Assessing Serbia's cereals export to the Middle East markets

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Abstract

Agriculture, especially cereal production, is one of the few sectors in which Serbia has a significant comparative advantage. Due to the policy of approaching the EU, almost all grain exports are placed in a few EU countries, which are not end-users but are also significant producers and resellers on the world market. This increases the risk of external shocks and reduces earnings from exports, while end importers pay a higher price. This research aims to determine the complementarity between Serbia's exports of cereals and the import demand of the Middle East and North Africa (MENA) countries. For these purposes, the markets analysis was conducted (including food safety indicators), and two different import-export matching coefficients were applied. Serbia's competitiveness in relation to the current suppliers of MENA for each type of cereals was assessed. The results showed high trade complementarity in terms of corn and wheat with all countries in the region, while for a few of them, it was barley. The trade routes for each type of cereal specified in this research are guidelines for engaging the government in export promotion.

Keywords*: Exports, Cereals, Trade complementarity, Serbia, MENA region.*

1. Introduction

During the transition of the 1990s, Serbia lost its competitive position on the international market in many manufacturing sectors. In terms of the technological level of some industries such as electronics and machinery, it returned to the level of several decades before the transition. Although it has also suffered transitional shocks, the agricultural sector has remained one of the pillars of the Serbian economy. Agriculture production is one of the few sectors in which Serbia has a significant comparative advantage in the international market. Agriculture has a higher share in GDP (6.5%) than the World average and almost all European countries (around 3.5%). In terms of exports, agriculture also has a relatively large share. The global share of agricultural exports in total exports is 1.4%, in Europe it is 1.3%. In comparison, in Serbia, it is 2.1% (World Bank Indicators, 2020). The value of total exports of agricultural and food products has a tendency to grow, with oscillations common to this sector.

However, the agricultural potentials of Serbia are not even close to being fully utilised. The abundance of natural resources, such as water, rich fertile land, unused agrarian land, scientific resources in the form of several agricultural institutes which achieve significant results in

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the development of new varieties of seeds and bio-materials, and the application of information technology in agriculture provide an opportunity for significantly higher production and exports.

Due to the accession process to the European Union (EU), the most important export partners for food, as for all other products, are the countries of the EU to whose markets Serbia exports food products mainly duty-free based on the Stabilisation and Association Agreement. The EU is a large enough market for Serbia, and yet there are at least two arguments in favour of recommending the expansion and diversification of the food export market.

The first is a general recommendation for each country to have as many export partners as possible. Although the EU has 28 members, Serbian exports in each sector relate to only a few export markets. In the case of cereals, it is Romania, which accounts for more than 70% of Serbia's corn exports and about 60% of wheat exports. The second is Italy with 10% of exports of these products. This makes production sensitive to changes in demand in these countries, which is especially evident during crises such as the World Financial Crisis in 2008-2009 and the Covid-19 pandemic in 2020.

Another reason for export diversification is a loss of potential income because Romania, Italy, Germany, and Bulgaria, as main export partners for Serbian cereal, are not end-users but also large producers and exporters of cereals on the world market. This circulation of goods increases the procurement costs of the end buyers and reduces the earnings of Serbia. For example, the countries of the Middle East in 2019 imported corn from Serbia at the price of 2.6 $/kg, 3 $ from Germany, and 4-5 $/kg from Italy (author's calculation based on UN Comtrade).

The problem of Serbia's very limited number of export partners in terms of total exports can often be found in scientific papers, although most often without an analysis of potential new export markets or ways to diversify exports. The importance of the markets of the Middle East and North Africa for the total export of Serbia was emphasised in Udovički (2018), and a quantitative assessment of the potential increase was made only in the works of Stanojević, Batić (2009; 2010). To our knowledge, there is no research on the export potential of a group of products from Serbia to the MENA region.

When it comes to the economic aspects of agriculture in Serbia, there is a relatively large number of significant studies in the field of business and management. At the same time, foreign trade in agricultural products and food is largely neglected in scientific papers. Among the most important articles are Đurić *et al.* (2017), whose results show that even though the agricultural sector has a dominant export position, its competitiveness is still at a low level. Similar and detailed results are obtained by Cvijanović *et al.* (2016), who show low competitiveness and diversity of agricultural products with a higher degree of processing and significant achievements in yield and quality of raw materials – cereals, fruits, and medicinal plants. With these results in mind, our research analyses the export of cereals as products whose processing does not require complex technology and is competitive in the world market.

Among the most influential authors on the export of Serbian agriculture are Aničić and Simić (2017), who investigated the adverse effects of very low geographical diversification of exports and the considerable dependence on the economic and political situation in the European Union. To our knowledge, there are no scientific papers that quantitatively (using compatibility coefficients, such as this paper, or developing an empirical model) assess potential export markets for Serbian agricultural products.

Due to numerous economic and geographical characteristics, the Middle East and North Africa (MENA) is identified as a suitable export market for Serbia's exports of food. The limitations of natural conditions in the MENA region, i.e. water scarcity and shortage of arable land, are an insurmountable obstacle to grain production which could meet the region's demand. Given the characteristics of Serbian agricultural production and the food needs of the MENA region, it is apparent at first glance that there is significant trade complementarity, that is, that Serbia has a great potential for exports to the region. Cereals are in the focus of the assessment because this product group shows the

lowest self-sufficiency ratio in the MENA region (Woertz, 2017). At the same time, cereals are the most essential of Serbia's export groups of agricultural products.

