

Competitiveness Analysis of the Romanian Agri-Food Sector

Irina Elena PETRESCU

Bucharest University of Economics Studies, Bucharest, Romania
irina.petrescu@ase.ro

Andreea APETREI KALVERAM

Universidad Catolica de Valencia, Valencia, Spain
andreea.apetrei@ucv.es

Simona Roxana PĂTĂRLĂGEANU

Bucharest University of Economics Studies, Bucharest, Romania
rpatarlageanu@eam.ase.ro

Mihai DINU

Bucharest University of Economics Studies, Bucharest, Romania
mihai.dinu@eam.ase.ro

Alina Florentina GHEORGHE*

Bucharest University of Economics Studies, Bucharest, Romania
**Corresponding author, gheorghealina20@stud.ase.ro*

Abstract. *The objective of this study is to assess the competitiveness of Romanian agri-food products on the world market, taking into account the use of land related to those products, using specific indicators. The central research question is whether the land is cultivated with crops that are globally competitive, what happens to the value of exports. To calculate the competitiveness of agri-food products the Balassa index is calculated. A detailed analysis of this index showed that there is a high performance for tobacco, barley, maize and wheat. However, for other agri-food products that are not export competitive, the size of arable land is quite large. The paper also proposes some structural changes in agricultural land use to encourage the cultivation of export-competitive products. However, these changes may affect food security and diet diversification, and it is therefore recommended that greater attention be paid to the use of such arable land.*

Keywords: competitiveness, agri-food, land patterns, Balassa index, RCA.

Introduction

The term competitiveness is frequently used in literature and is defined in various ways and has multiple meanings in both microeconomic and macroeconomic contexts (Istudor & Petrescu, 2023).

Analyzing the competitiveness of the agri-food sector is essential for adapting current agricultural production structures to the requirements of today's market economy and paradigm shifts in agriculture. In recent years, agricultural competitiveness has been increasingly closely linked to transformations in the domestic agricultural sector, agricultural productivity growth and, to a larger extent, international trade (Popescu et al, 2017).

The agri-food sector is an important part of a country's economy and is also important for food security. This sector includes the following: food production, food processing and distribution, and agriculture (Ménard, 2018).

The importance of this paper lies in understanding agri-food competitiveness which it contributes to the development of the domestic agricultural structure. This by enabling the capitalization of the most opportune crops that have maximum productivity, thus supporting the adaptation of agriculture to the demands of the global economy.

Also, monitoring the competitiveness of this sector can play an important role in discovering the factors that can help to increase exports of certain products (Lădaru et al, 2024).

The objective of this paper is to analyze the data on Romania's exports of agri-food products between 2019 and 2023 and to determine their competitiveness. At the same time, following the determination of the competitiveness of agri-food products, the aim is to develop a scenario in which agricultural land is used in such a way as to maximize the production of products that are the most competitive for export.

Literature review

Measuring the competitiveness of the agri-food sector is difficult because of the complexity involved (Aguiar & Balogh, 2022). In addition to complexity, competitiveness is also defined as a multidimensional and relative concept, changing depending on the situation and time (Chaudhuri & Ray, 1997; Flanagan et al, 2007). Looking from an economic perspective, competitiveness shows the economic strength of a state, an industry or a company (Srivastava et al, 2006). Mondal (2012) talks about the importance of a state to be as competitive as possible, because competitiveness is closely related to the prosperity of a nation. Feurer and Chaharbaghi (1994) provides a comprehensive definition of a country's competitiveness and emphasizes the role of competitiveness in how either states or companies manage their total competencies to achieve either prosperity or profit.

It is important to note that Porter (1990) presents the concept using two dimensions: micro and macro, emphasizing that firms compete in the international market, not countries. The macro dimension refers to the competition of a nation, while the micro dimension refers to the competition of firms within a country. In addition, Porter believes that it is firms that deliver economic value, while the country creates the best possible environment for realizing that value.

Delgado et al. (2012) propose a different definition of competitiveness, linking it directly to prosperity. They define competitiveness as the expected level of output per individual, determined by a country's general policy that supports doing business. The definition emphasizes the importance of the productivity of employed workers and the ability to mobilize the available labor force, highlighting that these aspects can be influenced by public policies to support increased prosperity.

