

**Publisher**<http://jssidoi.org/esc/home>**DEVELOPMENT OF MUTUAL AGRI-FOOD TRADE BETWEEN KAZAKHSTAN AND CHINA****Nazym Dabylytayeva¹, Gyuan Ma Min², Gulnara Baikushikova³, Assiya Kuzembayeva⁴**¹Almaty Technological University, str. Tole bi, 100, Almaty, Kazakhstan,^{2, 3, 4}Al-Farabi Kazakh National University, Karasaibatyr str. 95 a, Almaty, KazakhstanE-mails: ¹ nazym62@mail.ru; ² maminyuang@gmail.com; ³ baikushikova.gulnara@kaznu.kz; ⁴ kuzembaevaasi@mail.ru

Received 10 May 2024; accepted 3 September 2024; published 30 September 2024

Abstract. The study's relevance is due to the need for a significant increase in exports of products, which is supported by growth in the agro-food sector of Kazakhstan. However, increasing international tensions may jeopardize the opportunities for agro-food exports. In addition, more utilization is needed to ensure food production growth. Accordingly, an analysis of the fundamental factors determining Kazakhstan's agro-food export, resource potential, and expansion possibilities is critical. We are focused on the potential for market expansion in China and the development of exports of agro-food products with high-added value (non-resource exports). The study analyzes the main indices that characterize the comparative advantages of exports and indices of trade complementarity for individual markets. The paper assesses the real growth opportunities for agro-food exports, including particular products and goods in mutual trade with China. The absence of significant structural shifts in Kazakhstan's agro-food products supply to the Chinese market has been revealed. It is shown that the share of food and processed industry products in Kazakhstan's exports to China remains low compared to growth in exports of products of a low degree of processing. The weaknesses of Kazakhstan's agro-food exports are associated with the need to better realise the agricultural industry's resource potential.

Keywords: agriculture; agri-food trade; agro-food; exports; imports; resources; resource potential; competitiveness

Reference to this paper should be made as follows: Dabylytayeva, N., Ma Min, G., Baikushikova, G., Kuzembayeva, A. 2024. Development of mutual agri-food trade between Kazakhstan and China. *Entrepreneurship and Sustainability Issues*, 12(1), 448-458. [http://doi.org/10.9770/jesi.2024.12.1\(29\)](http://doi.org/10.9770/jesi.2024.12.1(29))

JEL Classifications: F18, Q17

1. Introduction

Considering Kazakhstan's growing agricultural production and agro-export, increasing the volume of mutual trade with China, one of the country's most important trade partners is possible. This will contribute to the improvement of the financial and economic situation of agricultural producers. In this regard, it is essential to develop a set of measures for the balanced development of Kazakhstan's agriculture, taking into account the available resource potential as the fundamental factor of competitiveness, allowing it to expand trade with China. This paper defines resource potential as a set of available resources (labour, land, water, material) conjugated, allowing for economic effect. As one of the economic effects, we can single out the output of agricultural products, which could be exported. Exports provide agricultural producers income and help build economic relations with other countries. China is particularly important in this context, being the Republic's major trade and economic partner. Given the above, the resource potential is considered from the result-oriented direction of the study.

In China, ensuring food security remains paramount, which requires stability in the production and supply of agro-food products abroad. In this regard, it is also crucial for China to have strong ties with Kazakhstani product suppliers.

The aim is to determine the real opportunities for growth of Kazakhstan's agri-food exports in the Chinese market based on comparative advantages, competitiveness and complementarity of trade, taking into account the resource potential of agriculture.

2. Literature review

The main directions of resource potential realization in the development of agriculture were discussed in the works of many scientists: Pyagai, Bespayeva and Iskakova (2022), Gusakov, Pilipuk and Rastorgueva (2023), Dolla (2011).

Studies in this direction in Kazakhstan are conducted by Akimbekova, Baymuhanov and Kaskabaev (2021); Kurmanova, Sukhanberdina and Urazova (2022); Eszhanova, Kalikov and Abdykadyr (2023); Mukhamedova et al. (2023), Shakeev et al. (2024); Zhagalbayev, Feng and Kazhiyeva (2024),

The results of the scientific achievements of the authors mentioned above are adopted as the analytical and methodological basis of this paper. In addition, the findings of Chinese scientists - on the issues of China's agricultural policy and its significance for the world commodity markets (Hansen, Tuan & Somwaru, 2011) - are used. The results of integrating urban and rural development are studied, and the following problems of the country's agricultural economy are identified: insufficient growth rates of farmers' incomes and resource outflow (Chen, 2009). Fan, Cho, and Ryu (2018) identified that public investment in agricultural research and development (R&D), rural education, and infrastructure has significant positive returns, including the reduction of poverty and regional inequality. Nurgazina et al. (2020) found that the structure of foreign trade in agricultural products between Kazakhstan and China is dominated by inter-industry trade based on comparative advantages, which means different trade orientations of countries and a considerable potential for further cooperation.

