and MADR. Considering their wide use, it is opportune to analyze them based on the bibliometric, bibliographic, statistical-mathematical data analysis and the cause-effect diagram. The analysis showed that the county with the largest area cultivated with sunflowers is Dolj, with Călărași rape and Brăila soybeans, the calculated yields being 2,725 tons/ha for sunflower, 3,022.89 tons/ha for rape and 3,422 tons /ha for soybeans. In the pessimistic scenario, the forecasted productions for the period 2023-2026 for sunflower could vary between 1,937-2,089 thousand tons, and in the optimistic one between 3,866-4,018 thousand tons. For rapeseed, in the pessimistic scenario, the predicted productions for the period 2023-2026 could vary between 331-450 thousand tons, and in the optimistic one between 1,946-2,166 thousand tons. For soybeans in the pessimistic scenario, the forecasted productions for the period 2023-2026 could vary between 74-130 thousand tons, and in the optimistic scenario between 415-535 thousand tons. Knowing the production potential for oilseeds in irrigated and non-irrigated systems, we appreciate that the forecast values are plausible, considering that the forecast was made taking into account the calculated multi-year averages.*

Keywords: *sunflower, rapeseed, soybean, processing, storage*

JEL classification: Q10, Q15

INTRODUCTION

Oilseeds are used in the production of food, animal feed and fuel, but also for industrial purposes. Oil and flour are obtained by crushing the seeds. Vegetable oil is generally used in the food industry or to produce biodiesel, while oilseed meal is an important component of animal feed (European Commission, 2018). Given the importance and multiple uses of these crops, they were studied by researchers so that on July 27, 2023, there were 767 articles related to sunflower, 590 to rape and 294 to soy in the Scopus database. The sunflower appeared, it seems, since 3000 BC, being brought to Europe by a Spanish explorer around 1569, its role being an ornamental plant and much later it was exploited in human and animal nutrition, as well as medicinal (Mureșan et al., 2013). Turek-Rahoveanu, in 2018, addressed the issue of land used for sunflower cultivation as a raw material for the seedoil industry. Consumption of new and improved products such as cold-pressed oils can improve human health and prevent certain diseases (Siger et al., 2008). China's edible oil industry has developed very rapidly, being one of the largest producers, consumers and exporters of oilseeds and vegetable oils in the world (Wang,2011). Rapeseed oil can be used for food consumption, as a raw material for the manufacturing industry and in the production of biodiesel. A by-product of processing is rapeseed meal, which contains valuable feed properties (Tanasiichuk et al.,2021). Watson et al. 2017, claims that there is a high demand for protein-rich animal feed materials in Europe, and European agriculture has a deficit of about 70% in terms of them, of which 87% is covered by imported soybeans and soybean meal.

MATERIAL AND METHOD

Several methods of data analysis and processing were used in the paper, the first research method used to be "bibliometric analysis" which was based on the SCOPUS database for searching, filtering and extracting scientific articles relevant to the topic addressed, having as reference period 1971-2023, by studying identified scientific articles, filtered by title, abstract and keywords. The second research method used is the "bibliographic analysis" which aimed to extract the official data existing in the research scope of the work. The data was collected by accessing the MADR and INS databases. The third method used was the statistical-mathematical analysis, this studying the phenomena and processes from a quantitative point of view, in order to describe them and to discover the laws that govern their manifestation, by calculating the statistical parameters: mean, variance, standard deviation of the mean, coefficient of variability etc.

RESULTS AND DISCUSSION

Out of the 93 countries where sunflowers are grown, Romania ranks 4th worldwide and first in Europe, having a share between 19.94% and 22.69% of the area cultivated with sunflowers in the EU countries. At the national level, in the period 2013-2022, there are counties where the average area cultivated with sunflowers was below 1,000 ha and they were no longer represented on the map (made according to the data collected from the INS database, calculating multi-year averages) and counties such as those in the SE of the country where the average areas have reached close to 80,000 ha. The calculated average was 27,097 ha. The county with the smallest average, which was represented on the map, is Vâlcea with 1,388 ha and the one with the largest area is Dolj with 89,464 ha. Although they are adjacent, the climatic and soil characteristics are totally different, those of Dolj being categorically more favorable for sunflower cultivation.