However, this perception of complementarity is not enough to detect the most favourable export destinations in the region. Due to the limited production capacities of Serbia, a more detailed assessment is necessary. To recommend correct economic policies, the number of potential markets needs to be reduced to those with the best prospects for exports. So, the main research question is: *Which MENA markets have the greatest complementarity of imports of certain types of cereals with Serbian exports?*

We come to the answer to this question and recommendations for correcting Serbia's economic policies through a three-stage procedure.

First, the MENA markets themselves are explored regarding the relationship between food availability and affordability. By analysing this data, some markets will be excluded.

Second, two different import-export matching coefficients are applied in this study: the coefficient of conformity (CC) and the trade complementarity index (TCI). In this way, the trade compatibility of cereals as a group and certain types of cereals with the largest share in the export of Serbia to each country in the MENA region are investigated.

Third, to create economic policies, it is necessary to combine the results of MENA market analysis, compatibility obtained by applying trade indices, and other economic circumstances affecting trade, such as the most critical competitive suppliers of cereals.

2. Theoretical background: MENA limitation and Serbia's advantages as the backbone of the food trade

Due to numerous economic, political, and geographical characteristics, the MENA region is identified as a suitable market for increasing Serbia's export in general.

- The geographical distance is relatively small and allows for lower transport costs compared to other countries in Africa and Asia; Distance can be a particularly negative factor in the food trade, especially in goods of low degree of processing, because their price per unit of product is low (Ozer, Koksal, 2016).
- Serbia as an economic partner has been present in many markets of the MENA region for several decades since the former Yugoslavia. Traditional trade links can be considered a positive factor in determining future trade routes. Trade ties that existed before are usually much easier to renew and expand than to penetrate new markets.
- The current intensification of the overall economic relations between Serbia and certain countries in the region created stimulating conditions for the identification of these countries as potentially great exporting markets. The inflow of substantial foreign investments from the UAE, Saudi Arabia, and Qatar to Serbia, provided by the Serbian government under extremely favourable conditions, has been growing strongly for several years, indicating significant economic and political convergence.

However, although these are good preconditions, they are not enough to include the focus on these countries as export partners for specific goods in the economic policies of Serbia. For the assessment of export routes to agricultural products, a necessary precondition is import/export compatibility, which is determined in this chapter by statistical description and qualitative assessment of compatibility in trade in cereals.

2.1. *Challenges of food supply in the MENA region*

The stability and sustainability of the MENA region's food supply have occupied the attention of scholars from various fields for decades and the most important international organisations. In contrast, the export potential of Serbian agriculture is very rarely the subject of scientific research. These two groups of studies form the conceptual framework for researching the compatibility of Serbian exports and MENA food imports.

According to the records of the UN Commission on West Asia (ESCWA, 2017), insuf-

Table 1 - Global food security index 2020.

Global rank	*Country*	*Affordability*	*Availability*	*Quality*
13	Qatar	99	64	84
18	Israel	83	74	84
21	UAE	90	64	78
27	Kuwait	88	62	76
30	S. Arabia	86	62	74
46	Oman	78	58	74
50	Bahrain	82	56	57
55	Egypt	58	70	66
59	Morocco	62	64	62
64	Jordan	71	55	54
69	Tunisia	62	58	62
70	Algeria	67	56	53
111	Yemen	45	29	30

Source: The author according to EIU 2020.

ficient food safety is the greatest challenge in the MENA region, with as many as 33 million vulnerable people. This is especially true for countries that do not have significant energy resources. However, even the richest countries in the region occasionally face irregular supplies due to the sanctions on Iran, which is the largest producer of food, especially cereals, which are scarce in the region.

Table 1 shows MENA countries' position on the global food security index list, compiled by the Economist Intelligence Unit (EIU). The index consists of three groups of criteria: affordability, which refers to the fact that the population has the means to buy food; availability, which refers to the market supply that meets demand; and quality, which refers to the nutritional value and health safety of products. Concerning the countries surveyed in this paper, the EIU has no data for Libya.

Any country where the availability is significantly lower than the affordability can be considered as an additional space for Serbia's food exports to this region. As the table shows, these are all Middle Eastern countries except Syria and Yemen, while Egypt and Morocco are the only countries in North Africa where food availability is greater than the ability to buy it.

Natural conditions are a critical limiting factor in developing agriculture in these countries and make the region dependent on food imports. The most important natural-geographical features, such as lack of water, desert climate, and desert land, largely shape the structure and development of economies in the region.

Lack of water is a key obstacle to the development of agriculture, many branches of industry, and the cause of constant and growing insecurity about domestic food supply. In most parts of the region, land cultivation is impossible without abundant irrigation. However, using scarce resources is not feasible because limited amounts of water are often not enough to meet the population's basic needs. Despite their great length and amount of water, the key rivers in the region are not enough to meet the requirements for water and food of the countries through which they flow, much less the entire region. Furthermore, "the region is predicted to become hotter and drier in the future due to climate change" (OECD/FAO, 2018, p. 70). Comparative data for 1972 and 2014 on water availability per capita indicate an alarming reduction in the available amount of water in the Middle East. This amount has been reduced 2 to 20 times depending on the country in just 30 years. Oman and Bahrain have almost no water, but the population of Egypt is also endangered,