Wang et al. (2022) results showed that Kazakhstan has a low share of the international grain market: however, wheat, barley, and buckwheat have substantial export advantages.

Zhou and Tong (2022) found differing competitiveness of agricultural products trade between China and the countries along the "Belt and Road". The scientists attributed Kazakhstan to weaker countries and stressed the importance of policies, among other factors, determining the capacity of trade in agricultural products.

Special attention in studies (Janshanlo, Askarova, & Agzamov, 2022; Abula et al., 2022; Khairullina, 2023; Omarbakiyev et al., 2023; Tkacheva et al., 2024) was paid to the risks and opportunities for Kazakhstan in the implementation of the Chinese project of the Silk Road Economic Belt. The basis of economic relations between Kazakhstan and China in agriculture is agri-food trade, so this article focuses on this aspect. In the literature, there are no examples of comprehensive analysis of the interaction problems between Kazakhstan and China, taking into account comparative advantages, competitiveness and complementarity of trade with regard to the resource potential of agriculture.

3. Research methodology

The study is based on ITC Trade Map data, namely mirror agri-food trade statistics from the Chinese side. The time series covers the years 2004-2022.

The Trade Complementarity Index (TCI) is one of the indices. This is a measure of the extent to which one country's import structure matches another country's export structure.

$$TCI = 100(1 - \sum (\frac{|m_{ik} - x_{ij}|}{2})), \quad (1)$$

where: x_{ij} – is the share of commodity i in the world exports of country j and m_{ik} – is the share of commodity i in all imports of country k .

The index ranges from 0 (no goods are exported by one country and imported by another) to 100 (export and import shares are the same).

The comparative advantage analysis in trade is based on Balassa's revealed comparative advantage (*RCA*) coefficient for goods from Kazakhstan and China. The calculation formula is presented below:

$$RCA = \frac{x_i/X}{x_{wi}/X_w}, \quad (2)$$

where: x_i – export of product i from a certain country, X – total exports of the country are taken, x_i – world exports of product i , X – total world exports.

RCA shows the ratio of the share of a product group (or a particular product) in a country's exports to the share of a product group (or a particular product) in world exports.

Since *RCA* does not consider the role of import flows of products, the analysis of the competitiveness of Kazakhstan's agro-industrial complex and China is supplemented by the calculation of the Lafay index (*LFI*). This indicator is:

$$LFI = 100 \left(\frac{x_{ij} - m_{ij}}{x_{ij} + m_{ij}} - \frac{\sum_{j=1}^N (x_{ij} - m_{ij})}{\sum_{j=1}^N (x_{ij} + m_{ij})} \right) \frac{x_{ij} + m_{ij}}{\sum_{j=1}^N (x_{ij} + m_{ij})}, \quad (3)$$

where: N – is the total number of goods sold; x_{ij} , m_{ij} – are exports and imports of goods j by country i , respectively.

In addition, export competitiveness index (*XCI*) is used:

$$XCI = \frac{x_{it}/X_{it}}{m_{kj}/M_{kt}}, \quad (4)$$

where: x_{ij} – exports of product j of country i ; X_{it} – total exports of country i ; m_{kj} – imports of product j to market k ; M_{kt} – total imports in market k .

4. Results

Among the countries of the world in terms of agro-food trade, China is a major partner of Kazakhstan. According to data for 2022, its share accounts for 11.3% of Kazakhstan's exports and 2.5% of Kazakhstan's imports from there. Moreover, China is among the top three importers of Kazakhstani agro-food products and ranks 4th among the largest suppliers to Kazakhstan.

If, up to 2013 inclusive, agro-food products did not occupy a prominent place in the mutual trade between Kazakhstan and China, then further its role begins to strengthen, especially with regard to exports from Kazakhstan. According to the results of 2022, the share of agro-food products in the structure of exports from Kazakhstan to China reached 3.6%, while Kazakhstan's imports from China - 2.1% (Figure 1).

