Eastern Journal of European Studies
DOI: 10.47743/ejes-2024-0107 • JUNE 2024 • VOLUME 15, ISSUE 1

How competitive is Romania's agro-export sector? Study from 2012 to 2021

Medalit De La Cruz Castellanos ✉ [a], **Ana Lucía Nieto Ochoa** [a], **Katia Soledad Ramos Leon**[a], **Miguel Ángel Capuñay Reátegui**[a], **Danton Arturo Escalante Yaulilahua**[a]
[a] Universidad Continental, Peru

Abstract
Within the member countries of the European Union, Romania is consolidated as the country with the sixth largest agricultural area and the fifth largest arable area; this natural advantage allows it to be a major agricultural producer and possibly a potential agro-exporter in the world. This research sought to analyse the competitiveness levels of the Romanian agro-export sector through its five most representative products using a competitiveness matrix; as a complement to the analysis, the Revealed Comparative Advantage indicator was used; the information was extracted from the ITC-TradeMap. As general results, Romania evidenced a solid agro-export sector, which manages to compete with the main exporters in the world and even manages to take advantage of different categories of the selected target markets, as is the case of Sunflower Seed.

Keywords: agro-export sector, competitiveness study, dynamism, top exporters and Romanian case

Introduction

Romania is one of the 27 member countries of the European Union (EU hereinafter) and since its accession in 2007, this sector has experienced an accelerated economic development (Dima et al., 2018). Romania ranks sixth in agricultural area among the 27 EU countries with 13.3 million hectares and its 8.3 million hectares of arable land makes it the fifth (Ministry of Foreign Affairs, 2021). It has a natural advantage par excellence (Daniels et al., 2013). Like many European countries, over the centuries, its territory has varied, although the Romania we know today is one of the largest countries on the European continent; but it is perhaps a little unimaginable that Romania, having a larger surface area than the Netherlands, is less competitive in the agricultural and agro-export sector. The Netherlands is a country with a small territory but occupying important competitive positions (Escalante et al., 2022);

✉ Medalit De La Cruz Castellanos, Faculty of Business Sciences, Universidad Continental, Peru; email: 74036556@continental.edu.pe.

perhaps this is due to its communist past and the period in which it was unable to develop economically before 1989.

After the collapse of the communist system in 1989, the transition to a market economy and land reform have helped the sector, generating more jobs in Romania (Tocco et al., 2012). Today, after joining the EU and the end of its communist past, Romania is able to take advantage of this development and its agricultural sector is beginning to grow rapidly, so much so that its production is no longer only used for local consumption, but also for export; a clear advantage of being within the EU-27 is that it opened the doors to a high demand market and that, due to its incorporation, the levels of requirements and tariff barriers were reduced.

Joining the EU also helped the sector, as there are policies and programmes within the EU to develop the agricultural sector, such as the Common Agricultural Policy [CAP] and currently the United Nations 2030 Agenda (Burja et al., 2020).

Learning and knowledge also allow this development of the sector, especially for small producers (Tudor, 2015), occupying almost 94% of agricultural production in Romania, where in most cases it is subsistence production (Popescu et al., 2016); although the largest production is concentrated in small groups of producers who are especially companies with larger investment capital and who have developed the Romania agro-export sector in recent years, making it more competitive.

Different authors have tried to explain and measure competitiveness, from the best known in the world of management, Michael Porter, to international organisations such as the Economic Commission for Latin America and the Caribbean [ECLAC hereinafter] (Labarca, 2007). Michael Porter (1991) states that competitiveness is the process in which companies manage to differentiate themselves from their competitors by improving their production processes; Ivancevich and Lorenzi (1997) state that the competitiveness of nations is the ability to place the products of a given country in new markets and to keep them. As for Balassa (1965), he defines that the level of specialization of the production of the countries is considered an advantage over their competitors, subtracting market share and Bonifaz and Mortimore (1999) seek to measure export efficiency to analyse the competitiveness of countries. In this sense, in order to measure competitiveness, Mandeng (1991) proposes that through the available export and import data, the levels of competitiveness of the countries should be analysed, but also the dynamism of the importing countries; this is where Ramón Lacayo and Cristian Morales proposed in 2007 a matrix in which the level of competitiveness of the exporting countries and the dynamism of the importing countries can be visualized.

The understanding of importing and exporting markets is of vital importance for all countries in the world, since there is no country that has not imported or exported a product. Given the current level of globalisation, countries tend to trade internationally more often than centuries ago, which is why competitiveness studies are important to establish policies for the promotion of an export sector or for the import of goods and services (Mandeng, 1991).

Likewise, the agricultural sector from an economic or business sciences perspective is not widely studied. However, the importance of agriculture should be present in all areas of science, since we could survive several months without internet or electricity, but without food or drinking water the panorama would be different.

As Balassa defines (1965) that countries with higher level of specialisation manage to outperform their competition, the present research also included the Revealed Comparative Advantage [RCA] indicator; so, this indicator will help us measure the level of specialization and with it the level of competitiveness (Yu & Qi, 2015). Several researches (Chasanah et al., 2017; Kathuria, 2013) showed the usefulness of RCA in understanding the competitiveness of exporting products and countries.

Given that there is no research on the competitiveness of the Romanian agro-export sector in terms of the competitiveness matrix, this study is important for Romania and countries that wish to understand in a simple way the situation of the sector until 2021. These studies, as already mentioned, are important because they allow countries to determine their competitiveness policies (Török, 2008), to promote and focus resources on the sectors or products where they can boost their growth and development in international trade (Talikadze, 2020).

The products that Romania produces the most are Maize and Wheat, the production of Maize being the one that has the largest presence in the crop fields (FAOSTAT, 2022); however, Romania exports more Wheat than Maize, this is mainly due to the high costs of fertilizers and a consumer market not so attractive to produce Wheat (Sala et al., 2016) Romania considers better to import Wheat and then re-export it together with its national production (FAOSTAT, 2022), thus becoming its main agro-export product. Despite all this, in the last decade the production of these grains has increased considerably, achieving production for local demand and for export (Soare & Chiurciu, 2016), as well as a surplus trade balance (Popescu, 2018).