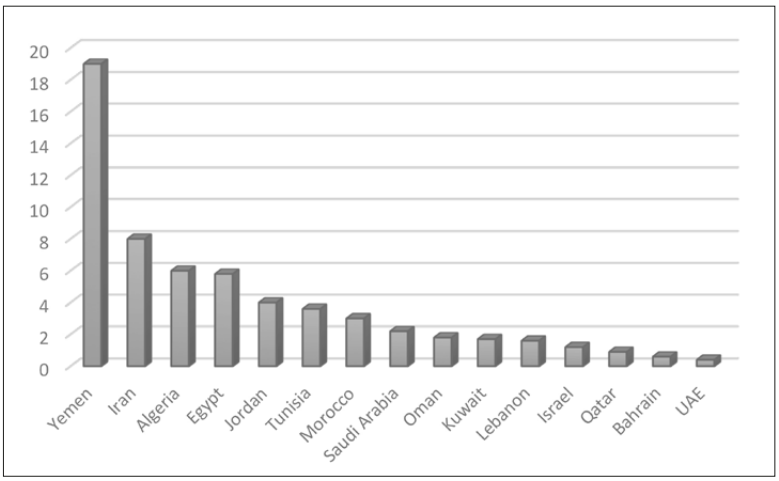

Figure 1 - Imports of cereals by MENA countries (% of total imports).

Source: The author according to the UN Comtrade data.

which, despite the Nile River, has no more than a symbolic amount of clean water per capita (Nin-Pratt *et al.*, 2018, p. 20).

Due to such natural conditions, the countries of the MENA region have much higher food imports (about 13% of total imports) compared to the world average (8% of total exports), as well as a huge trade deficit (World Bank Indicator, 2020). Due to the increasing demand of the rapidly growing population, food imports have been growing further (Hedoui *et al.*, 2019). Regarding the import of cereals, whose potential export from Serbia is the subject of this research, the relationship is even more unfavourable. Over the last 20 years, the share of domestic cereal production has been only 37%, while on average, in the world, this share is around 95% (Harrigan, 2014).

Cereal imports account for 40% to 50% of total food consumption in the region, and it reaches 70% (ESCWA, 2017) in Yemen and Lebanon. At the country level, food imports account for at least 7.2% of UAE merchandise imports and as much as 40% of Yemen's imports. As cereals participate in the total imports of the countries with very different shares, this cannot be observed at the level of the entire region, but the markets must be analysed separately.

Cereal imports are high in the poorest Yemen, with over 19% of merchandise imports and 8% in Iran, Algeria, and Egypt. At the same time, in the rich countries of the Persian Gulf, this share is minimal. The share of cereal imports accounts for less than 2% of total merchandise imports of Qatar, UAE, Bahrain, Kuwait, Lebanon, and Israel (Figure 1).

Differences in imports are not the result of differences in natural conditions but the degree of economic development. It is noticed that the share of grain imports is inversely proportional to the development of the economy. This is quite common because the import of other products dominates in richer countries, with a higher processing degree and higher prices, so that the import of basic food products, despite its huge amounts, represents a smaller part of the import.

Table 2 provides an overview of imports of basic cereal species from the countries of the MENA region, both in terms of value and quantity.

In recent years, MENA countries have been hit hard by global food price rises during and after the global economic crisis (Ianchovichina *et al.*, 2012), which pointed to numerous problems of dependence on imports of vital products (Woerz, 2017; Hedoui *et al.*, 2019). Governments in the

Table 2 - MENA import of the main type of cereals (2020).

Cereal	*HS cod*	*Imported value million US $*	*Quantity 1000 tons*
Wheat	HS 1001	11451	46326
Maize	HS 1005	6952	35416
Barely	HS 1003	2089	6614
Oats	HS 1004	31	78

Source: Author's calculation based on ITC data.

region are trying to tackle the problem of import growth and the price of food imports by changing economic policies in two directions. The first is a new concept of buying fertile land abroad to produce food for domestic consumption (IFPRI, 2012). Hurrigan calls this new approach to food security in the Arab states "macro-food sovereignty" (Hurrigan, 2014). The second approach is more common and involves the return of many governments in the region to earlier policies from the 1970s when there were numerous, mostly unsuccessful attempts to increase domestic food production.

The first strategy is the simplest and most efficient solution to the problem of food supply. Still, the costs of extraterritorial production are not lower than when imported. The initial investments exceed the possibilities of most countries in the region by far. This can be a successful strategy for a very small number of countries.

As for the second strategy, increasing domestic food production instead of imports is possible to some extent, but with additional consumption of water and land. Dependence on the imports of strategic products is always an unfavourable solution. Still, on the other hand, this situation can be observed the other way around: food imports contribute to more efficient water and land management. No country in the region can give up large-scale food imports. The most important goal of managing resources and the economy for each country is to find the optimal balance between water and food needs in terms of volume and the type of food.

As cereals require much more water and land than some other crops, imports of the four main grains: barley, corn, rice, and wheat, enable countries in the region to save significant amounts of water and land needed for population and agricultural production of other, traditional crops. In the example of Egypt, the import of 8.3 million tons of wheat saved 7.5 billion m^3 of irrigation water and 1.3 million ha of land (Lee *et al.*, 2019). These are the necessary resources for intensifying the production of traditional agricultural products, for which there are relatively favourable conditions: olives, dates, cotton, and others.

2.2. *Advantages of Serbia as an exporte of agricultural products*

In contrast to the countries of the MENA region, Serbia has relatively favourable conditions for food production. About 57% of the area of Serbia (5 million hectares) is agricultural land, which allows agricultural production to significantly exceed domestic needs. Arable land covers about 3 million hectares, while the rest are orchards, vineyards, meadows and pastures (Ševarlić, 2015).