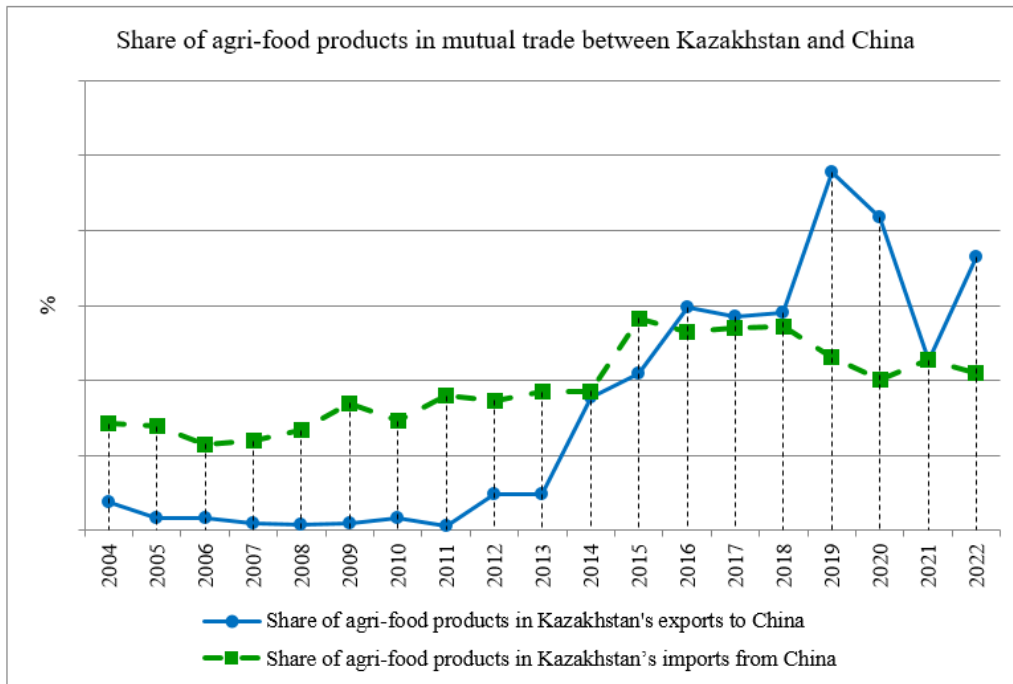


Figure 1. Share of agri-food products in mutual trade between Kazakhstan and China in 2004-2022, %
 Source: compiled and calculated by the authors according to ITC Trade Map.

From 2016 to 2022, the turnover of mutual trade in agri-food products between Kazakhstan and China increased 2.5 times and amounted to \$885.1 million (Figure 2).

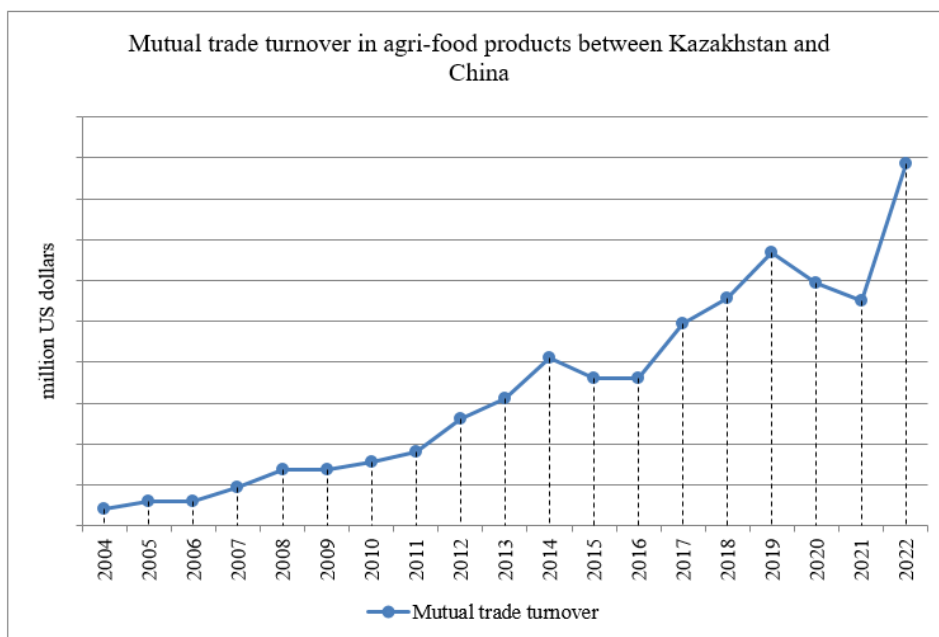


Figure 2. Turnover of mutual trade in agro-food products between Kazakhstan and China in 2004-2022, mln USD. USD
 Source: compiled and calculated by the authors according to ITC Trade Map

In 2022, agro-food exports from Kazakhstan to China increased 3.8 times compared to 2016, amounting to 540.5 million USD. USD. The dynamics of Chinese exports could have been more impressive: USD 344.7 mln with a growth of 1.6 times over the same period (Figure 3). The success of Kazakh exporters is due to a lower growth base compared to China.