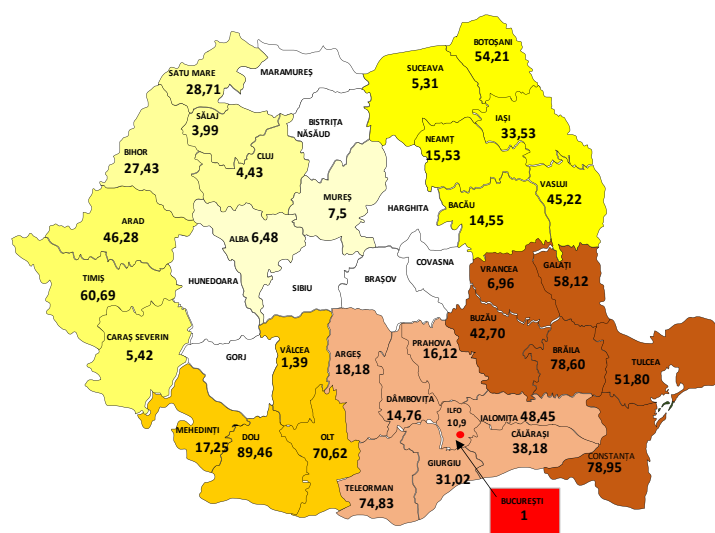


Figure 1 - Distribution by county of the surface areas cultivated with sunflowers - thousand ha

Source: INS data processing

Rapeseed is one of the most common oilseed crops, being a sustainable crop, with major producing countries considering it a strategic crop. This is due to the importance of rapeseed oil as a

food product, as it can compete with olive oil. Canola oil lowers blood cholesterol and can prevent heart attacks and strokes. It is widely used in industry as a biofuel. Green plant material, hay and meal are the feed for cattle. This crop is an excellent green manure and an excellent honey plant. Rapeseed is grown in 60 countries around the world, Romania ranking 12th worldwide and 4th in Europe, having a share between 4.47% and 9.52% of the area cultivated with rapeseed in European countries. At the national level, there are counties such as those in the SE of the country where the average areas have reached close to 37,000 ha. The calculated average was 11,668.5 ha. The county with the smallest average represented on the map was Cluj with 1,290 ha, and the one with the largest Călărași with 50,600 ha.

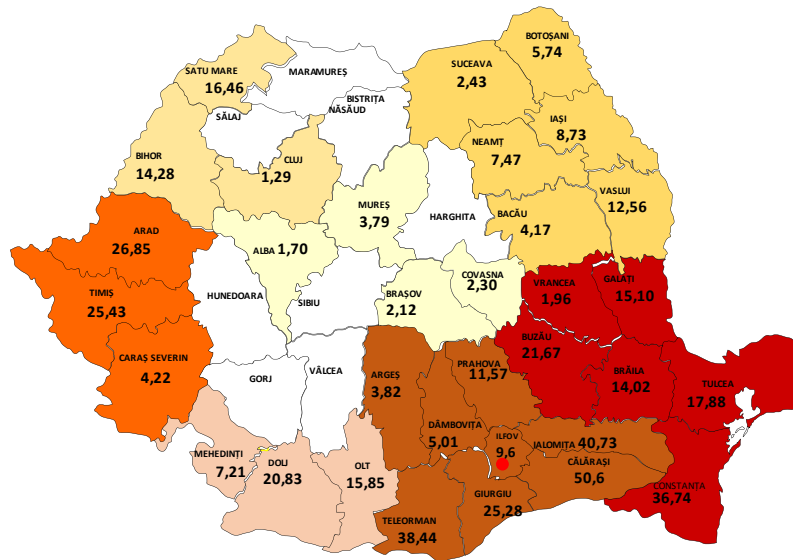


Figure 2 - The distribution of rapeseed crops by county - thousand ha
Source: INS data processing

Soybean is as important as wheat, rice and corn, being a drought tolerant crop. Southeast Asia is its natural habitat, where they have a long frost-free period, humid and hot summers.