Serbia has potential for additional production of high quality and healthy products, both conventional and organic, for the needs of the domestic market and for export (Đurić *et al.*, 2017). Agro-climatic conditions are favourable, with sufficient rainfall for almost all crops even without irrigation, temperate climate and relatively fertile land, as well as a wide range of agricultural products. A significant advantage is that Serbia is one of the leading European producers of cereal seed material, with several reputable development institutes. This enables it to develop different varieties of cereals in accordance with its own conditions and the needs of export markets (Babić *et al.*, 2016).

Serbia is a large producer and exporter of wheat and corn. Corn production in 2020 amounted to 7.3 million tons, and wheat 2.9 million tons (Statistical Office of the Republic of Serbia, 2021). In terms of maize exports quantity, Serbia is the fifth country in the world, behind the USA, Argentina, Ukraine, and Brazil, whose area is several hundred times larger than Serbia (Knoema, 2019). This is a remarkable achievement and is based on very high productivity given the very small territory. In terms of wheat productivity per hectare, Serbia is second behind the EU, with 5.6 t/ha, while corn productivity is in fifth place globally with a production of 6.7 t/ha (Saković, 2019). Corn is in second or third place in the total export of Serbia, in which it participates with about 3%.

Wheat has a significant share in agricultural production, but the share in exports is about 0.3%. At the international level, Serbia is the 8th largest exporter of corn and the 14th largest exporter of wheat globally (Index Mundi,

Table 3 - Serbian exports of cereal (millions of USD $).

	2018		*2019*		*2020*	
	Total	*MENA*	*Total*	*MENA*	*Total*	*MENA*
Corn	252.6	1.8	530.4	3.2	644.6	2.4
Wheat	195.1	0.00	51.2	0.00	89.0	0.00
Soya beans	31.6	1.3	71.9	0.4	108.7	0.01
Barley	14.5	0.02	9.6	0.02	16.2	0.06
Oats	0.3	0	0.5	0	0.3	0

Source: Author's calculation based on ITC data.

2021). In 2020 Serbia exported 3.5-3.6 MT of corn (depending on the source) and 436,000 MT of wheat (Statistical Office of the Republic of Serbia, UN Comtrade, ITC). The value of export of corn and soybeans are on a sharp rise in 2019 and 2020, while exports of other cereals have large oscillations (Table 3).

Despite the outstanding results in the production and export of cereals, a very small part of Serbia's cereal exports is placed on the MENA market. In 2020, the total corn export of Serbia amounted to 644 million USD, of which only 3 million USD was placed on the MENA markets, more precisely in six countries: Iran, UAE, Qatar, Algeria and Morocco (ITC, 2020). Export of other cereals to the region are statistically insignificant (Table 3).

This is a very small share of the region in the total export of Serbia if we keep in mind the geographical proximity of the Middle East, and especially North Africa from Serbia.

3. Data and methods

3.1. *Data set*

The type of research data is secondary, collected from UN Comtrade, based on Harmonised Standard (HS) classification. Besides data used for the main calculation of indices, data from the International Trade Centre (ITC), the Statistic Office of the Republic of Serbia, and Index Mundi, were also used.

Given the pronounced variability of production and even exports of agricultural products, the data were calculated based on a 3-year average depending on weather conditions and conditions. A preliminary review of exports in previous years showed a significant increase in Serbian grain exports over the past three years. Exports of corn have almost doubled, and barley exports have increased significantly, raising total exports of agricultural products. On the other hand, the export of oats and wheat, which participate less in the export of Serbia, has decreased. This is not just an incident but a trend. Therefore, only the latest data are included in the analysis, i.e. the average for 2018, 2019, 2020.

The analysis covers 11 countries in the Middle East and 5 countries in North Africa listed in Table 4. Due to the security situation, Iraq and Syria have no trade records for the recent period.

3.2. *Methods*

Several types of indices are most often used to assess more accurately the export potential of a particular product or group of products to specific markets. Indices have been the standard method for estimating foreign trade for several decades due to their simplicity, but above all, reliability.

The most commonly used is CC – coefficient of conformity, which occurs in research in several forms, ESI – Export Similarity Index, which was first presented by Finger and Kreinin (1979), as a means of measuring the similarity of the exports of any two countries to a third market, ICT – Index of Competitive Threat, RCA – Revealed Comparative Advantage, introduced by Balassa (1965), and the NRCA – Normalized Revealed Comparative Advantage, proposed by Yu *et al.* (2009), TCI – Trade Complementarity Index, introduced by Drysdale (1969), as well as TCI – Trade Complementarity Index by Michaely

(1996), SICT and DICT – Static and Dynamic Index of Competitive Threat, proposed by Jenkins (2008) and many others.

All of them consider the shares of different products in total exports and measure the extent to which two countries are "natural trading partners" in the sense that what one country exports overlap with what the other country imports.

The main idea of the index is to measure the extent to which one country's export pattern matches another country's import pattern more closely than it fits the pattern of world imports (Hoang, 2018). This research employs *the coefficient of conformity* (CC) as one of the most common indicators of import-export complementarity and Drysdale's (1969) Trade Complementarity Index (TCI).

The coefficient of conformity (CC) can be found in literature in several similar forms. A Blázquez-Lidoy *et al.* (2006) version is used in this study, as the most used in literature, especially in the OECD studies. Other indexes are often used only by the organisation that created them or single authors. CC will be used only for a rough assessment of import-export potentials between Serbia and MENA countries in terms of cereals in general.