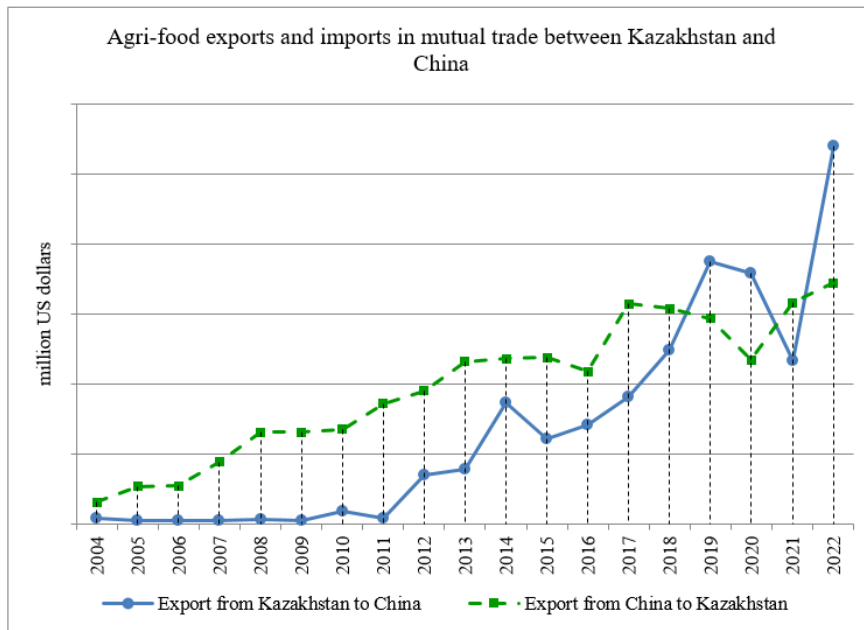


Figure 3. Agri-food exports and imports in mutual trade between Kazakhstan and China in 2004-2022, mln USD. USD
 Source: compiled and calculated by the authors according to ITC Trade Map.

Kazakhstan has had a positive agri-food trade balance with China since 2019, which amounts to \$81.4 million. In 2021, it became negative again (-84.0 million USD). Only in 2021 did it become negative again (-84.0 million USD) due to the introduction of temporary export bans in Kazakhstan in the context of measures to combat COVID-19. By the end of 2022, the balance increased to USD 195.8 million. By the end of 2022, the balance increased to USD 195.8 million (Figure 4), mainly due to the high growth rate of Kazakh supplies.

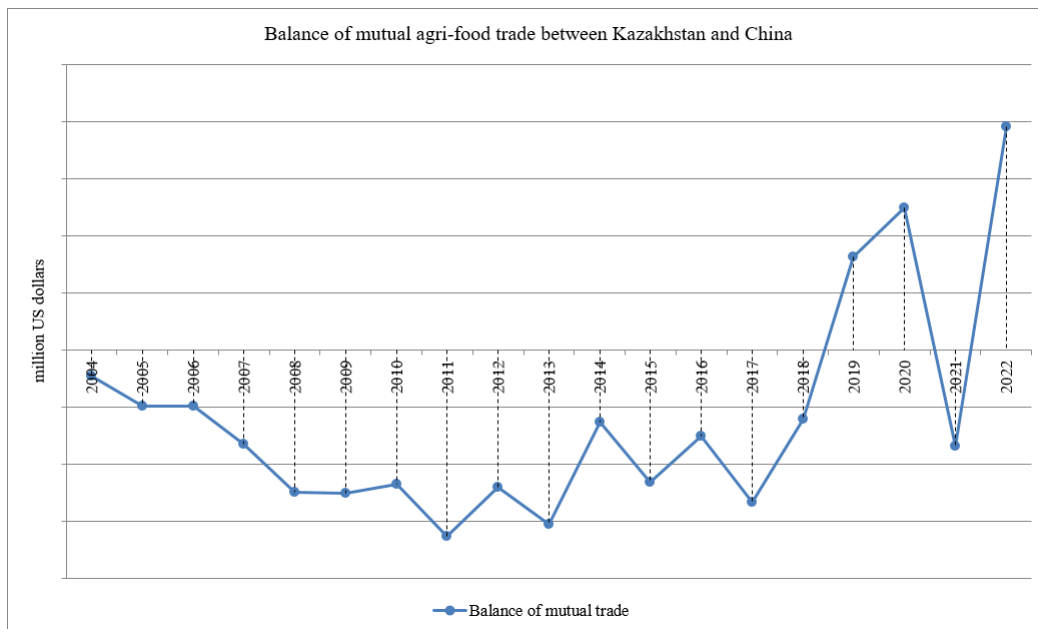


Figure 4. Balance of mutual trade in agri-food products between Kazakhstan and China in 2004-2022, mln USD. USD
 Source: compiled and calculated by the authors according to ITC Trade Map.

