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Comparative analysis of the cherry industry in Kyrgyzstan and Chile and market development strategies in China

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Abstract. The purpose of the study was to conduct a comparative analysis of cherry production and exports in Kyrgyzstan and Chile, assess their competitiveness in the global market, and identify key barriers and opportunities for expanding exports to China. The analysis was based on statistics on cherry production and exports, an estimate of logistics costs, customs procedures, and government support, as well as a calculation of the share of exports and the growth rate of supplies to the Chinese market. The results showed substantial differences between Kyrgyzstan and Chile in the development of the cherry industry. In 2024, cherry production in Chile reached 641 thousand tonnes, while in Kyrgyzstan, this figure is only 4.12 thousand tonnes, which reflects a substantial difference in the scale of production and the level of technological development. Chile provided 92.36% of Chinese cherry imports using efficient trade mechanisms, optimised logistics, and government incentives, while

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Kyrgyzstan's exports remain unstable and limited. High logistics costs in Kyrgyzstan (USD 900 per tonne) compared to Chile (USD 500 per tonne) reduced the competitiveness of products. The lack of modern transport corridors, storage facilities, and proper refrigeration equipment substantially complicate stable exports to China, leading to high losses of products during transportation. The analysis also showed that strict sanitary requirements, certification, and phytosanitary control created additional barriers for Kyrgyz products to enter the international market, which requires strategic changes in public policy and attracting investment in the modernisation of the industry. The study demonstrated that the competitiveness of cherry exporters is determined by the level of logistics infrastructure, the efficiency of trade mechanisms, and compliance with international requirements, which indicates the need to optimise logistics, create refrigerated warehouses, and simplify customs clearance to increase exports from Kyrgyzstan

Keywords: competitiveness; logistics; sanitary requirements; trade barriers; customs clearance; quality control

INTRODUCTION

In the current context of globalisation, agricultural markets are showing increasing integration, which creates both new opportunities and challenges for producing countries. Cherry is one of the most popular fruit and berry crops on the world market, in particular, in China, which remains the largest consumer of this product. In 2024, the total volume of cherry imports to China reached 641 thousand tonnes, of which 92.36% accounted for Chile, which retains its leading position in this segment. Therewith, the potential of other producing countries, particularly Kyrgyzstan, remains unrealised: the share of Kyrgyz cherries in the Chinese market was only 0.4%, which indicates substantial barriers to its export (Shu, 2024). The Food and Agriculture Organisation (n.d.) emphasises the importance of diversifying suppliers of agricultural products to reduce food risks and support small farms. The development of International Cherry trade through technological modernisation, logistics improvement, and quality improvement has become a priority task of the industry. According to the Food and Agriculture Organisation, global crop production continued to grow in 2024, which indicates a stable demand for fruit and berry products. Cherry production also increased, especially in exporting countries, in particular, Chile, the United States, Canada, Uzbekistan, Kyrgyzstan, Tajikistan, and Turkey, which confirms the high level of its consumption on the international market.

International cherry market research confirms that successful exports largely depend on efficient logistics, access to foreign markets, and adaptation of agricultural technologies. Improved customs clearance and the development of transport infrastructure contributed to the growth of Chile's share in China, which was analysed in detail by X. Shu (2024), who stressed the crucial role of optimising logistics processes in international trade. Thereby, the competitiveness of developing countries in the field of cherry exports was examined by J. Ninaquispe *et al.* (2024), emphasising that success in the global market is determined not only by production volumes but also by the ability of countries to build effective export strategies. The impact of agroclimatic changes on yield and the need for technological modernisation have become the main focus of the paper of D. Bali *et al.* (2022), who noted the importance of adapting cultivation to climate change. An equally substantial aspect is the potential of Central Asia in the cultivation of fruit crops, which was considered in the study by B. Vinceti *et al.* (2022), which stressed the role of traditional gardens in preserving biodiversity and the possibilities of integrating the region into the global market.

The scientific papers also emphasise the importance of organising production, developing export strategies, and using technological innovations in the field of cherry cultivation. Authors B. Gonçalves *et al.* (2021) investigated the agronomic features of sweet cherry cultivation, emphasising the importance of introducing modern breeding methods to improve fruit quality and increase yield. The effectiveness of such approaches is particularly critical for countries seeking to gain a foothold in the international market, which is confirmed by T. Qureshi (2022), analysing the potential for exporting horticultural products from Central Asia to China. The author draws attention to the need to increase competitiveness by improving cultivation methods and improving the conditions for post-harvest processing. N. Kemaloğlu and E. Çoruk (2024) examine the organisational aspects of agricultural trade in Kyrgyzstan, pointing out the fragmentation of production and poor coordination between producers, which makes it difficult to enter foreign markets.