According to Istudor and Petrescu (2021) competitiveness is based on two components: product quality and the cost of production, which is required to be as low as possible, below the average market price.

In terms of the efficiency of competitiveness of the agri-food sector Long (2021) is of the opinion that the export capacity of the respective state is decisive. In addition, another factor to be emphasized is the sustainability of the agricultural sector, and it is difficult to improve its competitiveness in parallel with sustainability.

Maranhã & Vieira Filho (2017) are of the opinion that the competitiveness of the agri-food sector is determined, among other things, by the efficiency of the production process, logistics and transportation.

Several authors (Ruzekova et al, 2020; Handoyo & Ibrahim, 2021; Zhou & Tong, 2022) are of the opinion that studying competitiveness can help companies to improve their market position, identify various opportunities and shape strategies to respond to international market demands.

The allocation and utilization of land resources in agriculture decisively influence the economic competitiveness of the agri-food sector and its ability to fulfill its social role of ensuring food security and food safety for both the entire population of the country and each individual household (Tudor, 2014).

According to Andrei & Popescu (2014); Ciutacu et al (2015) they are of the opinion that the agricultural sector occupies a primordial place in Romania's economy, contributing significantly to the formation of Gross Domestic Product (GDP). In addition to its importance in the economy, agriculture has a major social impact in rural communities.

Methodology

Economic theory offers various models to analyze the competitiveness of the agri-food sector. Within it we find several indicators for estimating competitive advantage, brought to light by: Bela Balassa, Michael Michaely, Thomas Vollrath, Gerard Lafay etc (Gutium, 2019). Among all of them, the theory of the economist Balassa is the most representative, he brought to everyone's attention a formula for determining the competitive advantage of a country, the main purpose of which is not to identify the source of this advantage (Balassa, 1965).

The Balassa index assesses the relative export performance at the country and sector level, and is calculated as the ratio of a sector's share in world exports to the share of a country's exports in total world exports.

The use of the Balassa index has been subject to several criticisms (Amador et al, 2007). Although widely used in the literature, it has significant limitations. Greenaway and Milner (1993) point out its partial accuracy due to the neglect of imports, especially when they have a significant share. The index also shows an asymmetry of values, ranging from 1 to infinity for comparative advantages and from zero to one for comparative disadvantages (Grigorovici, 2009).

Interpreting it can be difficult (Hinloopen & Van Marrewijk, 2001) and does not provide a clear picture of its competitiveness and size (De Benedictis & Tamberi, 2004). A country may experience declines in competitiveness while retaining an advantage for certain products, or it may be competitive without a comparative advantage. However, despite these limitations, the Balassa index remains a valuable tool and will be used in this paper.

In the first part, this paper aims to analyze data on exports of agri-food products between 2019 and 2023.

The second part will determine the competitiveness of these products using the relative advantage index (RCA).

$$RCA_i = \frac{\frac{X_{ij}}{X_{wj}}}{\frac{X_{it}}{X_{wt}}}$$

Where:

X_{ij} = exports of good j from country i

X_{wj} = world exports of the good j

X_{it} = total exports of country j

X_{wt} = total world exports

If the index has a value greater than 1, it means that the country for which it has been calculated is specialized in the production of that product or group of products. If the RCA is less than 1, the country is at a comparative disadvantage in the product or sector.

Results and discussions

Efficient exploitation of agricultural potential requires a high level of competitiveness at the sectoral level (Nowak & Róžańska-Boczula, 2022). Commercialized agricultural production is a key asset in modern economies, contributing to competitiveness and agricultural policy development. Agricultural exports support the realization of domestic potential and provide resources for new technologies and capital formation (Arisoy, 2020).

According to FAO (2025), Romania exported goods worth 100,642,463 thousand dollars in 2023, 30% more than in 2019, as shown in Table 1.