At the same time, the structure of Kazakhstan's exports to China has not undergone more significant changes. According to our calculations based on ITC Trade Map data, it is still dominated by supplies of products with a low degree of processing. The main exports to China are flax seeds (\$99.6 million, or 18.4% in the structure of exports to China).

The main exports to China are flax seeds (\$99.6 million, or 18.4% in the structure of Kazakhstan's agro-food exports to China by 2022); crude sunflower oil (\$91.2 million, or 16.9%); sunflower seeds (\$79.2 million, or 14.6%); wheat waste (\$63.6 million, or 11.8%); and barley (\$53.4 million, or 9.9%). Over the past five years, exports of crop products from Kazakhstan to China have increased 4.6 times, from 750,000 tons in 2019 to 3.5 million tons in 2023.

At the same time, the structure of Chinese exports to Kazakhstan differs in the direction of greater diversification. The first five in terms of export volumes in 2022 were shiitake mushrooms (\$32.8 million, or 9.5% of the structure of China's agro-food exports to Kazakhstan in 2022) and walnuts. The first five in terms of exports in 2022 were shiitake mushrooms (\$32.8 million, or 9.5% in the structure of China's agro-food exports to Kazakhstan, according to the results of 2022); walnuts without shells (\$24.5 million, or 7.1%); canned vegetables, fruits (\$22.1 million, or 6.4%); canned tomatoes (\$19.5 million, or 5.7%); walnuts in shells fresh, raw or dried (\$18.8 million, or 5.5%). According to the index of complementarity of agro-food exports, China is ahead of Kazakhstan - 58.2% against 49.1% according to the data for 2022 (Figure 5). One can note a positive trend in the dynamics of both indices, which indicates the feasibility of further development of bilateral trade. The main export items of both countries correspond to each other's needs.

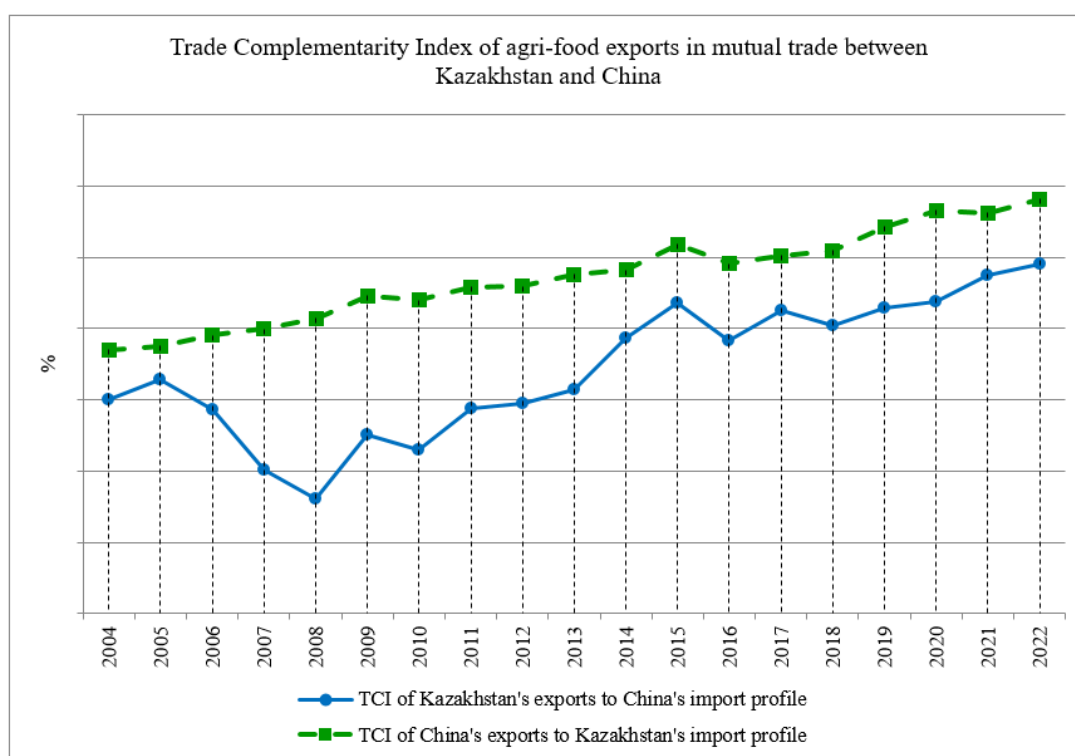


Figure 5. Index of complementarity of Kazakhstan's agro-food exports to China's agro-food import profile (blue line) and index of complementarity of China's agro-food exports to Kazakhstan's agro-food import profile (green line) in 2004-2022, %.