Another important factor in the development of the cherry sector is skilful resource management and optimisation of growing processes. Researchers T. Montenegro-Romero *et al.* (2022) investigated the dynamics of fruit production in Chile, paying attention to the need for effective land and water management. A similar approach is also relevant for global production, which is confirmed by S. Baicu *et al.* (2023), analysing trends in global cherry production growth. The study highlights the role of technological progress in improving industry efficiency. In turn, C. Stone *et al.* (2023) draws focus to the production challenges of growing cherries in

protected systems, underscoring that the use of modern agricultural technologies can substantially improve the quality of products and reduce the risks associated with changing growing conditions.

Despite its substantial natural potential, Kyrgyzstan's cherry industry remained underdeveloped due to weak production organisation, limited storage capacity, lack of investment in technology modernisation, and insufficient integration into global logistics networks (Sakkaraeva & Kumashev, 2024). The lack of specialised transport corridors and modern storage systems limited export opportunities, while the competitiveness of the industry was studied fragmentally, mainly in the context of the domestic market and certain aspects of product marketing. The study aimed to assess the production and marketing characteristics of the cherry market in Kyrgyzstan and Chile, identify key restrictions for its development, and justify measures to expand exports to China. The following tasks were solved to achieve this goal: to analyse the factors that influenced the formation of the export potential of the cherry industry in Kyrgyzstan and Chile, to determine the role of infrastructure, logistics, and trade barriers in the access of Kyrgyz products to the Chinese market, as well as to assess the possibilities of adapting successful practices of Chile to strengthen Kyrgyzstan's position in international trade.

MATERIALS AND METHODS

The study analysed data on the production, export, and competitiveness of cherries in Kyrgyzstan and Chile, and trends in the consumption of these products in China. In addition to these countries, the experience of the United States, Canada, Turkey, Uzbekistan, and Tajikistan as important players in the cherry market was considered to compare and evaluate global trends. The analysis of import demand in China considered the influence of other suppliers, including Australia, Argentina, Serbia, Moldova, Iran, Italy, South Korea, and Pakistan, which also export cherries to the Asian region and have different levels of integration into international trade.

Official Food and Agriculture Organisation (n.d.), as well as open databases on cherry exports. Data from customs statistics of the General Administration of Customs of China (n.d.), reports of the China Chamber of Commerce for Import and Export of Foodstuffs, Native Produce and Animal By-products (n.d.), and market research that analysed changes in demand for imported Cherries to assess market trends in China. The study used various methods to analyse the development of the cherry sector in Kyrgyzstan and Chile, in particular, economic and statistical analysis, which was used to assess the dynamics of cherry production, exports, and market share in the two countries, enabling the identification of the main trends and changes in the market structure. The market share was calculated, determined by the formula to determine the competitiveness of the products of the studied countries in the Chinese market (1):

$$Mi = \left(\frac{Xi}{Xw}\right) \times 100\%, \quad (1)$$

where M_i – market share of a particular country; X_i – volume of cherry exports from the country i; X_w – total volume of cherry imports to China.

In addition, to assess changes in the export structure, the calculation of export growth rates was used, which allowed tracing the dynamics of changes in supplies in different years. The growth rate was calculated using the formula (2):

$$G = \left(\frac{Xt - Xt-1}{Xt-1}\right) \times 100\%, \quad (2)$$

where G – export growth rate; X_t – export volume in the current year; X_{t-1} – export volume in the previous year.

The comparative analysis allowed comparing production processes, marketing strategies, logistics capabilities, and government support, which revealed critical advantages of Chile, in particular, a developed infrastructure and stable trade relations. Thereby, it is established that Kyrgyzstan faces barriers related to the Coordination of producers, the supply of products and an insufficient level of logistics. Induction allowed identifying the patterns of global cherry trade, in particular, simplified access to the Chinese market, stability of supply volumes, and compliance with the requirements of importers as key success factors. The deduction was used to assess restrictions that reduce Kyrgyzstan's competitiveness, including weak logistics, small production volumes, and insufficient integration into international trade networks. The synthesis of the results obtained enabled the integration of various approaches and formed a comprehensive idea of the prospects for exporting Kyrgyz cherries. Summarising the results allowed developing recommendations for improving logistics, improving product quality, adapting to Chinese requirements, and improving the organisational efficiency of manufacturers. Systematisation of the final data allowed for identifying essential areas of Industry Development and determining strategic measures that can help increase cherry exports from Kyrgyzstan to the international market.