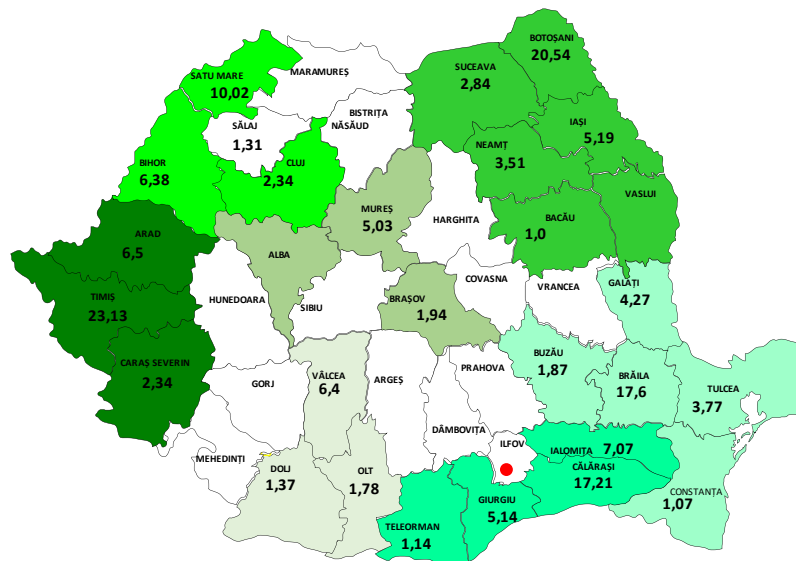


Figure 3 - The distribution by county of the surfaces cultivated with soybeans -thousand ha
Source: INS data processing

Out of the 118 countries around the world where rapeseed is grown, Romania ranks 22nd worldwide, while at the European level it ranks 2nd, having a share between 13.47% and 17.23% of the area cultivated with soybeans in European countries . At the national level, there are counties such as those in the West of the country where the average areas have reached close to 23,000 ha (Timiș). The calculated average was 11,668.5 ha. The county with the lowest average was in Constanța County with 1,074 ha, and the largest in Timiș County with 23,129 ha.

In terms of productions and yields, multi-year averages were calculated for the analyzed period, resulting in Romania taking the 4th place in the world with 2,760 thousand tons of sunflowers, the 12th place in the world in rapeseed with a calculated average production of 1,255 thousand tons, and in soybean ranks 18th in the world with a calculated average production of 383 thousand tons. From the point of view of calculated yields, Romania ranks 11th in the world with 2,514 tons/ha in sunflower, 9th in the world in rape with an average calculated yield of 2,614 tons/ha and 5th in the world in soybeans with an average calculated yield of 2,473 tons/ha.

At the national level, the average production of sunflowers varied between 234,789 tons in Dolj county and 10,537 tons in Caraș-Severin. Counties with production below 1,000 tons were not represented on the graph (Graph 1).