Source: compiled and calculated by the authors according to ITC Trade Map data.

Note: TCI - complementarity.

Such Kazakhstani export items characterize the highest index of export competitiveness in the Chinese market as products of the flour and cereals industry (XCI was 10.5 in 2022); cereals (3.7); tobacco (2.0); vegetables (1.4); finished meat and fish products (1.3) (Figure 6). Of the commodity groups covering the products supplied to the PRC, comparative advantages at the world level were revealed for all of them. Thus, the Balassa index for flour and cereal products in 2022 was 8.5, for cereals - 3.6, and for oilseeds - 1.2. The Lafaye index for the same commodity groups amounted to 0.6, 1.4, and 0.3, respectively. If we talk about the leading commodity positions of Kazakhstan in the Chinese market, we can highlight the eggs of birds without shells and egg yolks, fresh, dried (501.7); wheat flour or wheat-rye (433.2); onions, shallots, garlic, leeks (302.4); wheat gluten (271.0); cereals, coarse flour and cereal granules (193.3); undenatured ethyl alcohol (102.0).

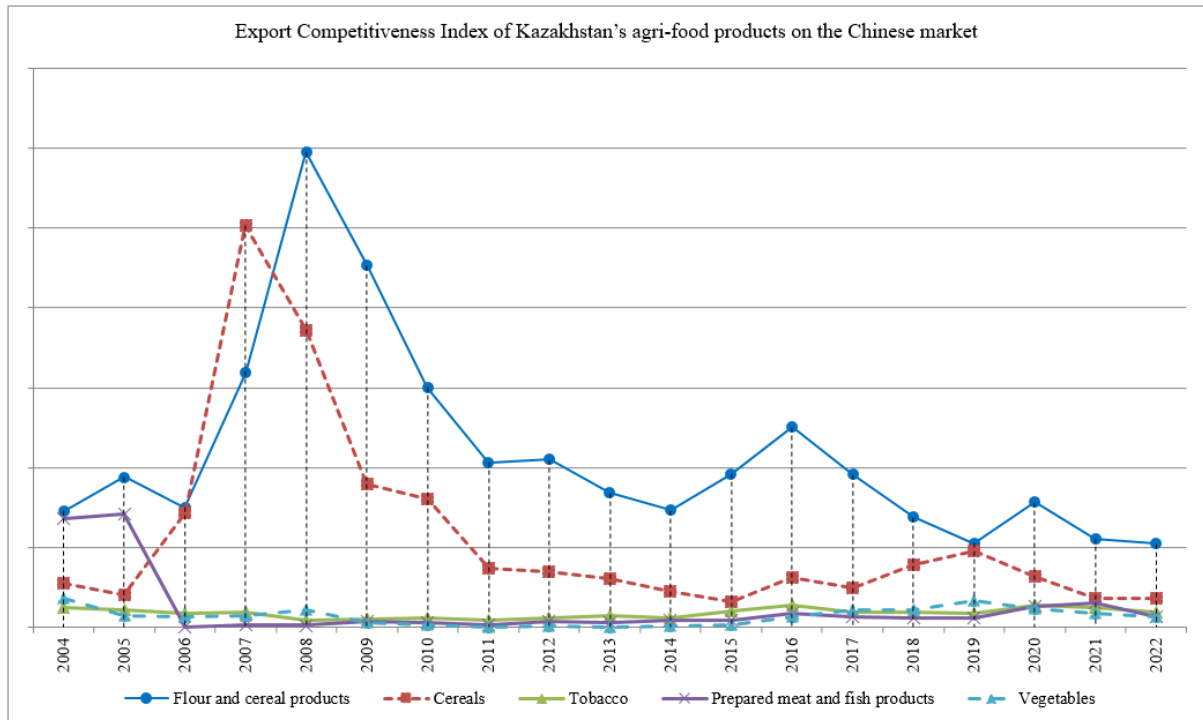


Figure 6. Export competitiveness index of Kazakhstan's agri-food products in the Chinese market in 2004-2022.

Source: compiled and calculated by the authors according to ITC Trade Map.

Among Chinese goods on the index of export competitiveness in the market of Kazakhstan in 2022, the leaders are plant materials for wicker (XCI was 5.0 in 2022); shellac, gum, resins (3.8); fish and crustaceans (1.1); finished products from meat, fish (0.7); processed products of vegetables, fruits (0.4) (Figure 7). When considered in the context of China's leading commodity items, we can note pelts and other parts of birds with feathers or down, feathers and parts of feathers (482.4); fruits and nuts preserved for short-term storage (123.7); peanut butter (93.4); plant materials used mainly for weaving (e.g., bamboo) (69.4); aquatic invertebrates other than crustaceans and molluscs (67.5); mutton and goat meat (44.9).