Table 1. Evolution of agri-food exports (% change compared to 2019)

	2020/2019	2021/2019	2022/2019	2023/2019
01. Live animals	-6%	20%	2%	16%
02. Meat and edible meat offal	-17%	6%	26%	31%
03. Fish and crustaceans	4%	41%	64%	75%
04. Milk and milk products; eggs; natural honey	1%	19%	31%	50%
05. Other products of animal origin	-22%	13%	7%	-1%
06. Live plants and floricultural products	-1%	31%	140%	89%
07. Vegetables, plants, roots and tubers	2%	19%	39%	34%
08. Edible fruit	34%	71%	69%	45%
09. Coffee, tea, spices	7%	27%	24%	52%
10. Cereals	-15%	48%	59%	54%
11. Products of the milling industry	12%	66%	428%	609%
12. Oil seeds and oleaginous fruits; industrial or medicinal plants	-9%	49%	77%	89%
13. Gums, resins and other saps	-33%	-32%	-22%	-31%
14. Braiding materials	-14%	56%	51%	-11%
15. Animal or vegetable fats and oils	-11%	69%	171%	92%
16. Meat and fish preparations	9%	20%	33%	45%
17. Sugar and sugar confectionery	6%	0%	76%	281%
18. Cocoa and cocoa preparations	-6%	11%	15%	26%
19. Cereal-based preparations	4%	28%	45%	82%
20. Preparations of vegetables, fruit	11%	49%	72%	71%
21. Miscellaneous food preparations	9%	29%	60%	112%
22. Alcoholic and non-alcoholic beverages	-3%	25%	74%	122%
23. Food industry residues	0%	29%	53%	52%
24. Tobacco and tobacco substitutes	48%	50%	46%	71%
Total agri-food products	-1%	41%	57%	65%
Total	-8%	14%	25%	30%

Source: Author's calculations based on data provided by FAO STAT.

Similar results can also be observed in other papers (Popescu, 2023), where the analysis of Romania's agri-food sector for the period 2019-2022 shows a significant increase in exports, increasingly contributing to total foreign trade. Agri-food exports accounted for an increasing share of Romania's GDP, highlighting a positive trend in the diversification of international trade. A similar situation is reported by the European Commission in its economic analysis for Romania, highlighting an increase in exports of tobacco products, accounting for 50% of total exports of food, beverages and tobacco in 2021. In 2023, the value of exports of tobacco products exceeded €1.68 billion, marking a significant increase compared to the previous year. Food, beverages and tobacco products made an important contribution to Romania's international trade, with total exports of €4 billion in 2023 (European Commission, 2024).

According to the study by Andrei et al (2023), the share of agri-food trade in Romania's foreign trade has undergone significant changes in the pre- and post-accession period. The study highlights an increase in agri-food exports after accession, but the trade balance remained negative, with imports exceeding exports during this period.