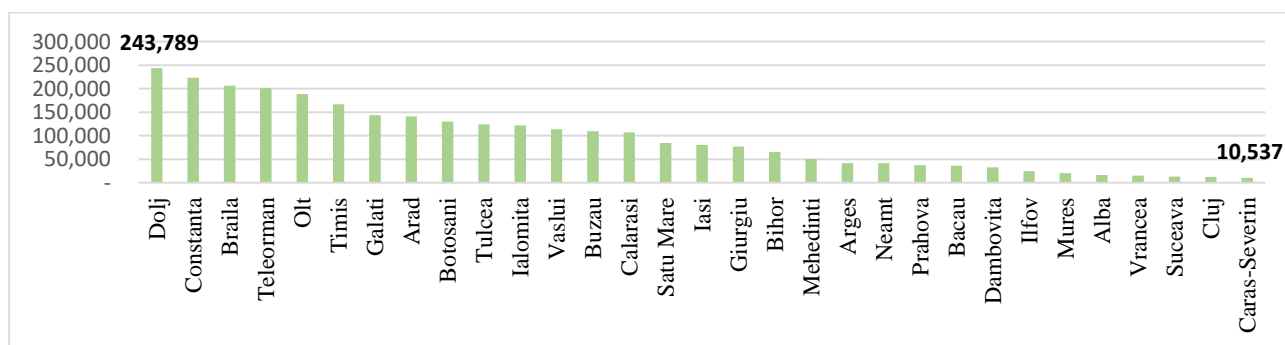


Figure.4- Average sunflower production by county (tons)

Source: INS data processing

Taking into account the analyzed data, a forecast can be made for sunflower productions using the Forecast function. In the pessimistic scenario, the forecasted productions for the period 2023-2026 for sunflower could vary between 1,937-2,089 thousand tons. In the optimistic scenario, productions could vary between 3,866 – 4,018 thousand tons (figure 5). Knowing the production potential for sunflower in irrigated and non-irrigated systems, we consider that the forecast values are plausible, considering that the forecast was made taking into account the calculated multi-year averages.

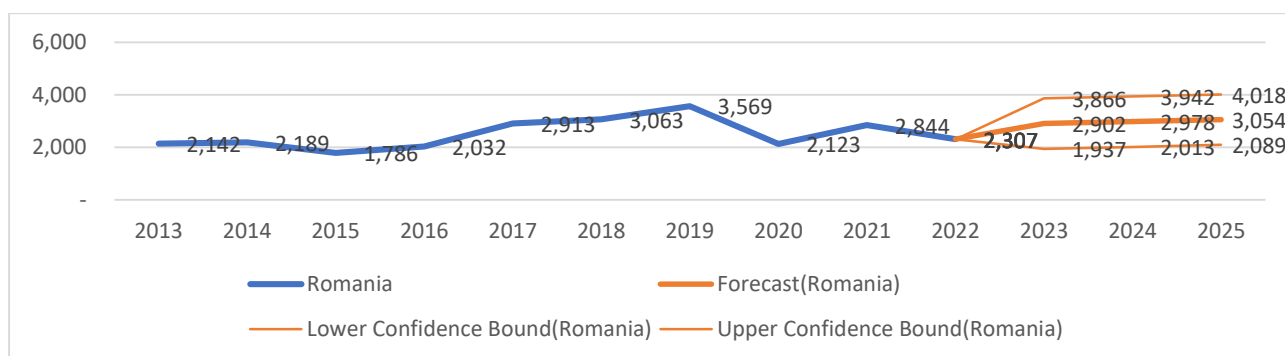


Figure 5- Sunflower production forecast for 3 years

Source: INS data processing

In rapeseed, the average production varied between 152,965 tons in Călărași County and 1,458 tons in Sălaj County. Counties with production below 1,000 tons were not represented on the graph (figure 6).