Wheat production is very large in Romania; however, it does not achieve the performance of neighbouring countries so it is important to help producers with various programmes to improve their production (BE Soare, 2018); even so, Romania manages to maintain its market because wheat consumption is part of the daily diet in the world (Marin, 2014).

As mentioned, the most produced crop in Romania is Maize. Being the largest producer of all EU countries, it becomes a key element in the competitiveness of the agricultural export sector in Romania; added to this are the advantages that the demand is increasingly constant and higher from importing countries and a higher yield per hectare favours the production and attractiveness of this grain (Soare & Dobre, 2016).

Romania is also the main producer of Sunflowers Seeds, the only product where it leads the world exports and it is expected that in the coming years it will continue to lead the production and export (Popescu, 2012); after sunflower seeds,

Romania also produces and exports Rapeseed and also other oilseeds (Pânzaru et al., 2020); given the consumption trend in recent years, the production of these oilseeds has been growing and other producers have joined such as Argentina, Brazil and Canada (Arghiroiu et al., 2015). In the coming years Romania could focus on new markets outside the European Union, such as Russia and Ukraine (Ionel, 2014), because of its regulation on agrochemicals for pest control and its impact on production with a lower loss in production, it offers a greater opportunity for new markets.

The fifth most exported product from Romania is Barley, which due to its use in different sectors and its high demand, such as the brewing industry, is expected to achieve higher yields per hectares planted in the coming years through good foliar fertilisation (Tarjoc & Tabără, 2011) and an improvement in the phenotypic level of barley (Vasilescu et al., 2022).

The main objective of this study is to understand the competitiveness of the Romanian agro-export sector through its five main exported products. For this purpose, it will be compared with the world´s main exporters of each product and will be added to the analysis of the main target markets; it will also analyse the behaviour and provide recommendations for policy makers interested in this sector in Romania.

As general results, Romania evidenced a good competitive level in all the categories studied, being the Sunflowers Seeds category where it leads the world exports and reveals its level of competitiveness, and the second category is Colza Seed. In the rest of the categories analysed, it maintains its good levels of competitiveness despite not being among the main agro-exporting countries.

1. Methodology and data

Three formulas were used to analyse Romania´s competitiveness divided into two categories: the specialisation indicator (with the RCA) and the competitiveness indicators for the elaboration of the matrix are detailed below:

1.1. Revealed Comparative Advantage [RCA]:

This indicator makes it possible to measure and compare the level of specialisation and thus the comparative advantage of a product or group of products of a given country (Addison-Smyth, 2005); likewise, this indicator can be used to compare this advantage with competing countries; if the value of the indicator exceeds 100, it can be affirmed that the product analysed possesses a comparative advantage (Utkulu & Seymen, 2004). The formula is as follows:

$$VCR_{ij} = \frac{(X_{ij}/X_j)}{(X_i/X)} \times 100 \quad (1)$$

Where:
VCR ij: The RCA of product i from country j
X i: Total world exports of product i
X: Total exports from the world
X ij: total exports of product i from country j
X j: total exports of country j

1.2. Competitiveness indicators

Dynamism or sectoral participation index [SP].

This indicator makes it possible to analyse the behaviour of the product under study and compare it with the country's total imports.

$$SP_i = \frac{M_i}{M_{total}} \times 100 \quad (2)$$

Where:
SP i: dynamism of product i
M i: imports of product i in the country considered for the analysis
M total: Imports of all products of the country under analysis

Competitiveness or market share [MS]:

Unlike the SP indicator, this one analyses the behaviour of products and exporting countries; the formula is as follows:

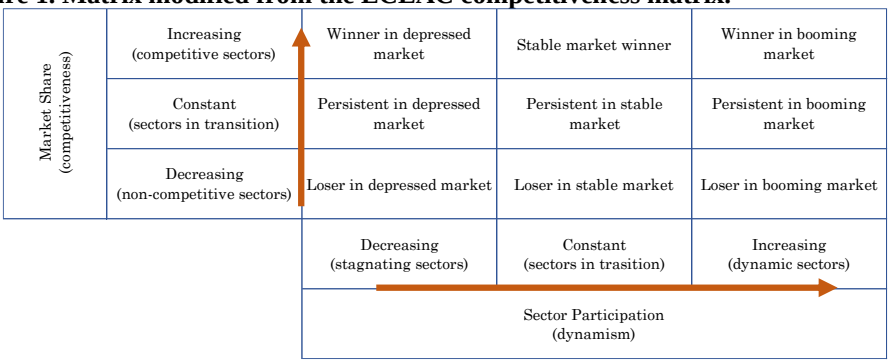
$$MS_{ij} = \frac{X_{ij}}{M_i} \quad (3)$$

Where:
MS ij: competitiveness of product i produced in country j in the market considered.
X ij: total exports of product i from country j to the considered country
M i: imports of product i from the country under consideration.

Ramón Lacayo and Cristian Morales (2007) proposed the modification of the Competitive Analysis of Nations [CAN] matrix, which was developed by the ECLAC, in their article aimed at measuring the level of competitiveness of Chile´s agro-export sector. This competitiveness matrix, which will be used in the preparation of this research, went from four quadrants to one of nine, thus allowing for a better interpretation of the dynamism and competitiveness of the countries studied. The calculation of both indicators was obtained on an annual basis and in a

time series of 10 years, where the number of years allows us to elaborate a more significant linear regression with a Type I error and an error level of 5% (Morales et al., 2008), thus allowing us to obtain three options of competitiveness and dynamism (decreasing, constant and increasing) thus achieving the nine quadrant matrix as shown in Figure 1; however, Willmer Guevara and Cristian Morales (2018) published in their paper entitled "Analysis of the export competitiveness of the main products exported by Chile and Peru" the interpretation of each of the quadrants of the matrix proposed in 2007 by Ramón Lacayo and Cristian Morales.

Figure 1. Matrix modified from the ECLAC competitiveness matrix.



Source: prepared from the interpretation of Guevara & Morales (2018) to the quadrants of the matrix modified by Ramón and Lacayo (2007)

1.3. Source and choice of data

To obtain information on imports (M) and exports (X), the database of the International Trade Centre, the trade statistics for international business development [ITC-TradeMap], consulted from 1st August to 25th October 2022, was used; the information extracted was in an nnual time series over a period of 10 years from 2012 to 2021.