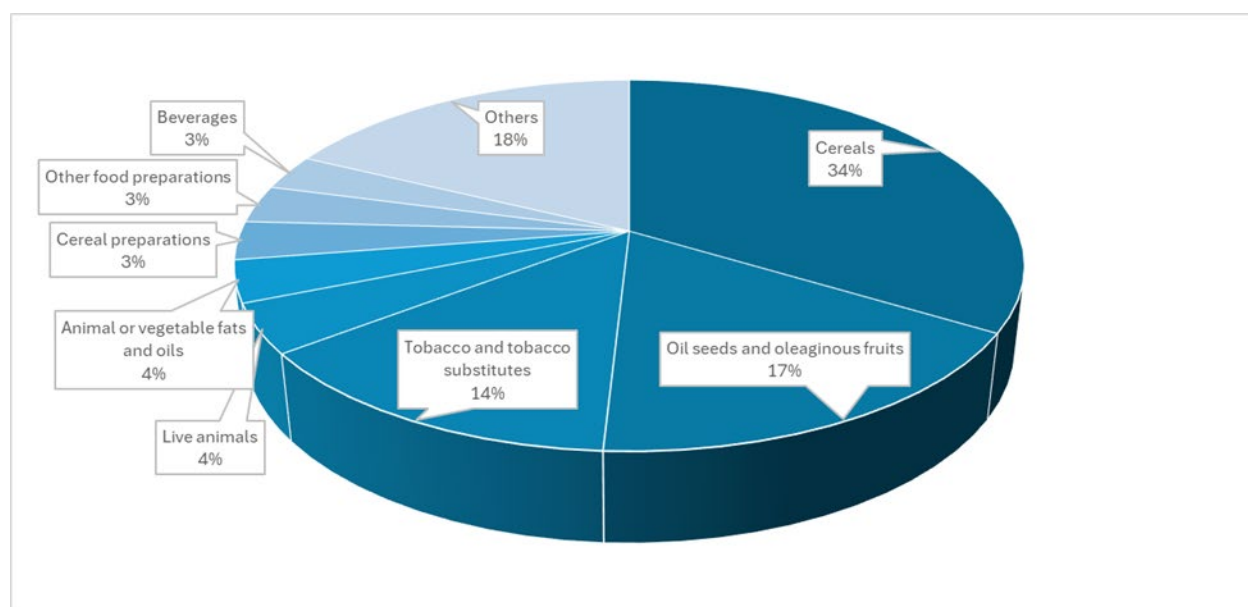


Figure 1. The structure of agri-food export in Romania, by product, in 2013 (%)

Source: Author's calculations based on FAOSTAT (2025).

According to Figure no. 1, in 2023, the structure of Romania's exports of agri-food products was as follows: cereals had the highest share, representing 4,460,117 thousand USD. They are followed by oilseeds and oleaginous fruits, with 2,285,600 thousand USD, and tobacco and tobacco substitutes, with 1,817,877 thousand USD. Other important products include live animals (567,467 thousand USD), animal or vegetable fats and oils (482,546 thousand USD), cereal-based preparations (443,069 thousand USD) and other food preparations (434,796 thousand USD). Beverages also had exports of 409,194 thousand USD, while other miscellaneous products accounted for 2,357,873 thousand USD. The structure of exports has changed compared to previous years.

The destination markets for Romanian products are represented by: Germany 20.8%, Italy 10.2%, France 6.3%, Hungary 5.7%, Bulgaria 4.2%, Poland 3.7%, etc.

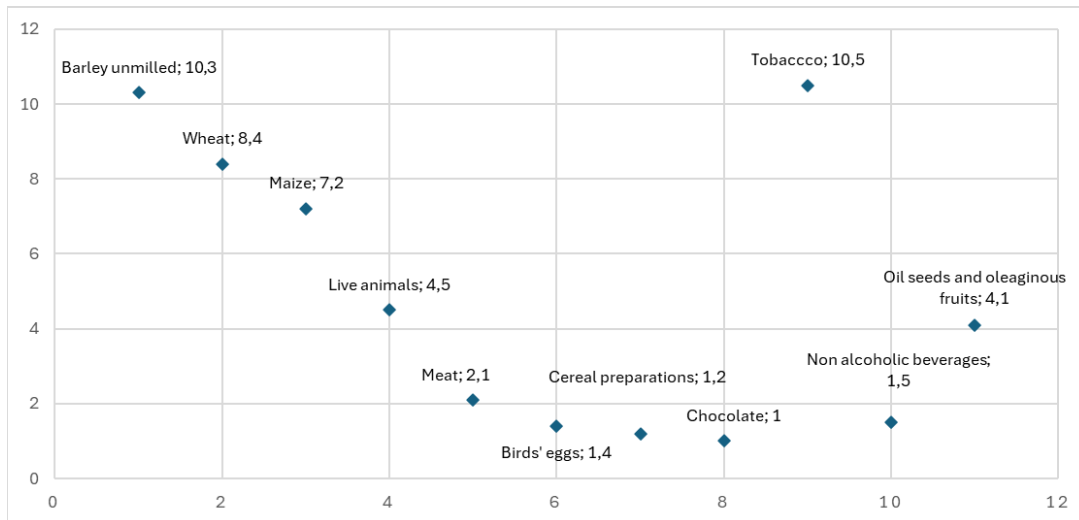


Figure 2. Balassa indices for Romanian agri-food products of vegetal origin, in 2023

Source: United Nations Trade and Development Data Hub (2025).