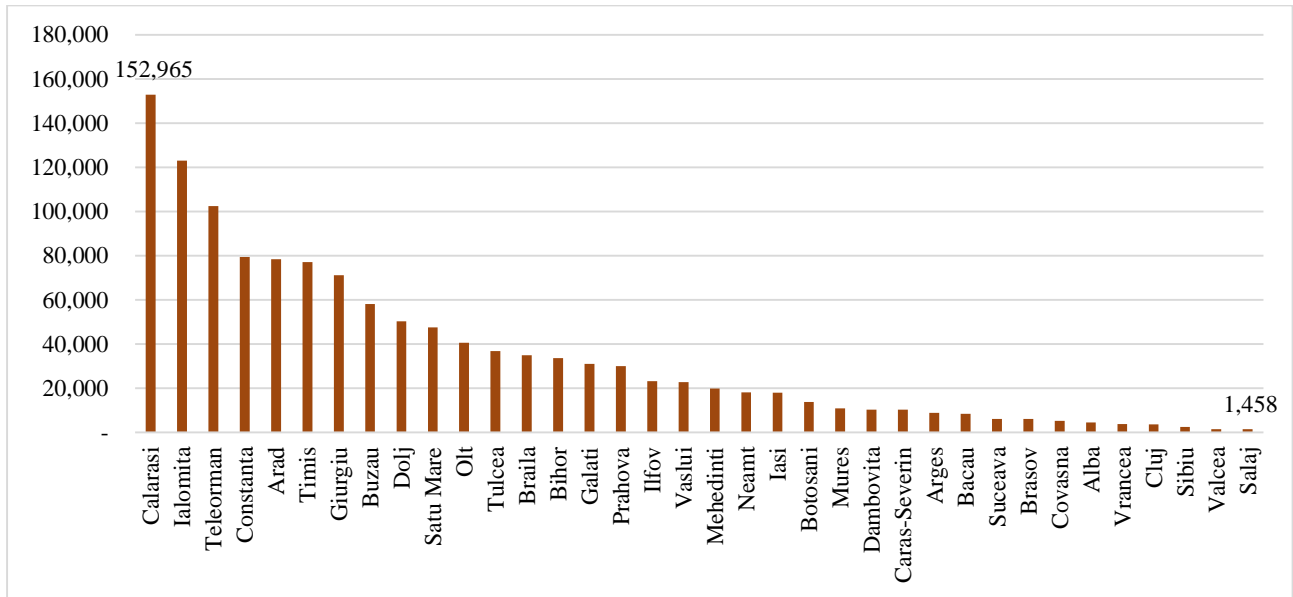


Figure 6. - Average rapeseed production by county (tons)

Source: INS data processing

Taking into account the analyzed data, a forecast can be made for rape production using the Forecast function. In the pessimistic scenario, the forecasted productions for the period 2023-2026, for rape could vary between 331-450 thousand tons. In the optimistic scenario, the productions could vary between 1,946-2,166 thousand tons, and in this case we appreciate that the forecasted values are plausible, considering that the forecast was made taking into account the calculated multi-year averages (figure 7).