For the choice of products, the six-digit Harmonized System of the 2017 edition of the World Trade Organisation was used, being at this level more specific products and covering similar characteristics. The five most representative products of the Romanian agro-export sector for the year 2021 were analysed. The Harmonised System describes each tariff heading, but for an easy understanding of each product these will be summarized in a few words and will be in the "Name" section of table 1 and will be in inverted commas.

For the competitor countries, the main exporters in the world were chosen for analysis in each category, as their level of exports would help a lot to understand the behaviour and the situation of the Romanian sector; in the same way, the main importing countries were chosen for each category; however, it is important to mention that in order to achieve a good analysis for both categories, competitors and

importers, we must present available foreign trade information, as the level of competitiveness of a country could not be measured if it does not present trade relations with the importing country. Table 1 summarises the categories, countries and world ranking.

Table 1. Selected categories, exporting countries and destination countries

HS6	**Name**	**Description**	**Main Exporters (competitors)**	**World Ranking**	**Share in world exports 2021 (%)**	**Main Importers**	**World Ranking**	**World Ranking Share in world imports 2021 (%)**
100199	"Wheat"	Wheat and meslin (excluding seed for sowing, and durum wheat)	Ukraine and Romania	5th and 9th	9 and 3.4	Italy, Spain, Israel and Tunisia	11th, 15th, 28th and 31st	2.8, 2.1, 1.1 and 0.8
100590	"Maize"	Maize (excluding seed for sowing)	USA and Romania	1st and 6th	37 and 3.5	Republic of Korea, Egypt, Spain and the Netherlands	5th, 6th, 8th and 10th	5.9, 4.4, 3.9 and 2.7
120600	"Sunflower seeds"	Sunflower seeds, whether or not broken	Romania and Bulgaria	1st and 2nd	20.9 and 15.4	Türkiye, the Netherlands, Germany, France and Austria	1st, 3rd, 7th, 9th and 11th	10.8, 7, 3, 5, 4.5 and 3.6
100390	"Barley"	Barley (excluding seed for sowing)	Ukraine and Romania	3rd and 8th	10.9 and 4.6	Saudi Arabia, Türkiye, Tunisia and Cyprus	2nd, 4th, 9th and 28th	9.7, 5.7, 2.3 and 0.5
120510	"Colza seeds"	"Low erucic acid rape or colza seeds "yielding a fixed oil which has an erucic acid content of < 2% and yielding a solid component of glucosinolates of < 30 micromoles/g"	Ukraine and Romania	3rd and 7th	10.1 and 2.8	Germany, France, the Netherlands and Poland	1st, 5th, 6th and 11th	22.7, 7.2, 6.3 and 2.3

Source: authors' representation based on ITC-TradeMap statistics

3. Results and analysis

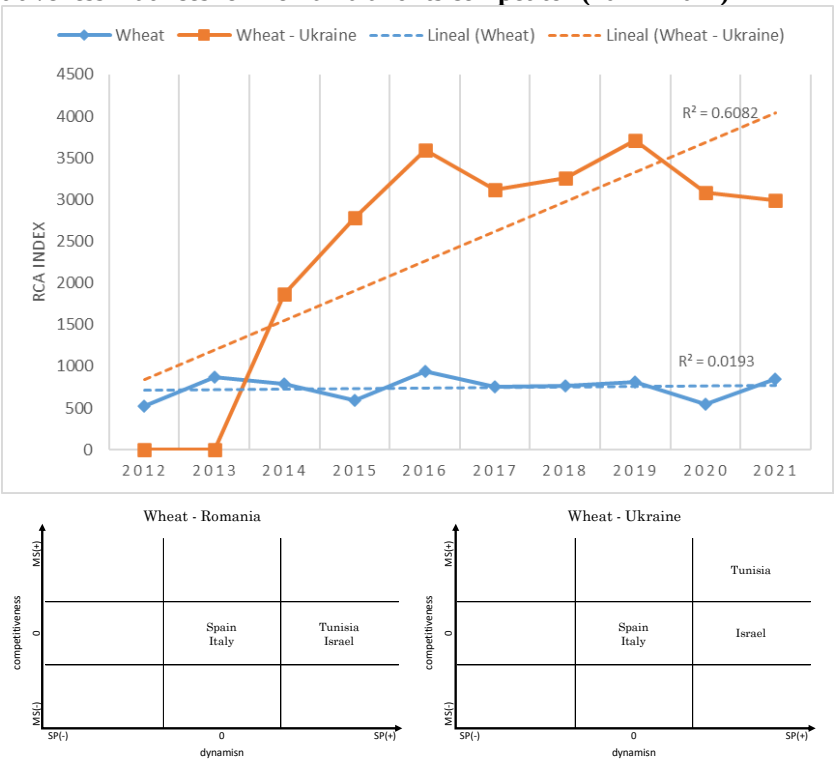
The main agricultural region of Romania is the Bărăgan plain region located in the south of Romania (also called the Danube Plain); this region is well known for its high agricultural productivity and yield; Wheat, Maize, Sunflower and Colza

being the main crops and also the main export products of Romania (Sima et al., 2015); likewise, the areas of South-Muntenia, South-East and South-West Oltenia are high production areas due to their conditions unlike other places, especially for Wheat (Soare, 2018).

3.1. Wheat

For this category, which is Romania's main agro-export product, at the level of comparative advantage, the competitor (Ukraine) has a greater advantage than Romania, and its growth projection is higher. The average growth of the indicator in the studied period for Romania is 11.22% and for Ukraine 9.07%. As it can be seen in Figure 2, despite being below the main competitor, Romania maintains good levels of competitiveness (above 100), considering that it is the ninth largest exporter in the world.