RESULTS

Dynamics of cherry production and exports in Kyrgyzstan and Chile. Cherry production and exports are important segments of the agricultural sector in Kyrgyzstan and Chile, but their development differs substantially in scale, structure, and integration into World Trade. Chile is the world's leading exporter of cherries, especially to the Chinese market, due to effective government policies, substantial investment in production, and a developed infrastructure (Bamber & Fernandez-Stark, 2016). Therewith, Kyrgyzstan, having

favourable natural and climatic conditions, occupies a small share in the global cherry sector due to low yields, a weak logistics system, and insufficient state support (Shaiyldaeva *et al.*, 2024).

Chile shows a steady increase in cherry production, which is a consequence of the use of modern agricultural technologies, mechanised harvesting systems, and effective water resources management. In 2022, production volumes amounted to 397 thousand tonnes, in 2023 – 414 thousand tonnes, and in 2024 reached 641 thousand tonnes, which confirms an increase in production areas and a growing focus on exports. High yields in Chile are the result of the use of breeding varieties, drip irrigation systems, and effective management of phytosanitary risks (Tudela *et al.*, 2023). However, Kyrgyzstan does not show such positive dynamics. In 2022, cherry production amounted to 6.4 thousand tonnes, in 2023 – 4.1 thousand tonnes, and in 2024 – 4.12 thousand tonnes, which indicates the absence of substantial development of the sector (Table 1). The main limitations are the small area of plantings, the low level of mechanisation of production and the lack of investment in the modernisation of farms (Shaiyldaeva *et al.*, 2024).

***Table 1**. Comparison of cherry production in Kyrgyzstan and Chile (2022-2024)*

Year	Kyrgyzstan (thousand tonnes)	Chile (thousand tonnes)
2022	6.4	397
2023	4.1	414
2024	4.12	641

***Source:** compiled by the authors based on P. Bamber and K. Fernandez-Stark (2016), A.K. Shaiyldaeva et al. (2024)*

The data indicate a substantial difference in the scale of production between countries. Chile shows a steady increase in production volumes, which in 2024 reached 641 thousand tonnes, while Kyrgyzstan does not show dynamic development, remaining at the level of 4.12 thousand tonnes. This indicates the high efficiency of the Chilean agricultural sector, due to state support and active investment, while in Kyrgyzstan, the lack of infrastructure and low level of funding do not allow for a substantial increase in production capacity. Chile is the world's leading cherry exporter, and its share in the Chinese market continues to grow (Table 2). The main success factors of Chile are optimised logistics processes, strategic agreements with China, and a well-developed product certification system. The growth rate of Chile's total exports and the growth rate of cherry exports to China were determined using formula (2).

***Table 2**. Dynamics of cherry exports from Chile (2022-2024)*

Year	Total exports of Chile (thousand tonnes)	Export growth rate (%)	Export volumes to China (thousand tonnes)	Export growth rate to China (%)
2022	397	-	358	-
2023	414	4.28%	377	5.31%
2024	641	54.83%	592	56.98%

***Source:** compiled by the authors based on General Administration of Customs of China (n.d.), China Chamber of Commerce for Import and Export of Foodstuffs, Native Produce and Animal By-products (n.d.)*

The data shows a substantial increase in Chile's exports to China. In 2024, shipments to China increased by 56.98%, as a result of increased trade cooperation between the two countries, high confidence in Chilean products, and improved logistics processes. Kyrgyzstan, on the other hand, shows unstable exports, which largely depend on logistical constraints and unpredictable changes in demand. In 2022, due to the COVID-19 pandemic, it was completely stopped (Table 3). Data that allow estimating the country's contribution to the total volume of cherry supplies to the Chinese market were calculated using Formula (1).

***Table 3**. Cherry exports from Kyrgyzstan and Chile to China (2022-2024)*

Year	Kyrgyzstan (tonnes)	Chile (thousand tonnes)	Chile's share in China's imports (%)
2022	0	358	90.18%
2023	12.06	377	91.06%
2024	1.65	592	92.36%

***Source:** compiled by the authors based on General Administration of Customs of China (n.d.), China Chamber of Commerce for Import and Export of Foodstuffs, Native Produce and Animal By-products (n.d.)*

As can be seen from the table, Chile continues to strengthen its position in the Chinese market, while Kyrgyzstan loses even small export volumes. This may indicate problems with product certification, non-compliance with sanitary standards, and limited transportation options. The impact of factors such as low yields, high transportation costs, and lack of logistics capacity reduces the competitiveness of Kyrgyz Cherries (Table 4). The data was calculated using Formula (2).