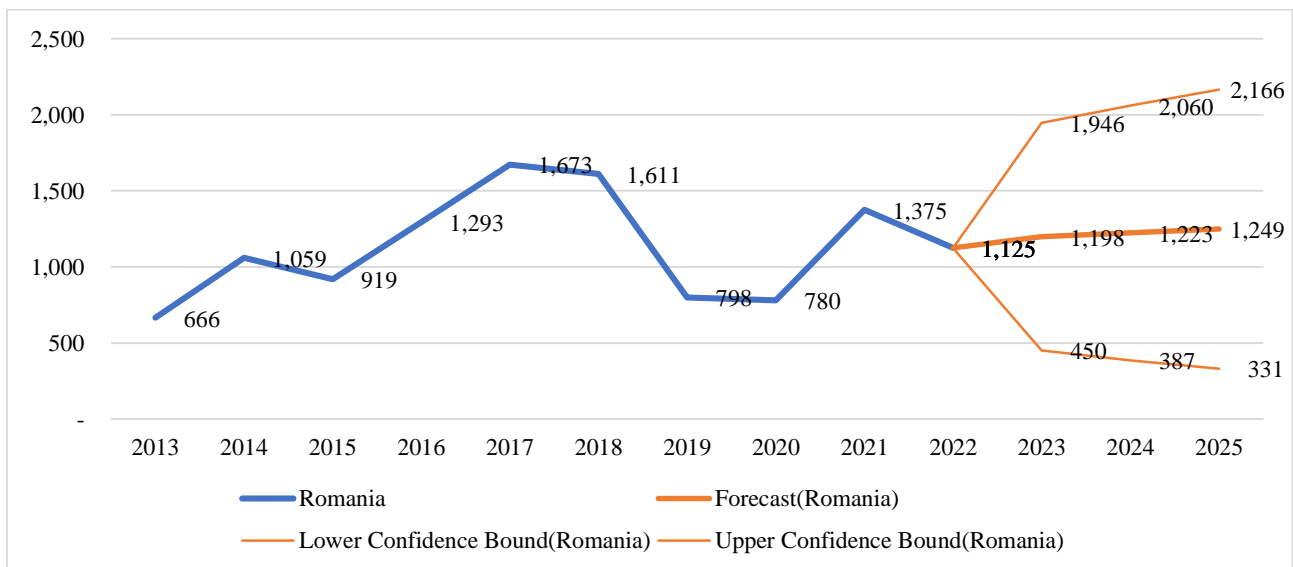


Figure 7. Rapeseed production forecast for 3 years

Source: INS data processing

For soybeans, the production average varied between 60,247 tons in Brăila county and 1,143 tons in Vaslui county. Counties with production below 1,000 tons were not represented on the graph (figure 8).

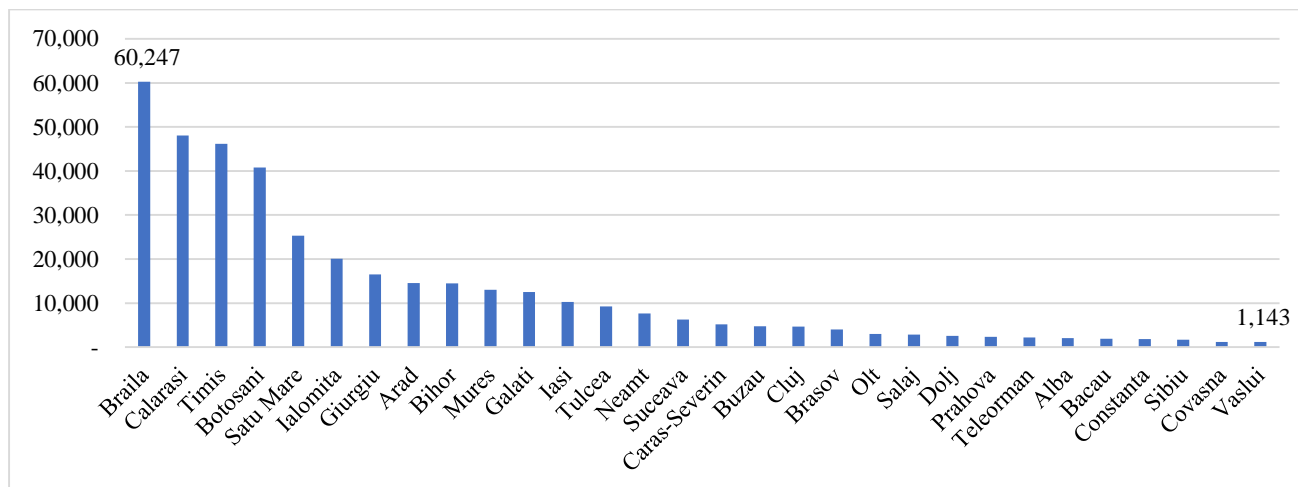


Figure 8. Average soybean production by county (tons)

Source: INS data processing

Taking into account the analyzed data, a forecast can be made for soybean production using the Forecast function. In the pessimistic scenario, the forecasted productions for the period 2023-2026 for soybeans could vary between 74-130 thousand tons. In the optimistic scenario, the productions could vary between 415-535 thousand tons, and in this case we appreciate that the forecast values are plausible, considering that the forecast was made taking into account the calculated multi-year averages.