Figure 2. Evolution of the RCA indicator for Wheat category exports and competitiveness matrices for Romania and its competitor (2012 - 2021)



Source: authors' representation based on ITC-TradeMap statistics

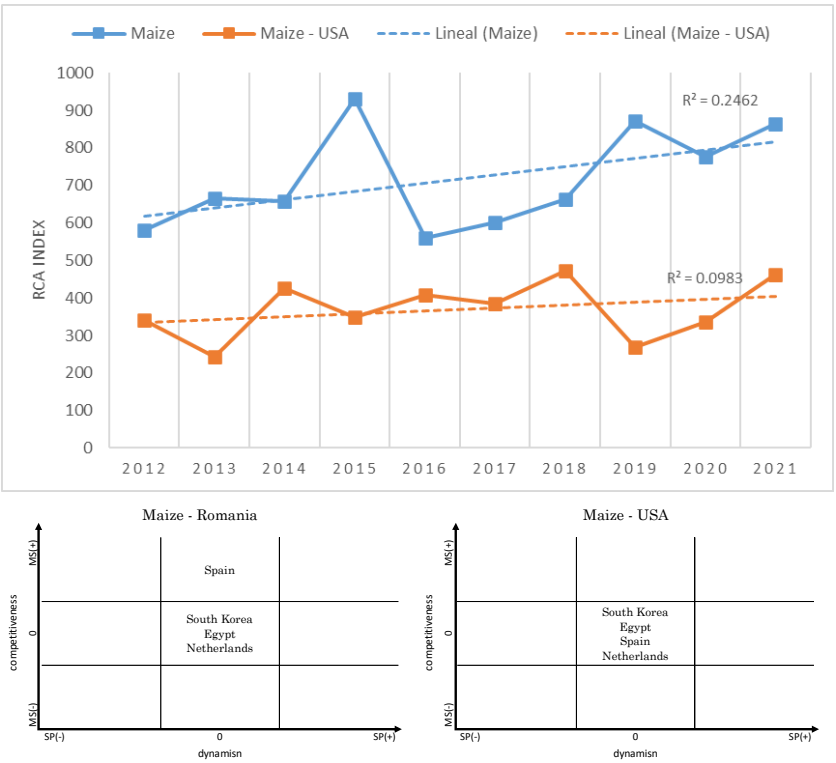
At the level of competitiveness, Figure 2 shows the two matrices where the destination markets of Spain and Italy maintain their dynamism constant; in the period of time studied they have not presented drastic variations that could give an interpretation of growth or recession, as is the case with Tunisia and Israel, which do have a growing dynamism. These last destination markets occupy the 28th and 31st position in world imports, while Italy and Spain are the 11th and 15th; as these countries are not the main importers, or at least the first 5 or 10 in the world, their dynamism is considered positive and attractive for investments, because they are maintained and are even growing (as in the case of Tunisia and Israel). Romania's performance in these markets is reasonably good as it manages to maintain its competitiveness in all the target markets, while in the case of Ukraine it does manage to position itself in the winning quadrant in Tunisia, and in the rest of the countries it maintains its competitiveness. The average participation in the period studied for Romania in Italy was 4.70%, Spain 7.37%, Israel 15.69% and Tunisia 7.35%; while for Ukraine it was 4.01%, 7.39%, 23.52 % and 40.61% respectively.

Despite being Romania´s main agro-export product, it does not manage to take advantage of the booming markets of Tunisia and Israel; however, given its levels of competitiveness, it manages to remain stable in all countries, unlike Ukraine, which, given its geographical position and proximity to Middle Eastern countries, manages to take advantage of these markets. The case of Romania in this category is a bit special, given that Wheat is the second largest product produced. However, Romania imports Wheat and re-exports it with domestic production, which is why it manages to be Romania´s largest export product (Popescu, 2018).

3.2. Maize

For this category, in Figure 3, it is shown that Romania has a higher comparative advantage revealed; its competitor also evidences a high level of advantage (above 100); both countries lack a linear growth and have a tendency to a high variation, or a forecast difficult to affirm. Given that they are agricultural products, certain climatic conditions could affect the production and eventually create an imbalance in these indicators (Popescu, 2018); in spite of that, in the whole period, Romania has presented a growth of 6.15%, while the United States a 4.51%. It is important to mention that this competitor is the main exporter of this category in the world, while, for Romania this is its second agricultural export product, but it ranks sixth in world exports.

Figure 3. Evolution of the RCA indicator for exports of the Maize category and the competitiveness matrices for Romania and its competitor (2012 - 2021)



Source: authors' representation based on ITC-TradeMap statistics

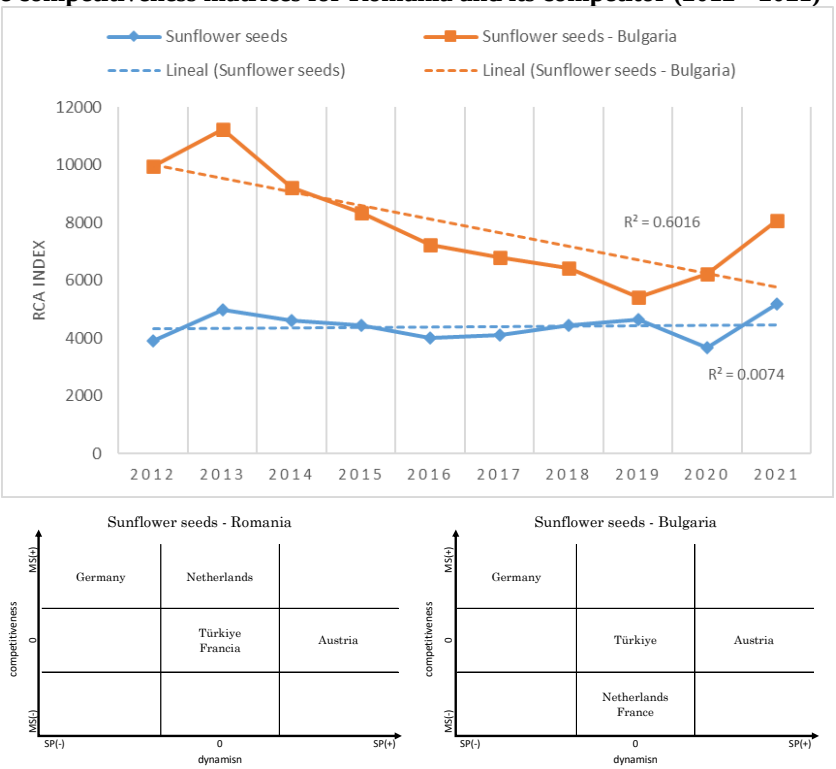
In terms of competitiveness, the matrices show that all importing countries remain constant in their dynamism, considering that they occupy the first 10 positions in world imports. Romania is the only one that manages to position itself in the winning quadrant with Spain; in the rest of the countries it manages to maintain that competitiveness; for the main competitor its situation is almost similar as it maintains its competitiveness stable - this is very important as it concentrates 37% of the exports of the category in the world; managing to maintain the levels of competitiveness at that level or quantity of exports is a very big challenge; this is supported by its good level of RCA analysed previously. Romania´s export concentration in the world for this category is 3.5%. Romania's share in the Republic of Korea was 1.81%, Egypt 3.36%, Spain 8.82% and the Netherlands 6.40%; while for the United States it was 31.81%, 7.73%, 2.59% and 1.54%, respectively. As can be seen, its level of market share is lower than that of Romania; in spite of this, their market share is very competitive in the category, which is an advantage for Romania.