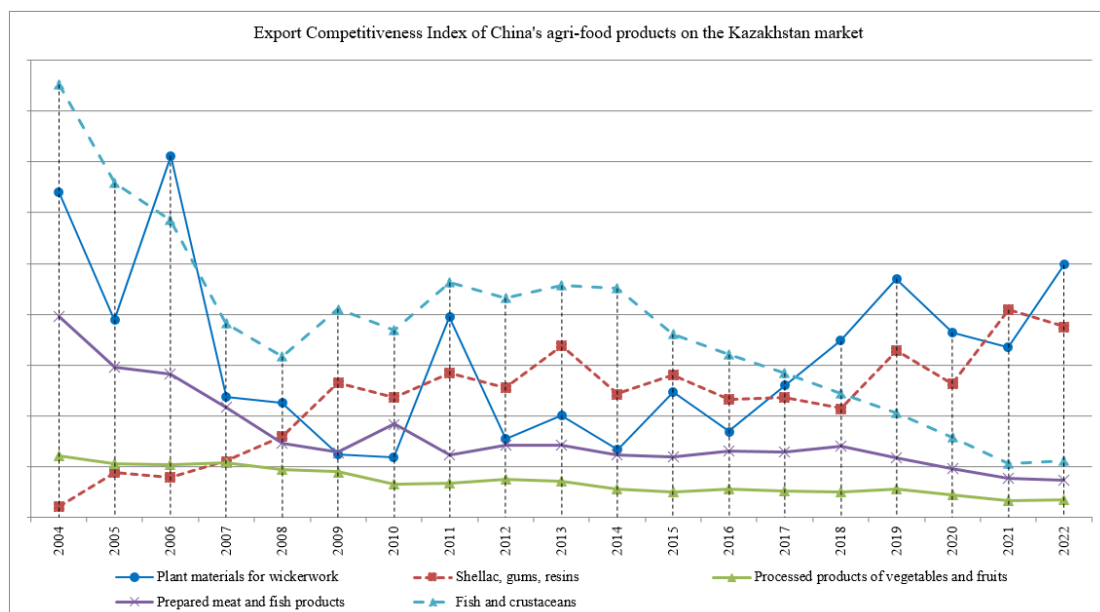


Figure 7. Export competitiveness index of Chinese agri-food products in the market of Kazakhstan in 2004-2022

Source: compiled and calculated by the authors according to ITC Trade Map.

China annually imports more than \$150 billion worth of agricultural products and foodstuffs from countries worldwide. Expenditures on food products in the country are estimated at \$1.1 trillion per year, and this figure is growing and is projected to reach \$1.8 trillion in the next five years. At the same time, the country has reached its capacity limit in grain production. Given the high demand, China is the most promising market for Kazakhstan's agricultural exports. However, working more actively on logistics issues is necessary to maximise this potential.

China intends to continue importing meat, grain, vegetable oils and other agricultural products from Kazakhstan. Given the size of the Chinese market, there is potential to increase imports from Kazakhstan.

In addition, PRC proposes to take control of establishing a subcommittee on cooperation in the agro-industrial complex. The platform will allow the organization of regular joint visits and establish permanent direct contacts between the authorized agencies of the Republic of Kazakhstan and the PRC on topical issues of the agricultural sector.

It is noted that the draft charter has already been developed, and the Chinese side proposed to sign it at the meeting of foreign ministers of the SCO member states, which was held in May 2024 in Astana. The parties considered a proposal to build a modern meat processing plant equipped with new technologies in North Kazakhstan.

Wheat is the main crop supplied by Kazakhstan to China. In 2023, its exports amounted to 592 thousand tons, for the first quarter of 2024 - 220 thousand tons. However, we note that within the new season, wheat supplies from Kazakhstan to China decreased - in September 2023, about 62 thousand tons of this product was shipped, in December, this figure fell to 19.3 thousand tons. The main reasons are logistical problems and periodic temporary bans on shipments to China imposed by NC Kazakhstan Temir Zholy JSC.

Over the past five years, exports of crop products from Kazakhstan to China have increased 4.6 times, from 750 thousand tons in 2019 to 3.5 million tons in 2023. China's grain harvest is 650 million tons for the ninth consecutive year, and the per capita grain share is 493 kg. However, the gap between grain supply and demand may widen, making it necessary to increase production capacity further to ensure food security.

Corn and soybeans will mainly contribute to increased grain production, while rice and wheat will improve quality and structure. The State Development and Reform Committee of the PRC and the Ministry of Agriculture and Rural Affairs of the PRC plan to assist 720 county governments in implementing a range of projects to improve grain production capacity.