It is calculated in the following formula:

$$CC = \frac{\sum_p^n Xip Mjp}{\sqrt{\sum_i^n (Xip)^2 \sum_i^n (Mjp)^2}} \qquad (1)$$

where i stands for an exporter country and j for an importer partner; the subscript p shows different product groups; Xip is the share of exports of product p in the overall export of country i; Mjp is the share of imports of product p in the overall import of country j.

The results of the CC analysis have values between 0 and 1. Value 1 means perfect complementarity between country *i's* export and country *j's* import. By contrast, the values closer to 0 refer to a competitive trade structure. Trade competition is more likely if the exporting structure between two countries is quite similar (Blázquez-Lidoy *et al.*, 2006).

Much more precise and important results are expected from applying Drysdale's (1969) Trade Complementarity Index (TCI) to the trade in cereals, especially each individual type of cereal in the export range of Serbia. The great advantage of this model is that, in addition to the import of one and the export of another country, it includes global average import/export ratio trade in the target product. While the other mentioned coefficients exclude the possibility of assessing the role of the third party (importers and exporters of specific goods), TCI puts bilateral trade in the context of competitiveness in the world market.

The TCI can be presented as follows:

$$TCI_{ab} = \Sigma j^n \left(\frac{Xa^j}{Xa} \times \frac{Mw - Ma}{Mw^j - Ma^j} \times \frac{Mb^j}{Mb} \right) \qquad (2)$$

where X_a is the country a's export of commodity j; X_a is country a's total export; M_w is the world import; M_a is country a's total import; M_w is the world import of commodity j;$^j M_a$ is the country a's import of commodity j; M_b is the country b's import of commodity j. M_b is country b's total import.

The value of TCI greater than 1 indicates the existence of strong complementarity between the export specialisation of a country a and the import specialisation of country b, and conversely, an index of less than 1 shows weak complementarity and low prospects for trade improvement. The TCI value 1 means that the export and import specialisations are similar to the world economy specialisation. Therefore, the existence of comparative advantage cannot explain bilateral trade.

Both indices actually determine the export-import structure of two countries in terms of a selected product group. To assess the compatibility of the economies of Serbia and the MENA countries, the import-export match coefficients CC and TCI were applied to the cereals sector.

4. Results and discussion

The results show that Serbia does not use significant potentials for grain exports to the MENA region. Table 4 highlights all fields that indicate significant import/export compatibility according to the above methodology. Both indices show a high degree of complementarity between Serbia and all Middle Eastern econ-

Table 4 - Compatibility of Serbia and MENA countries in terms of cereal trade.

Country	*CC*	*TCI*
Iran	0.993	5.344
Israel	0.986	0.793
Lebanon	0.990	1.076
S. Arabia	0.971	1.685
UAE	0.976	0.311
Qatar	0.977	0.635
Oman	0.988	1.111
Kuwait	0.987	1.148
Yemen	0.984	12.689
Bahrain	0.990	0.391
Jordan	0.985	2.701
Egypt	0.979	4.131
Algeria	0.981	2.451
Libya	0.976	3.446
Morocco	0.990	2.286
Tunisia	0.995	2.486

Source: Author's calculation.

omies in terms of cereal trade. The CC ranges from 0.97 for Saudi Arabia, which has relatively favourable conditions for exporting cereals, to 0.99 with Iran, Lebanon, Oman, Kuwait, Bahrain, Morocco and Tunisia (Table 4).

The Trade Complementarity Index (TCI) confirms high complementarity because in many but not all countries, it shows amounts far higher than 1. The TCI shows that Serbian grain exports could first increase to Yemen, Iran and all five North African countries (Egypt, Libya, Algeria, Morocco and Tunisia) (Table 4).

The application of the TCI index to the most important individual products in the group of cereals is shown in Table 5. Wheat and corn, as the most important agricultural products in Serbia, have excellent compatibility with the markets of the Middle East. Trade compatibility concerning these two cereal types has a TCI value greater than 1 (shaded fields) in most countries of the region (Table 5).

Table 4 highlights all the fields that, according to the above methodology, indicate import/export compatibility. The greatest complemen-

Table 5 - Trade Complementarity Index (TCI) of Serbia and MENA countries: cereals by types.

Country	*Maize HS 1005*	*Wheat HS 1001*	*Soya beans HS 1201*	*Barley HS 1003*
Iran	82.12	0.00	2.16	4.23
Israel	7.95	2.74	0.22	0.00
Lebanon	10.39	3.26	0.22	0.72
S. Arabia	7.49	0.73	0.12	3.11
UAE	0.69	0.61	0.01	0.34
Qatar	0.61	1.01	0.00	0.55
Oman	2.97	2.88	0.00	1.02
Kuwait	2.34	1.63	0.00	0.23
Yemen	52.13	42.60	0.00	0.25
Bahrain	0.57	1.05	0.00	0.17
Jordan	9.74	4.39	0.00	2.17
Egypt	43.06	18.04	0.00	0.76
Algeria	15.59	10.35	0.00	0.17
Libya	29.49	16.78	0.04	0.22
Morocco	10.17	7.09	0.70	0.37
Tunisia	8.11	4.26	0.21	0.32

Source: Author's calculation.

tarity in terms of corn exports is observed with the markets of Iran, with a TCI of as much as 82, Yemen with 52, Egypt with 43. Still, complementarity is also emphasised with other countries in the region. The only exceptions are the UAE, Qatar and Bahrain.