Given that this is the category with the largest cultivated area and production in Romania, its indicators are very similar to those of Wheat (Popescu, 2018).

3.3. Sunflower seeds

For this category, as it can be seen in figure 4, both countries under study present a high level of comparative advantage, slightly higher for Bulgaria. In the whole period under study, Romania had a growth of 1.50% in the indicator and for Bulgaria a decrease of -2.44%; as it can be seen in figure 4, Bulgaria starts with a good indicator, but as the years go by it starts to lose; however, in 2020 it starts to recover its advantage. Romania and Bulgaria share the first and second place in terms of world exports and this is the only category where Romania leads world exports.

Figure 4. Evolution of the RCA indicator for exports of the Sunflower seeds category and the competitiveness matrices for Romania and its competitor (2012 - 2021)



Source: authors' representation based on ITC-TradeMap statistics

As it can be seen in figure 4, the dynamism for Germany is decreasing (it could be said that it is a depressed market), while the Netherlands, Turkey and France maintain their dynamism constant and only Austria presents a growth in its

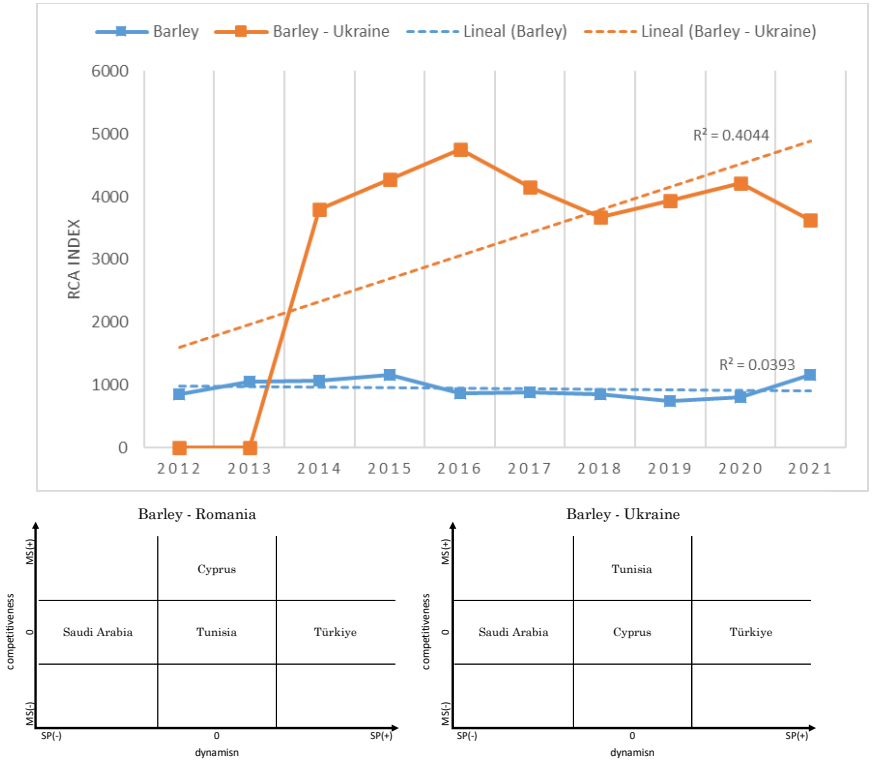
dynamism (booming market). Romania manages to take advantage of its high levels of competitiveness to position itself in the winning quadrant with Germany and the Netherlands, with Germany being a declining country; in the rest of the countries, it manages to maintain its levels of competitiveness. In the case of Bulgaria, the situation is a little different: it manages to position itself in the winning quadrant in Germany, as does Romania, maintains its competitiveness in Turkey and Austria, but loses competitiveness in the Netherlands and France, and this can be explained by the slight decrease in its RCA indicator. Romania´s average share in Turkey was 14.79%, the Netherlands 34.27%, Germany 4.84%, France 41.22% and Austria 4.83%; while for Bulgaria it was 12.87%, 26.29%, 25.56%, 12.15% and 12.80% respectively.

3.4. Barley

In this category, the RCA index is also positive, both have indicators above 100, with the competitor (Ukraine) having the greatest comparative advantage. For Romania and Ukraine, this category is the fourth agro-export product, however, Ukraine consolidates its position as the third largest exporter in the world and Romania the eighth.

The dynamism for the main destination markets is varied: starting with Saudi Arabia, which is the country with a decreasing dynamism or a market in recession despite being the second importer of the category in the world, followed by Tunisia and Cyprus with a constant dynamism and finally Turkey with an increasing dynamism. Romania manages to maintain its competitiveness levels in almost all countries, with the sole exception of Cyprus, where it is positioned in the winner quadrant; for Ukraine, the main competitor, the situation is similar to that of Romania with the sole exception that it is positioned in the winner quadrant in the country Tunisia, and in the rest of the countries it maintains its competitiveness. Both countries, due to their high levels of RCA, show in the matrix their level of competitiveness. Romania’s average share in Saudi Arabia was 11.05%, Turkey 8.65%, Tunisia 10.93% and Cyprus 18.14%; while for Ukraine it was 23.90%, 25.54%, 12.57% and 17.17% respectively.