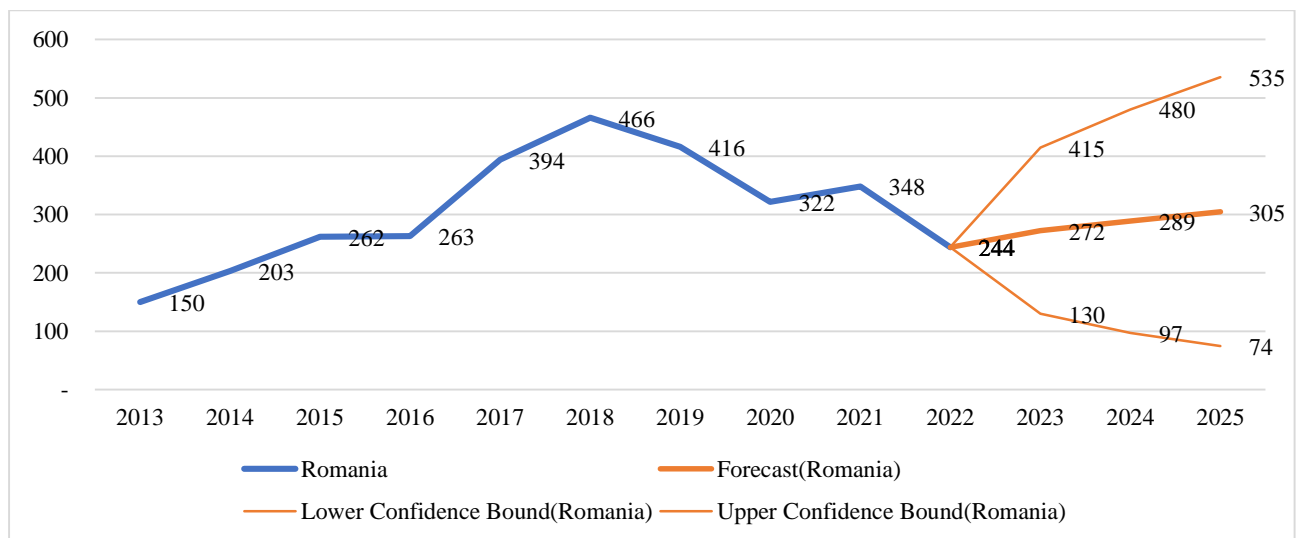


Figure 9. - Soybean production forecast for 3 years

Source: INS data processing

On the website of the Ministry of Agriculture, the list of authorized spaces for the storage of agricultural products, for each individual county, is available. In Romania, there are 5,541 authorized operators operating storage facilities, most of them being located in Muntenia, Banat-Crișana and Moldova (3,904), representing 70.46% of the total number at country level. The 22 counties in the mentioned regions are located in plain or meadow agricultural areas, mainly storing cereals. The total

authorized capacity in these 3 regions is 19.3 million tons, representing 65% of the total per country (Table no. 1).

Table 1. The situation of operators who exploit storage spaces, by geographical region

No crt	Region	No. economic operators operating storage facilities	Total authorized capacity (tonnes) of which:	Silo	Storage	Average number of operators	Capacity average/operator
1	Maramureş	201	1,071,790	615,000	456,790	101	5,332
2	Banat-Crişana	1132	5,467,038	2,184,749	3,282,289	283	4,830
3	Oltenia	534	2,882,442	1,360,036	1,522,406	107	5,398
4	Transilvania	413	1,205,855	592,719	613,136	41	2,920
5	Moldova	838	3,942,996	1,606,463	2,336,533	105	4,705
6	Muntenia	1934	9,944,625	5,228,018	4,716,608	176	5,142
7	Dobrogea	489	5,070,091	2,331,618	2,738,473	245	10,368
TOTAL COUNTRY		5,541	29,584,837	13,918,603	15,666,235		