Potentially the most important export markets of Serbia for wheat are Yemen, Egypt, Libya, Morocco and other countries except Iran, Saudi Arabia and the UAE.

Other cereals that have a certain share in some countries' imports are soybeans and barley. The complementarity of Serbian barley exports is relatively high with Iran, Saudi Arabia, and Jordan imports. Soybeans can be a significant export product only to Iran (Table 5). Due to the small oats production in Serbia, no assessment of TCI has been made for this cereal.

As the export markets require to be defined more precisely, the most important result of the quantitative research is actually the differences between the markets. According to the TCI values, Yemen stands out as a market, with an index of 12.6. Given the long-running civil war, the stagnation of its economy and the inability to pay, Serbia's export strategy should not be aimed at this country. The same is true for Libya, which has shown high complementarity with Serbian exports of all cereals. Still, this country is volatile in terms of security due to deep internal turmoil and conflicts that have been ongoing since the removal of Muammar Gaddafi and the Arab Spring in 2011.

Unlike significant compatibility variations with the countries in the Asian part of the Middle East, compatibility with all five North African markets is very high. At the same time, the realised export to these countries is almost symbolic, as presented in Table 2. The value of corn exports to the Asian part of the Middle East is several times higher than North Africa. This difference is not proportional to the size of the market and the smaller distance of Serbia from North Africa than from the Middle East.

There is obviously high compatibility in food production, especially cereals, between Serbia and the MENA countries. As the data showed, this compatibility is not reflected in the realised exports.

The implications of the survey results show that there is no significant potential to increase exports of any cereals to Yemen, Morocco, UAE and Qatar, as well as Iraq and Syria, which are not even included in the analysis due to the security situation. The application of import/export coefficients shows that Yemen stands out as the most important market. Still, given the long civil war and less affordability to pay for food than its availability, this market is not of interest to Serbia. In addition, in Yemen and Morocco, food affordability is significantly lower than availability (Table 1), which further reduces their importance as export markets. The UAE and Qatar, although they have high purchasing power, are not targeted markets for grain exports from Serbia, as TCI has not shown import/export compatibility for any type of grain.

The results also imply no potential for a significant increase in exports of oats, barley and soya beans to MENA countries. As Serbia's most important agricultural products, wheat and corn have the greatest compatibility with the MENA markets. For soybean exports, Iran is depicted as a potentially significant market, while barley exports have significant compatibility with imports from Iran, Saudi Arabia and Jordan. However, these cereals have low import needs and modest export potential, so policy implications are relevant only for corn and wheat exports to the 12 remaining countries.

For the export of corn, as one of Serbia's most important export products, potentially the most important markets are Iran, then Libya, Israel, Saudi Arabia, Lebanon, Algeria, and Egypt. These countries have a high index of trade compatibility with Serbia. In addition, their key suppliers of corn are countries that are not large producers or are not corn producers at all, but only resellers. Relations with Iran deserve a special place in trade policies. This country is a major consumer of food and a key distributor for other countries in the region. Trade coincidence between Serbia and Iran is very high in corn exports, and Iran is one of the largest importers of corn in the world. Serbia and Iran have recently intensified trade cooperation, but only in one direction. Serbia's imports from Iran multiplied in 2015-2019 (UN Comtrade), while exports re-

mained unchanged. This leaves room for Serbia to negotiate higher exports of corn, whose average value in the previous period was about $ 1.5 million. This would not be to the detriment of Iran, as its largest suppliers of corn are Switzerland, the Netherlands and Singapore, which are in fact trade intermediaries, from which Iran imports $ 200-300 million worth of corn a year.

Algeria, Libya, Lebanon, Israel, Saudi Arabia, and Egypt also do not have particularly favourable supply options. They import corn from large producers such as Argentina, Brazil, USA, with high transport costs, then from Romania, which actually buys 70% of corn from Serbia and their neighbours who are also importers.

The most significant potential increases in exports can be realised to Libya, Algeria, Egypt, and Lebanon when it comes to wheat exports. The trade compatibility index is slightly lower than in the corn trade, but it is still high. These countries import wheat from some of the largest producers, such as Ukraine and Russia, and in the case of Algeria, France. Serbia is not competitive with these exporters in terms of price, nor can it meet a significant part of the needs of these markets with its production volume. However, in Lebanon and three North African countries, there are countries with which Serbia can compete as large suppliers of wheat. These are Romania, which, in addition to its own, resells wheat from Serbia and other Eastern European countries, Canada, the USA and Australia due to high transport costs.

5. Conclusions and policy implications

Based on the assessment of the limitations of natural conditions in the MENA region and the characteristics of Serbian agriculture, the cereals sector stands out as particularly important for both parties. Due to the scarcity of natural resources, especially water and arable land, the production of cereals in the MENA is economically unprofitable, i.e. mostly more expensive than imports. No country in the region can meet the demand of the domestic food market with its own production, which is why food imports have a more significant share in total imports than the world average. Some exceptions are Egypt, Morocco, Tunisia, which have relatively developed agriculture, but even there, the production of key products, especially cereals, has an extremely low level of efficiency.

Although the dependence on the imports of strategic products is generally an unfavourable position of the MENA countries, the import of cereals is more rational for these countries than domestic production. Given that cereals require large areas per unit of product, domestic production is not rational regarding a very scarce area of arable land in the region. Also, cereals require more water than provided by the natural supply of the region. The import of cereals enables the scarce resources to be used more usefully, to intensify the production of traditional agricultural products for which there are favourable conditions and demand on the international market: olives, dates and other products specific to this region.