Figure 5. Evolution of the RCA indicator for exports of the Barley category and the competitiveness matrices for Romania and its competitor (2012 - 2021)

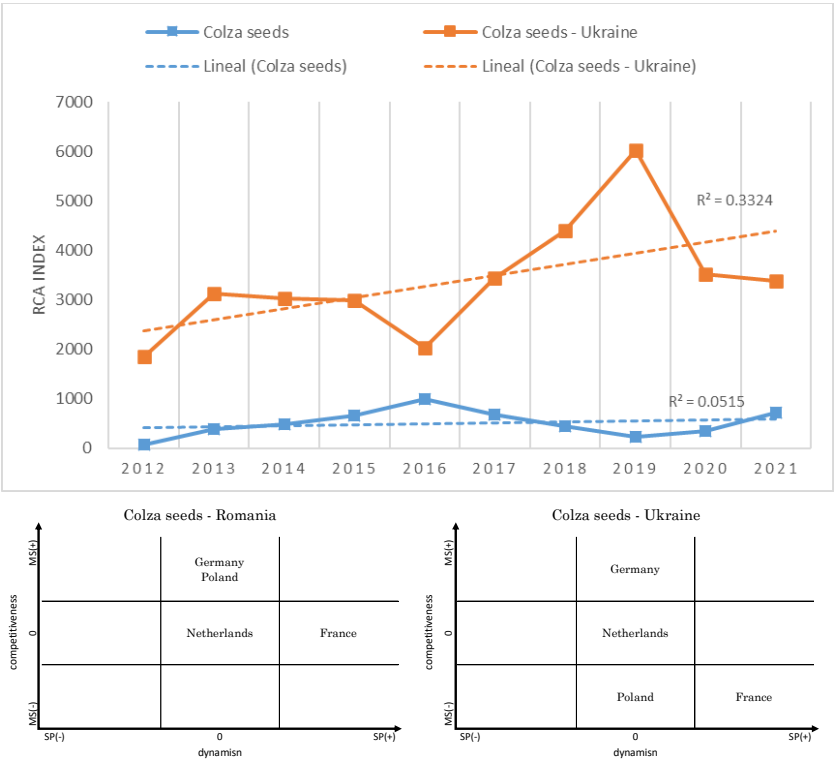


Source: authors' representation based on ITC-TradeMap statistics

3.5. Colza seeds

Finally, in the category of Rapeseed seeds, as shown in Figure 6, the RCA index for Romania is not as high as the previous categories; however, it does exceed the value of 100 and therefore we can affirm that it does have a comparative advantage; For the competitor, Ukraine, this does show a comparative advantage superior to that of Romania; this is partly due to the fact that Ukraine is the third world exporter of the category and Romania is the seventh, being its competitor a country that has developed its oilseed sector (Kryukova et al., 2018); however, in the studied period Romania evidenced an average growth in the indicator of 53.69% and for Ukraine 12.93%.

Figure 6. Evolution of the RCA indicator for exports of the Rapeseed seeds category and the competitiveness matrices for Romania and its competitor (2012 - 2021)



Source: authors' representation on ITC-TradeMap statistics

In terms of the dynamism of the main destination markets, it can be observed that Germany, Poland and the Netherlands maintain their sectoral participation and only France shows a growth in dynamism; Germany is consolidated as the largest importer of the category, its concentration of imports is 22.7%, while the rest of the destination markets studied add up to a total of 15.8% of imports. Against this, Romania manages to position itself as a winner in the countries of Germany and Poland and manages to maintain its competitiveness in the Netherlands and France. Ukraine does not share the same fate as it loses competitiveness in Poland and France, the latter being a booming market; despite this, it manages to maintain its competitiveness in the Netherlands and is positioned in the winning quadrant in Germany. Romania´s average share in Germany was 1.33%, France 3.34%, the Netherlands 11.38% and Poland 2.39%; while for Ukraine it was 7.19%, 24.59%, 23.91% and 32.47% respectively.

Romania´s agricultural sector, which is mainly composed of family farming, has not developed as one might expect, taking as an example countries with similar

conditions such as Ukraine or the Netherlands, and despite the country's efforts to develop since 1989 (Tocco et al., 2012), it is not enough; it is necessary to take advantage of its potential in order to achieve higher yields and benefits for the Romanian society; this is due to the fact that the number of small families in this sector is greater than the few companies that concentrate a larger amount of cultivated land; and the focus on sustainable agriculture is the key to the future of this sector in Romania (Mărunțelu, 2020); because Romania ranks sixth in agricultural areas, focusing on rural production and family farming is of vital importance in order to take advantage of this natural advantage (Ioniță et al., 2018), obviously through state policies oriented to Romania´s reality, but taking as an example other EU countries that have better performance and development in this sector (Ciutacu et al., 2015) as well as taking advantage of European programs and funds for rural development in the agricultural sector (Dinu et al., 2020).

Given the scarcity of investments, its evolution has depended more on climatic changes than on productivity gains. This is a consequence of the predominance of subsistence agriculture in the Romanian agricultural sector (small farmers without financial possibilities hold a large part of the country's agricultural area) (Economic and Commercial Office of Spain in Bucharest, 2010). Another problem faced by Romania is the fact of speculation in the purchase and sale of agricultural land and its fragmentation due to its growth in recent years (Burja et al., 2020) despite the fact that such purchase is not oriented towards medium or long-term exploitation.

Land concentration is a global problem, where in countries such as Latin America, Africa and South Eastern Europe it is most evident (Burja et al., 2020); there, foreign investors often occupy 40% or more of arable areas and there is little or no official statistical information about foreign investors (Kay et al., 2015); such openness to new markets and EU integration has brought with it a problem of concentration and hoarding of large tracts of agricultural land in the hands of the few entrepreneurs who are not from Romania (Kay et al., 2015). Thus, appropriate land use policies are essential for all countries based on the principle of subsidiarity (where a decision, effort and responsibility lie with each country).

In order to achieve higher production, it is also important to have more water in the fields and to ensure a year-round flow and not only in rainy seasons (Prăvălie et al., 2016), especially for maize production. The development of technologies and laboratories for the early pest detection and treatment is also important (Tarjoc & Tabără, 2011). The use of agrometeorological technology helps in higher production and securing production, because crops are very susceptible to sudden changes in temperature and climate (Hurduzeu et al., 2014) which could trigger a total loss and a serious crisis in food security; practices such as complete residue removal or burning should be avoided due to concerns about reduced soil organic matter levels and problems of soil erosion and environmental pollution; it is important to adopt tillage and residue management techniques for better management and development of the agricultural sector (Soleymani & Khoshkharam, 2016).