According to data provided by UNCTAD on the Relative Advantage Index (RCA), only a fraction of agri-food products in 2023 show competitive advantages in world markets. Of these, tobacco stands out with a high competitive advantage of 10.5. For crop products, barley has the highest relative competitive advantage index of 10.3, followed by wheat (8.4) and maize (7.2). Oilseeds have an index of 4.1. Animal products, live animals have a high competitive index of 4.5, followed by meat (2.1) and poultry eggs (1.4).

Food products that are processed, such as cereal-based preparations and chocolate, have relatively lower indices of 1.2 and 1 respectively. Non-alcoholic beverages have an index of 1.5.

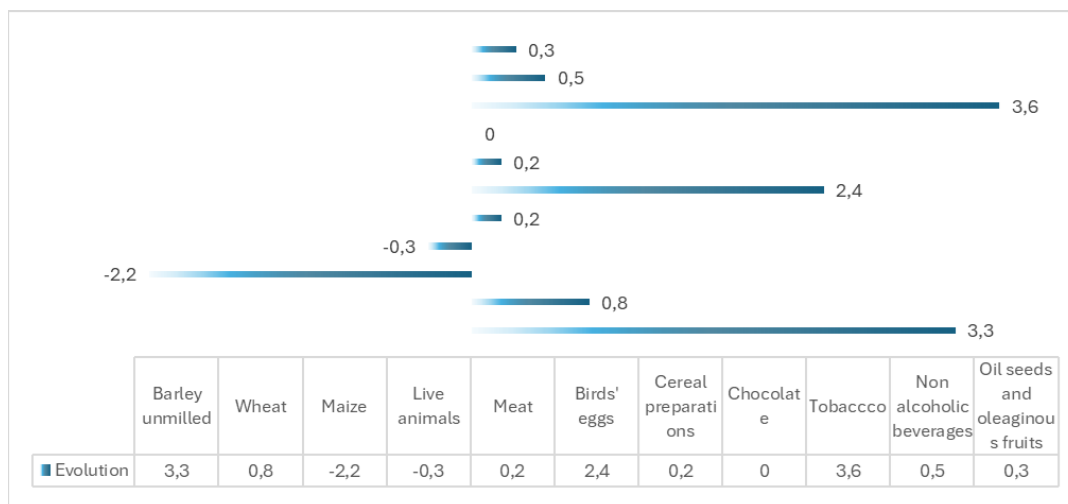


Figure 3. Dynamic of Balassa indices for Romanian agro-food products of vegetal origin, 2009–2013

Source: Author's calculations based on United Nations Trade and Development Data.

The dynamics of the competitiveness of Romanian agri-food products show mixed trends between 2019 and 2023. The highest increases are recorded for tobacco and barley, 3.6 and 3.3 respectively. Poultry eggs show an improvement with an increase of 2.4 percentage points.

On the other hand, corn together with live animals saw a decrease in competitiveness of 2.2 and 0.3 respectively.

Other products such as meat, cereal-based preparations and alcoholic beverages had smaller increases and chocolate stagnated.

Building on the previous analysis of the competitive advantage of Romanian agri-food products, the way land is cultivated will be investigated to identify correlations between the competitiveness of a given product and land use.

Of the total 23.8 million hectares that Romania has, the agricultural area is 14.7 million hectares, of which: arable (9.4 million), pasture and meadows (4.7 million), vineyards and orchards (390 thousand hectares) (INS, 2025).

Regarding arable land, cereals and oilseeds occupied 85.7% of total arable land in 2023, 1.32% more than in 2019.

Of the cereals, maize and wheat occupy the largest area (55%). Other significant areas are cultivated with oilseeds (22.7%), fodder (19.4%), barley and barley (6%). Land cultivated with legumes has smaller prominences, 2.2%.