The import of cereals is of strategic importance for all the countries in the region, while at the same time, this is one of the most important Serbia's export group of agricultural products. High trade compatibility is the best and longest-lasting basis of foreign trade.

It is interesting that Serbia, which has traditionally had excellent trade and friendly relations with MENA countries, simply neglected these trade routes and limited exports to Romania and Italy. In recent years, restoring traditional friendly and economic relations with Arab countries has been a significant part of the Serbian government's foreign policy. Most of the initiatives in the field of investment and trade have received a positive response from these countries, and many projects are being successfully implemented. However, trade in agricultural products, especially cereals as a key comparative advantage of Serbia over MENA countries, has not been the focus of bilateral relations with these countries.

The research confirmed extremely high compatibility between the exports of Serbia of the whole group and certain types of cereals, with the import of the MENA. In most papers of complementarity in agricultural trade, these indices are far lower than those obtained in this study. This is especially true for research on the complementarity of markets in the same geographi-

cal region, as agriculture is largely determined by natural-geographical conditions. Thus, the aforementioned Hoang's (2018) application of TCI in ASEAN countries showed extremely low values, almost close to zero and found that food trade within the region has no potential to increase. Even in articles that have applied import-export coefficients to countries with different natural geographical conditions, such as China and trading partners along the Belt and Road (He *et al.*, 2016), their value is far lower than that obtained for corn trade and wheat between Serbia and MENA countries. It should be added that the coefficients in these papers were not applied to individual products but to entire groups of food products, which multiplies the probability of compatibility.

Specifying export destinations is particularly important for Serbia due to its very limited production and export capacities. Therefore, it was necessary to determine a smaller number of markets in which the placement of cereals would be easiest to increase.

Policy implication derives from the above data on a) MENA markets in terms of affordability, availability and quality of food; b) results of statistical research on import/export compatibility between Serbia and each individual MENA country of each type of cereals that Serbia exports, and c) assessment of whether Serbia is competitive in such targeted markets concerning their current suppliers. The situation with procurement from resellers is mentioned, but due to the abundance of this data, it is not described in detail in the text. These data (based on ITC, 2020) serve as additional information on markets that have proven to be desirable based on the first two criteria.

Based on these three criteria, the results showed that for corn exports, the largest potential markets are Iran, then Libya, Lebanon, Algeria, Egypt, Israel, and Saudi Arabia, while for wheat, it is Libya, Lebanon, Algeria, Egypt. These are markets that have shown a high degree of complementarity with imports and exports from Serbia, significant affordability for food imports and have suppliers that are not substantial competitors to Serbia in terms of exports of certain cereals.

Since they are in most of the same countries, Serbian institutions have additional reasons to put these countries in the focus of economic policies. The results imply that significant adjustments to Serbia's trade policies regarding cereal exports are needed.

Significant potential for increasing exports of corn and wheat to target markets has to be supported by the initiative of:

- chambers of commerce (central and several regional);
- Ministry of Foreign Affairs through embassies in these countries;
- Development Agency of Serbia (RAS) and other state economic entities and diplomatic missions.

Even if they are large companies, producers in this sector alone cannot take significant export initiatives. Namely, the purchase of cereals in Serbia is centralised; no producers independently export these products in raw form. The state has a wide range of mechanisms of influence on both trade and foreign policy relations. The Ministry of Agriculture also cannot play a significant role in increasing exports. Still, together with producers, it should enable an increase in production for export.

Based on the experience in cooperation between Serbia and MENA countries in other segments of the economy, it may be recommended to include Arab partners in joint investment projects to increase the quantity or certain types of food to supply the MENA region.

References

Aničić A., Simić M., 2017. Tobin's tax in the EU. *Oditor*, 3(2): 100-106.

Babić V., Pavlov M., Boćanski J., 2016. Status and perspectives of plant breeding and seed industry of Serbia. *Selekcija i semenarstvo*, 23(2): 19-27. doi:10.5937/SelSem1602019B (in Serbian).

Balassa B., 1965. *Trade Liberalisation and "Revealed" Comparative Advantage*. Manchester: The Manchester School of Economics.

Blázquez-Lidoy J., Rodríguez J., Santiso J., 2006. *Angel or devil? China's trade impact on Latin American emerging markets*. OECD Development Centre Working Papers No. 252. Paris: OECD Publishing. https://doi.org/10.1787/422232033888.

Cvijanović D., Ignjatijević S., Milivojević I., Mihailović B., 2016. *Potentials of Serbia in the international framework - the importance of agriculture and health tourism*. Faculty of Hospitality and Tourism in Vrnjačka Banja, Republic of Serbia.

Drysdale P., 1969. Japan, Australia, New Zealand: The Prospect for Western Pacific economic integration. *The Economic Record*, 45(3): 321-342.

Đurić D., Ristić J., Đurić D., Vujanić I., 2017. Export of agricultural and food products in the function of economic growth of republic of Serbia. *Economics of Agriculture*, 64(3): 887-900. 10.5937/ekoPolj1703887D.

EIU (Economist Intelligence Unit), 2020. *Global Food Security Index*. Retrieved from https://foodsecurityindex.eiu.com/Index (June 13, 2021).

ESCWA (Economic and Social Commission for Western Asia), 2017. *Arab Horizon 2030: Prospects for Enhancing Food Security in the Arab Region*. Beirut: Economic and Social Commission for Western Asia, UN and FAO.

Finger J., Kreinin M., 1979. A Measure of ʻExport Similarity' and Its Possible Uses. *Economic journal*, 89(356): 905-912. doi: 10.2307/2231506.