Conclusions and recommendations

In conclusion, Romania evidenced a good competitive level in all the categories studied, especially in the category of Sunflowers Seeds where it leads the world exports and reveals its level of competitiveness; the second category is Colza Seed. In the rest of the categories analysed, it maintains its good levels of competitiveness even when compared with the main exporters in the world.

Romania does not manage to take advantage of its natural resources to increase production and in the future be able to occupy better positions in the world. The technology they use may not be adequate, because yields are lower than the average in EU countries, despite the fact that they have a larger cultivable area; in addition, the size of the farms should be increased through the union in associative forms for a more efficient use of capital and human resources and to increase economic efficiency; although Romania does not manage to have the levels of production and participation of the main exporters in the world, it does manage to gain competitiveness with its agro-export sector and with a boost, in the coming years, Romania could gain greater market share and could also take advantage of its geography to start in cultivation and production of other products that in time could lead to agricultural exports; however, it is important to mention that although it is true that there is no definitive definition of competitiveness, it is of vital importance to take into account the cultural and social aspects of the countries; it is possible to promote a bad idea of competitiveness where only high production is promoted, but as a consequence the environment is seriously damaged and even human rights are violated.

For future research, this article invites to use the competitiveness matrix to analyse other products or categories of products from other countries in order to know their level of competitiveness, and we hope that the information and results presented in this research will be useful for companies in public and private organisations in their decision making.

References

Addison-Smyth, D. (2005). Ireland's revealed comparative advantage. *Central Bank of Ireland Quarterly Bulletin, 1*, 101-114.

Arghiroiu, G. A., Cristea, S., & Alecu, I. (2015). Trends regarding trade with oleaginous seeds of Romania. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, 15*(3), 49-58.

Balassa, B. (1965). *Trade liberalization and "revealed" comparative advantage*. The Manchester School, *33*(2), 99-123.

Bonifaz, J. L., & Mortimore, M. (1999). *Colombia: a CAN analysis of its international competitiveness*. United Nations. https://repositorio.cepal.org/handle/11362/4657

Burja, V., Tamas-Szora, A., & Dobra, I. B. (2020). Land Concentration, Land Grabbing and Sustainable Development of Agriculture in Romania. *Sustainability*, *12*(2137), 1-19. https://doi.org/10.3390/su12052137

Chasanah, N., Mulyo, J. H., & Darwanto, D. H. (2017). Competitiveness and Export Similarity of Indonesian Horticulture in The Asean-Asean+3. *Agro Ekonomi*, *28*(1), 32. https://doi.org/10.22146/jae.25583

Ciutacu, C., Chivu, L., & Andrei, J. V. (2015). Similarities and dissimilarities between the EU agricultural and rural development model and Romanian agriculture. Challenges and perspectives. *Land Use Policy*, *44*, 169-176. https://doi.org/10.1016/j.landusepol.2014.08.009

Daniels, J. D., Radebaugh, L. H., & Sullivan, D. P. (2013). *International Business Environments and operations (14th ed.)*. PEARSON Education of Mexico.

Dima, A. M., Begu, L., Vasilescu, M. D., & Maassen, M. A. (2018). The Relationship between the Knowledge Economy and Global Competitiveness in the European Union. *Sustainability*, *10*(1706), 1-15. https://doi.org/10.3390/su10061706

Dinu, M., Pătărlăgeanu, S. R., Chiripuci, B., & Constantin, M. (2020). Accessing the European funds for agriculture and rural development in Romania for the 2014-2020 period. *Proceedings of the International Conference on Business Excellence*, *14*(2), 717-727. https://doi.org/10.2478/picbe-2020-0068

Economic and Commercial Office of Spain in Bucharest. (2010). *Note on the agricultural sector in Romania, investment opportunities*.

Escalante Yaulilahua, D. A, Lezama Verástegui, D. V, Verástegui Espíritu, L. P, Muñoz Acevedo, L. M., & Venegas Rodriguez, P. B. (2022). A look into the competitiveness of the main Dutch agricultural export products. *The Journal of Globalization, Competitiveness and Governance*, *16*(5), 103-122. https://doi.org/10.3232/GCG.2022.V16.N2.05

FAOSTAT. (2022). Food and Agriculture Organization Corporate Statistical Database.

Guevara Ramírez, W., & Morales Letzkus, C. (2018). Analysis of the export competitiveness of the main products exported by Chile and Peru. *Journal Globalization, Competitiveness and Governance*, *12*(2), 38-56. https://doi.org/10.3232/GCG.2018.V12.N2.02

Hurduzeu, G., Kevorchian, C., Gavrilescu, C., & Hurduzeu, R. (2014). Hazards and risks in the Romanian agriculture due to climate changes. *Procedia Economics and Finance*, *8*, 346-352. https://doi.org/10.1016/S2212-5671(14)00100-2

Ionel, I. (2014). Regulation implications on banning the treatment of seeds with neonicotinoid insecticides on the seed market in Romania. *Lucrări Științifice Management Agricol*, *16*(2), 223-228. http://www.lsma.ro/index.php/lsma/article/view/574

Ioniță, N., Mărcuță, L., & Mărcuță, A. G. (2018). The evolution of agricultural holding in macro-region four (Southwest-Oltenia) after Romania's integration into the European Union. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, *18*(2), 255-258.

ITC-TradeMap. (2022). International Trade Center, Trade statistics for international business development.

Ivancevich, J., & Lorenzi, P. (1997). *Quality management and competitiveness* (2nd ed.). Madrid. McGraw-Hill Interamericana of Spain.

Kathuria, L. M. (2013). Analyzing competitiveness of clothing export sector of India and Bangladesh: Dynamic revealed comparative advantage approach. *Competitiveness Review*, *23*(2), 131-157. https://doi.org/10.1108/10595421311305343

Kay, S., Peuch, J., & Franco, J. (2015). *Extent of farmland grabbing in the EU*. https://www.europarl.europa.eu/RegData/etudes/STUD/2015/540369/IPOL_STU(2015)540369_EN.pdf

Labarca, N. (2007). Theoretical Considerations of Managerial Competitiveness. *Omnia*, *13*(2), 158-184.