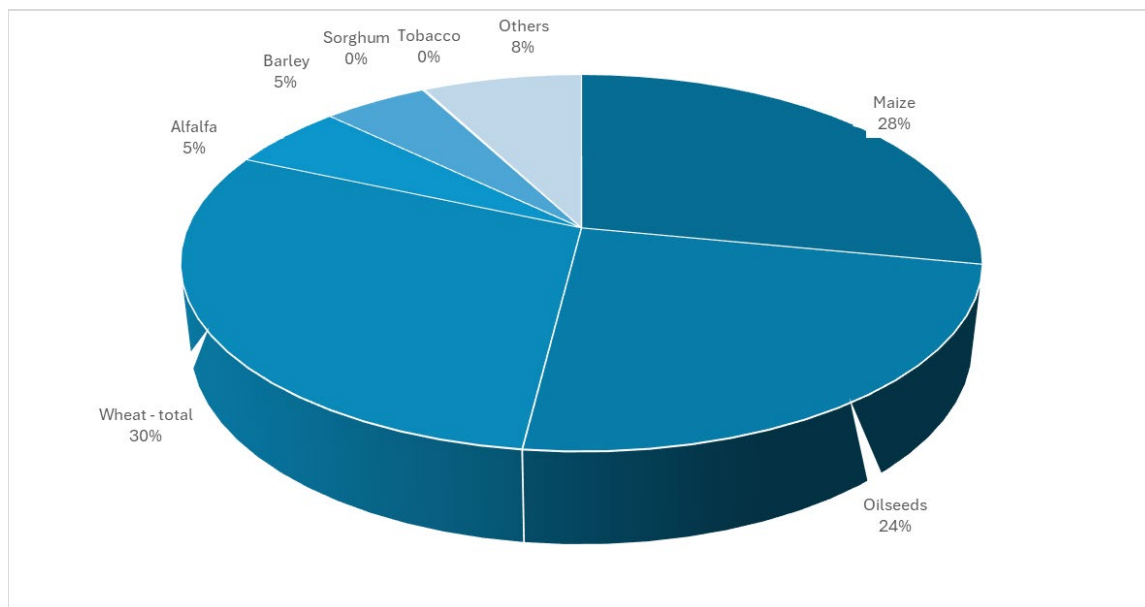


Figure 4. Structure of production, arable land in 2023 (%)

Source: Author's calculations based on FAOSTAT (2025).

Regarding the share of area types, maize next to wheat takes the largest share in 2023. Maize being grown on 2,195,344 hectares and wheat on 2,317,692 hectares. Oilseeds also occupy a significant area of 1,865,435 hectares, followed by barley at 393,767 hectares. Lucerne is grown on 435,907 hectares. Other crops, for example sorghum (6862 hectares) and tobacco (529 hectares) occupy very small areas.

Crops included under "Other" are grown on 600 055 hectares.

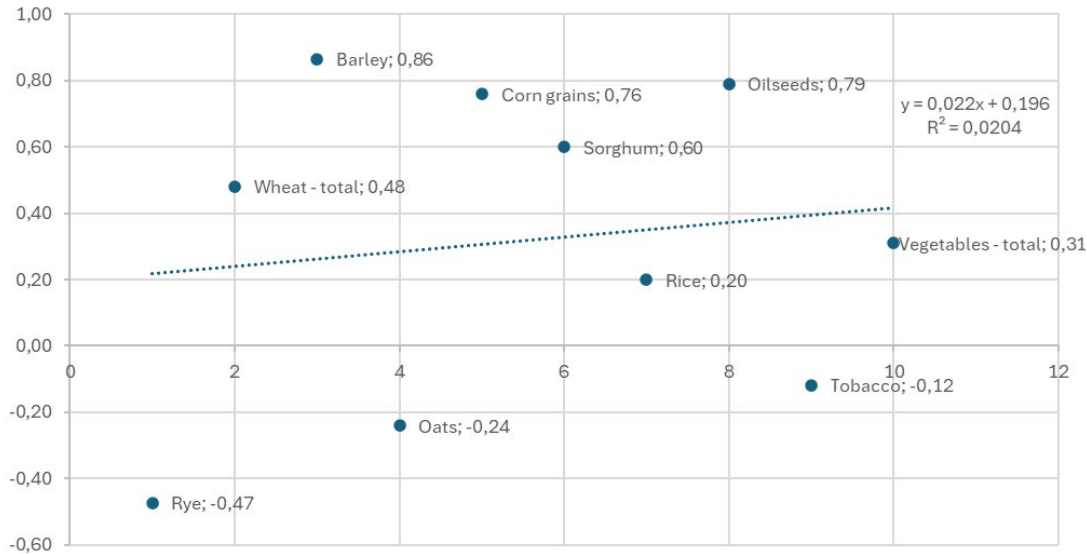


Figure 5. Correlations between area cultivated and exports competitiveness, by product

Source: Author's calculations based on FAOSTAT (2025).