Harrigan J., 2014. *The Political Economy of Arab Food Sovereignty*. London: Palgrave Macmillan. https://doi.org/10.1057/9781137339386.

He M., Huang Z., Zhang N., 2016. An Empirical Research on Agricultural Trade between China and "The Belt and Road" Countries: Competitiveness and Complementarity. *Modern Economy*, 7(14): 1671-1686. http://dx.doi.org/10.4236/me.2016.714147.

Hedoui M.A., Natos D., Mattas K., 2019. EU Agricultural Integrated Policies: The Case of EU and Mediterranean Counties. *New Medit*, 18(3): 17-29. http://dx.doi.org/10.30682/nm1903b.

Hoang V., 2018. Assessing the agricultural trade complementarity of the Association of Southeast Asian Nations countries, *Agricultural Economics – Czech*, 64: 464-475. https://doi.org/10.17221/253/2017-AGRICECON.

Ianchovichina E.I., Loening J.L., Wood C.A., 2012. *How Vulnerable Are Arab Countries to Global Food Price Shocks?* Policy Research Working Paper, No. 6018. Washington D.C.: World Bank. https://openknowledge.worldbank.org/handle/10986/11976.

IFPRI (International Food Policy Research Institute), 2012. *2011 Global food policy report*. Washington, D.C.: International Food Policy Research Institute. doi: 10.2499/9780896295476.

Index Mundi, 2021. *Wheat Exports by Country in 1000 MT*. https://www.indexmundi.com/agriculture/?commodity=wheat&graph=ty-exports.

ITC (International Trade Center), 2020. *Trade map*. Retrieved from https://www.trademap.org/Index.aspx (April 13, 2021).

Jenkins R., 2008. *Measuring the Competitive Threat from China*. Research Paper No. 2008/11. Helsinki: United Nation University - World Institute for Development Economics Research. Retrieved from https://www.wider.unu.edu/sites/default/files/rp2008-11.pdf (June 13, 2021).

Knoema, 2019. *Data Atlas. Maize exports quantity*. https://knoema.com/atlas/topics/Agriculture/Trade-Export-Quantity/Maize-exports-quantity.

Lee S.H., Mohtar R.H., Yoo S.H., 2019. Assessment of food trade impacts on water, food, and land security in the MENA region. *Hydrology and Earth System Science*, 23: 557-572.

Michaely M., 1996. *Trade preferential agreements in Latin America: an ex ante assessment*. Policy Research Working Paper No. 1583. Washington, D.C.: The World Bank.

Nin-Pratt A., El-Enbaby H., Figueroa J.L., Eldidi H., Breisinger C., 2018. *Agriculture and Economic Transformation in the Middle East and North Africa - A Review of the Past with Lessons for the Future*. Food Policy Report. Washington, D.C. and Rome: International Food Policy Research Institute (IFPRI) and Food and Agriculture Organization of the United Nations (FAO). https://doi.org/10.2499/9780896292956.

OECD/FAO, 2018. *OECD-FAO Agricultural Outlook 2018-2027*. Paris and Rome: OECD Publishing and Food and Agriculture Organization of the United Nations. doi:10.1787/agr_outlook-2018-en.

Ozer O.O., Koksal O., 2016. Determinants of Turkey's citrus exports: a gravity model approach, *New Medit*, 15(3): 37-42.

Saković V., 2019. *Serbian grain market and export possibilities*. Serbia Grain Conference, Association Serbia Grains, FAO, European Bank, and Ministry of Agriculture of Serbia, held in Belgrade, October 31th. Retrieved from https://www.zitasrbije.rs/download/REZERVACIJA%20HOTEL%20HILTON.pdf (July 17, 2021).

Ševarlić M., 2015. *Agricultural land - Census of Agriculture 2012*, Statistical Office of Serbia (in Serbian).

Stanojević N., Batić J., 2009. Assessment of Serbian export potentials in Mashriq countries. In: *Dealing with the Global Economic Crisis by Companies and Economies*, 7th International Scientific Conference of Megatrend University, Belgrade, pp. 357-366.

Stanojević N., Batić J., 2010. Quantitative analysis of Serbia's export potential to North African countries. *Megatrend review*, 7(1): 163-180.

Statistical Office of the Republic of Serbia, 2021. Retrieved from https://www.stat.gov.rs/en-US (June 29, 2021).

Udovički K., 2018. *Serbia's Economic Structure: Challenges and Opportunities for Accelerating Growth*. Belgrade: CEVES. https://ceves.org.rs/wp-content/uploads/2019/02/Serbias-Economic-Structure-Challenges-and-Opportunities-for-Accelerating-Growth.pdf.

UN Comtrade, 2020. Database. Retrieved from https://comtrade.un.org/data/ (June 21, 2021).

Woertz E., 2017. Agriculture and Development in the Wake of the Arab Spring. In: Luciani G. (ed.), *Combining Economic and Political Development: The Experience of MENA*. Geneva: Graduate Institute Publications and Boston: Brill-Nijhoff, International Development Policy Series 7, pp. 144-169. doi: 10.4000/poldev.2274.

World Bank Indicators, 2020. Agriculture & Rural Development. Retrieved from data.worldbank.org/indicator (June 20, 2021).

Yu R., Cai J., Leung P.S., 2009. The normalized revealed comparative advantage index. *The Annals of Regional Science*, 43: 267-282. https://doi.org/10.1007/s00168-008-0213-3.