Lacayo, R., & Morales, C. (2007). An analysis of the performance of Chilean agricultural exports (1994-2004). *Interscience*, *33*(5), 296-302.

Mandeng, O. J. (1991). International competitiveness and specialization. *CEPAL Review*, *45*, 25-42. https://doi.org/10.18356/091b9e1e-es

Marin, D.-E. (2014). Evolution of supply and demand of wheat in Romania. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, *14*(1), 207-210.

Mărunțelu, I. (2020). Research on the small peasant individual households in Romania within the framework of sustainable agriculture. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, *20*(1), 341-346.

Ministry of Foreign Affairs. (2021). *Demand Survey 2021, Romania. 2021*. https://www.cancilleria.gob.ar/es/argentinatradenet/inteligencia-comercial/informes-globales/relevamiento-de-la-demanda-2021/rumania#:~:text=

Morales, C., Lacayo, R., & Sfeir, R. (2008). An analysis of the performance of Chilean aquacultural exports (1995-2005). *Interscience*, *33*(12), 875-881.

Pânzaru, R. L., Medelete, D. M., & Vladu, M. (2020). Some considerations regarding the foreign trade of Romania with oil seeds (2014-2016). *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, *20*(1), 411-416.

Popescu, A. (2012). Research regarding oil seeds crops development in Romania in the EU context. *Economics of Agriculture*, *59*(1), 129-137.

Popescu, A. (2018). Maize and Wheat - Top agricultural products produced, exported and imported by Romania. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, *18*(3), 339-352.

Popescu, A., Alecu, I. N., Dinu, T. A., Stoian, E., Condei, R., & Ciocan, H. (2016). Farm Structure and Land Concentration in Romania and the European Union's Agriculture. *Agriculture and Agricultural Science Procedia*, *10*, 566-577. https://doi.org/10.1016/j.aaspro.2016.09.036

Porter, M. E. (1991). *Competitive Advantage Creating and Sustaining Superior Performance*. Macmillan.

Prăvălie, R., Patriche, C. V., Sîrodoev, I., Bandoc, G., Dumitraşcu, M., & Peptenatu, D. (2016). Water deficit and corn productivity during the post-socialist period. Case study: *Southern Oltenia, Romania. Arid Land Research and Management*, *30*(3), 239-257. http://dx.doi.org/10.1080/15324982.2015.1091399

Sala, F., Rujescu, C., & Constantinescu, C. (2016). Causes and solutions for the remediation of the poor allocation of P and K to wheat crops in Romania. *AgroLife Scientific Journal*, *5*(1), 184-193.

Seleka, T. B., & Kebakile, P. G. (2017). Export Competitiveness of Botswana's Beef Industry. *SSRN Electronic Journal*, *31*(1), 76-101. https://doi.org/10.1080/08853908.2016.1199982

Sima, M., Popovici, E.-A., Bălteanu, D., Micu, D. M., Kucsicsa, G., Dragotă, C., & Grigorescu, I. (2015). A farmer-based analysis of climate change adaptation options of agriculture in the Bărăgan Plain, Romania. *Earth Perspectives*, *2*(5), 1-21. https://doi.org/10.1186/s40322-015-0031-6

Soare, B. E. (2018). Analysis of the situation of the wheat crop on macroregions in Romania. *International Conference on Competitiveness of Agro-Food and Environmental Economy Proceedings*, *7*, 142-149. https://econpapers.repec.org/RePEc:aes:icafee:v:7:y:2018:p:142-149

Soare, E., & Chiurciu, I.-A. (2016). Research on the Romanian wheat market. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, *16*(2), 287-292.

Soare, E., & Dobre, I. (2016). Changes and trends of corn production in Romania. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, *16*(1), 511-516.

Soleymani, A., & Khoshkharam, M. (2016). The impact of barley residue management and tillage on forage maize. *Rome*, *33*, 161-167.

Talikadze, N. (2020). Competitiveness of Export Agro Products and Economic Policy for increasing the Competitiveness. *Globalization and Business*, *128*, 120-128. https://doi.org/10.35945/gb.2020.09.015

Tarjoc, F. C., & Tabără, V. (2011). Issues concerning the impact of foliar fertilization on the production of barley in Timisoara. *Research Journal of Agricultural Science*, *43*(1), 184-189.

Tocco, B., Davidova, S., & Bailey, A. (2012). Labour adjustment in agriculture: Evidence from Romania. *AgEcon Search*, 1-15.

Török, A. (2008). Export competitiveness and the catch-up process of Hungary (1996-2001): A comparative analysis with some reflections on trade theory. *Competitiveness Review*, *18*(1/2), 131-153. https://doi.org/10.1108/10595420810874646

Tudor, M. M. (2015). Small scale agriculture as a resilient system in rural Romania. *Studies in Agricultural Economics*, *117*, 27-34. https://doi.org/10.7896/j.1503

Utkulu, U., & Seymen, D. (2004). Revealed Comparative Advantage and Competitiveness: Evidence for Turkey vis-à-vis the EU/15. *European Trade Study Group 6th Annual Conference*, 1-26.

Vasilescu, L., Petcu, E., Sîrbu, A., Petcu, E., & Lazăr, C. (2022). Grain morphometry analysis of Romanian winter barley cultivars registered during 1959-2019 period. *Romanian Agricultural Research*, *39*, 1-9.

Yu, C., & Qi, C. (2015). Research on the Complementarity and Comparative Advantages of Agricultural Product Trade between China and CEE Countries—Taking Poland, Romania, Czech Republic, Lithuania and Bulgaria as Examples. *Journal of Service Science and Management*, *08*, 201-208. https://doi.org/10.4236/jssm.2015.82022

Kryukova, I.O., Kalyna, T. Ye, Panteleiev, V. P., & Minakova, S. M. (2018). The export potential of the agrarian sector of Ukraine in a competitive environment. *Фінансово - Кредитна Діяльність: Проблеми Теорії уои Praktiki*, *3*, 196-207. https://doi.org/10.18371/fcaptp.v3i26.144833