Figure 5 shows the Pearson correlations coefficients between the area under different crops and their export competitiveness for agri-food products.

It can be seen that there are strong correlations in the area planted with barley, oilseeds, grain maize and their competitiveness (0.86 and 0.76 respectively). This suggests that as the area planted with these products increases, the relative competitiveness index increases due to higher production and product surpluses available for export after covering domestic consumption and strategic stocks.

Another, more moderate, correlation is identified for sorghum (0.6) and a weaker correlation of 0.48 for wheat.

For the other crops such as rye (-0.47), oats (-0.24) and tobacco (-0.12), the correlations are negative and insignificant, indicating that the area under cultivation does not influence export competitiveness.

Vegetables and rice have a weak correlation of 0.31 and 0.2 respectively.

Considering the fact that barley and corn have relatively high competitive advantage and from the premise, according to the estimation of the correlation between cultivated area and competitiveness, namely when the area with those crops increases and competitiveness increases, land shifts should be made in that direction. That is to increase the area cultivated with these cereals at the expense of those that are not competitive on the external market. According to Figure X, rice crops are not competitive in the external market, however this crop is cultivated on a significant area of 2 428 ha in 2023. Thus, this crop will be considered in the scenario.

In FAO (2025), Romania exported 5239 tons of rice worth \$3 305 000 in 2023. The total production was 12214 tons and a yield of 5,031/ha. If not growing the 2 428 rice, Romania may decide to produce barley or maize, which have a net higher competitive advantage.

Table 2 shows a scenario where Romania grows barley on the 2 428 ha.

Table 2. Scenario for structural changes in land use for increasing international competitiveness

Area reassigned to wheat (ha)	Yield (kg/ha)	Production (kg)	Price (dollars/kg)	Value of wheat exported (dollars)	New Balassa index for wheat
2428	4,294	10 425 832	0,9	9383249	10,6

Source: Author's calculations.

The proposed changes to the redistribution of agricultural areas with respect to rice and oats result in a surplus in the value of barley exports of \$9,383,249. As a result of these changes, the Balassa index increases from 10.3 to 10.6, a positive change in international competitiveness.

Thus, a small change in the cultivation structure of some crops can lead to increases in relative competitiveness.

Conclusion

Analyzing the value of exports of agri-food products from Romania between 2019 and 2023, it can be observed an increase of 65% in 2023 compared to 2019, from 8037592 to 13258539 thousand dollars.

Researching the competitive advantages of Romanian agri-food products in the year 2023, it was found that barley together with maize hold the greatest advantages, this is largely attributed to the large areas they have, especially in the case of maize, where 28% of the arable area is cultivated with maize, compared to 5% where it is cultivated with barley.

Export competitiveness and agricultural land use is correlated only in the case of barley, maize and oilseeds, therefore it is worth emphasizing that land use is recommended to be dominated by these crops.

Therefore, a scenario was created where the area planted with rice, a crop that does not have high export competitiveness, is replaced by barley. This resulted in a change in the relative competitiveness index from 10.3 to 10.6.

Extrapolating, it can be said that by changing land use and choosing crops that have a high correlation in terms of land use and export competitiveness index, Romania can obtain much higher export revenues.

However, these changes may affect food security and diet diversification. For example, vegetables are products with low competitiveness, but the reduction in the areas cultivated with vegetables would have negative implications on domestic consumption as the trade balance is in deficit in this area (Pătărlăgeanu et al, 2020).

Thus, future research directions should focus on different scenarios to analyze competitiveness where the optimal use of agricultural land is found, so that, Romania maximizes the value of exports without influencing food security and assortment diversification.

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