According to an action plan released by the State Council of the People's Republic of China, China aims to increase grain production capacity by more than 50 million tons by 2030. By that time, the area under cereals will amount to about 117 million hectares. China has increased grain imports by almost 30%.

With the growth of the economy in China, the structure of nutrition is actively changing. If rice and greens had been consumed more in the past, now the consumption of meat, milk, dairy, and flour products is growing.

At the same time, domestic production growth is affected by problems that hinder the full utilization of the resource potential of Kazakhstan's agriculture. Such issues include soil erosion and degradation, population outflow to urban areas, and lack of water for irrigation. Although China is increasing imports primarily of food products and represents a large market, Kazakhstan risks failing to meet the challenge of increasing exports due to insufficient utilization of the resource potential of agriculture and problems with transportation and logistics infrastructure.

For example, logistical difficulties prevent further increases in exports from the republic. Kazakhstan is landlocked and uses railroads. If we analyze all land crossing points of China by rail, Alashankou is a central transshipment hub in the Xinjiang Uygur Autonomous Region. In 2023, more than 23 million tons were transported through it, with an annual growth rate of 12%. However, for comparison, we note that Ningbo

seaport handles more than 100 million tons of cargo per month. Kazakhstan is currently working on constructing a new railroad terminal near Bakhty Point; its commissioning will increase logistical opportunities. However, it is necessary to pay attention to the potential of Lianyungang Port, where there is a logistics terminal in Kazakhstan. This route opens Kazakhstan's access to the sea and provides excellent trade opportunities. Several countries - Vietnam, Korea and Japan - are interested in buying Kazakh grain and oilseeds.

In June 2024, the first Kazakh-Chinese grain forum will be held in Xinjiang Uygur Autonomous Region of China, a significant step towards strengthening cooperation in grain supplies from Kazakhstan to China.

The grain forum will be attended by representatives of Kazakh and Chinese businesses, government agencies and state companies of the two countries involved in the regulation of export/import of grain and grain products on the way to barrier-free trade: the removal of FMD restrictions on exports of meat products from the south-eastern regions of Kazakhstan to China in February 2024. This allowed Kazakhstan to resume exports of high-quality livestock products to China based on the organisation of joint projects in Kazakhstan for the production and deep processing of agricultural products, including the principles of production cooperation in the export of grain and oilseeds, meat, poultry, dairy and fish products, honey and other types of food.

In the future, it is planned to establish a joint subcommittee on cooperation in agriculture, which will make it more effective and realize the potential for collaboration between the two countries in the field of the agro-industrial complex.

Kazakhstan's agriculture is characterized by relatively low production efficiency, high wear and tear of machinery and tractor fleet, and lagging in technology, which demonstrates underutilization of resource potential. Strengthening the resource potential of agriculture will create favourable opportunities for development, allowing an increase in the total volume of added value exported by each particular country. In addition, high resource potential would diversify exports while stimulating production and income growth.

Given the importance of resource potential in strengthening and enhancing the sustainability of agri-food trade, the following conclusions are legitimate. Expanding exports to China should be implemented not only by increasing the export of raw materials but also by processing them in the territory of Kazakhstan. This can be realized through the establishment of joint ventures with Chinese investors. They could help expand the exports of goods with high added value.

In addition, it is essential to stimulate the expansion of the range of goods. Expanding the resource potential of Kazakhstan's agricultural sector harmonizes with reducing trade and logistics costs and barriers. In this regard, it is advisable to stimulate foreign direct investment, trade development, transportation and other types of infrastructure.

Conclusions

There is a clear trend of increasing Kazakhstani supplies to the Chinese market. The products with identified comparative advantages are exported to China in bulk. At the same time, the share of exports of agricultural raw materials and processed products of the agro-industrial sector of Kazakhstan differs from Chinese indicators. The share of raw material exports from Kazakhstan to China exceeds the share of processed products.

The weaknesses of Kazakhstan's agro-food exports are related to the need for more realization of the resource potential of the agricultural sector. Strengthening trade relations with China should accompany a further increase in Kazakhstan's agro-food exports.

An important place should be given to the coordination of work of the state and business to improve the competitiveness of Kazakhstan's exports and the development of resource potential.

Therefore, it is essential to ensure the development of competitive food and processing industries on the territory of Kazakhstan, stimulating the expansion of the range of goods, diversification of exports through the

production and sale of goods with high added value, improving customs procedures, facilitating the attraction of foreign direct investment, development of trade, transportation, warehousing and other types of infrastructure.

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Author Contributions: The authors contributed equally. All authors have read and agreed to the published version of the manuscript.

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