Source: processing according to the List of authorized spaces for the storage of agricultural products, MADR <https://www.madr.ro/lista-spatii-autorizate-pentru-depozitarea-produselor-agricole.html>

By county, the number of operators operating storage spaces varies from 513 in Timiș County to 5 in Sălaj County. In the Municipality of Bucharest there are two operators that exploit storage spaces, one based in Berceni and one in the Obor area. Regarding the storage capacity, it varies between 4,100,945 tons in the Jud. Constanța and 6,300 tons in Jud. Bistrita-Năsăud. The first 10 counties (Constanța, Timiș, Calarasi, Ialomița, Dolj, Teleorman, Arad, Brăila, Satu-Mare and Ilt) totaling 18,941,135 tons, i.e. 63.67% of the country's storage capacity.

Constanța County ranks first with a total storage space of 4,100,945 tons and an average of 12,503 tons/warehouse, followed by Timiș County with a total storage space of 3,181,764 tons. Analyzing and comparing the data shows that in the counties of Caraș-Severin, Ialomița, Bacău, Călărași, Brăila the storage spaces are fewer but larger, and in Timiș they are more and smaller. The average storage capacity per country was calculated at 5,369 tons/storage space.

According to the information on the website of the Ministry of Finance regarding the companies, we have compiled a list of the main oilseed processing companies.

Tabel 2. Oil processing plants

TOWN	PRODUCT	TRADE NAME
Buzău	sunflower oil	Floriol
Lehliu	rapeseed oil, sunflower processing of soybeans biodiesel production	Unisol Raza soarlui Ulvex
Traian	processes rapeseed sunflower and soybean seeds	Kaliakra pt export Bulgaria
Iași	processes rapeseed sunflower and soybeans	
Slobozia	sunflower and rapeseed oil sunflower and rapeseed meal biodiesel	Bunica Marisol Ulcom
Galati	sunflower oil	Spornic

TOWN	PRODUCT	TRADE NAME
	sunflower meal sunflower pellets	
Țândărei	sunflower oil imported from Moldova	Ultex
Carei	oil and sunflower rapeseed and soybean meal	Ardealul
Constanța	oilseeds srots and pellets of sunflower and rapeseed	Argus Sorica Tomis

Source: Ministry of Finance data processing, company websites

CONCLUSIONS

The informational system provided by this study provides an overview of the production, processing and storage capacity of oilseeds in Romania, its realization being up-to-date in the conditions where consumers are increasingly demanding regarding the quality of the seeds and the products obtained. The adaptation capacity of Romanian structures (producers, processors, warehouses, sellers) was analyzed with the help of a system of resulting value indicators, which were calculated on the basis of data taken from established databases.

The 2022 agricultural year began for Romania with a prolonged drought and very high prices for fertilizers and energy that affected especially spring crops, in this case sunflower. The start of the conflict between Russia and Ukraine upset Romanian producers, as they were not prepared to face the new socio-economic conditions. However, the sunflower situation became quite serious following the drought that continued long into the summer. According to the latest data updated by MADR (November 1, 2022), the total area affected by drought was 1,017,358 ha, and the areas affected by drought were reported nationally in 38 counties. Of the affected area, 22% (224,112 ha) were sunflowers, where productions lost at least 30% due to drought and soil dryness.

At this moment the association seems to be the solution for the adoption of coherent measures at the level of the entire sector, at the level of the county and the country. Unfortunately, this relies heavily on interpersonal relationships and capital of trust in a community, not being rooted in a contractual approach. Agricultural associations with a representative role predominate, and associative forms with an economic purpose are very little developed. Small producers must mobilize their resources, form their administrative capacities and the infrastructure necessary to access the market, and all these desired are more easily achieved within structures that allow the coordination of efforts and the division of tasks.

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