***Table 4**. Dynamics of cherry exports from Kyrgyzstan (2022-2024)*

Year	Total export of Kyrgyzstan (thousand tonnes)	Export growth rate (%)	Export volumes to China (thousand tonnes)	Export growth rate to China (%)
2022	0.64	-	0	-
2023	0.41	-35.94%	0.01206	-
2024	0.412	0.49%	0.00165	-86.32%

***Source:** compiled by the authors based on General Administration of Customs of China (n.d.), China Chamber of Commerce for Import and Export of Foodstuffs, Native Produce and Animal By-products (n.d.)*

These results confirm the need to strengthen government support, investment in logistics, and conclude long-term trade agreements to strengthen Kyrgyzstan's position in the Chinese market. In addition, Chile has a well-developed sea transportation system that minimises product losses during transportation. The Cherry Express programme reduces delivery time from 30 to 22 days, ensuring stable deliveries during peak demand. The use of a cold chain allows maintaining product quality and reducing the risk of spoilage. Kyrgyzstan faces serious logistical difficulties. The limited number of modern transport corridors, the lack of specialised warehouses with cooling systems, and high transportation costs make cherry exports economically unprofitable. Customs barriers related to China's sanitary and phytosanitary requirements substantially complicate the stable entry of Kyrgyz products into the Chinese market.

Chile actively supports cherry producers through subsidies, investment in infrastructure development, and export promotion. These measures allow farmers to introduce modern technologies, expand production areas, and improve product quality. In Kyrgyzstan, the situation is radically different. The lack of state support, low level of investment attraction, and weak integration into world markets lead to a lack of dynamic development of the industry. Solving these problems requires a comprehensive approach, including expanding investment in logistics, signing new trade agreements, and introducing modern agricultural technologies (Bujdosó & Hrotkó, 2017; Yunusov & Demirsoy, 2024). Chile is the main supplier of cherries, which ensures its stable growth in production and exports due to government support, investment in logistics, and modern agricultural technologies. Kyrgyzstan, although it has the potential to grow cherries, faces serious constraints, including insufficient infrastructure development, weak government support, and unstable export flows. It is necessary to invest in the modernisation of production facilities, improve logistics chains, and conclude new trade agreements to increase the competitiveness of Kyrgyzstan, which will increase export volumes and strengthen the country's position in the international market.

Global cherry production and sales: Trends and market leaders. The global cherry market is growing dynamically, covering a wide range of producing countries, including Turkey, the United States, Chile, Uzbekistan, Tajikistan, Canada, Kyrgyzstan, Australia, and Argentina. The main factors for the development of the industry are favourable agroclimatic conditions, access to international markets, modernisation of production technologies and state support (Arısoy *et al.*, 2023; Cramer, 2023). Countries with developed logistics and stable trade relations show more stable export indicators (Table 5).

***Table 5**. Cherry production in different countries of the world (thousand tonnes, 2024)*

Country	Production (thousand tonnes)	Main export markets
Turkey	800	EU, Middle East
USA	435	Canada, EU, China
Chile	641	China, USA, Europe
Uzbekistan	240	Commonwealth of Independent States, China
Tajikistan	35	Commonwealth of Independent States, China
Canada	60	USA, China
Kyrgyzstan	4.12	China, Kazakhstan
Australia	85	China, Southeast Asia, EU
Argentina	30	China, Brazil

***Source:** compiled by the authors based on H. Arısoy et al. (2023), C. Cramer (2023), G.A. Lang (2017)*

Turkey is the largest producer, providing more than 800 thousand tonnes annually, which is explained by the favourable climate and developed agricultural technologies. A substantial share of products is exported to Europe and the Middle East, but dependence on weather conditions and the need to modernise processing facilities remain the main challenges. The United States, one of the largest exporters, produces about 435 thousand tonnes per year, with the main share consumed in the domestic market. American manufacturers ensure stable deliveries to Europe and China, where their products are in high demand due to strict quality standards. Chile is the world's leading exporter of cherries, supplying 641 thousand tonnes annually, of which more than 90% goes to China. A high level of mechanisation, modern logistics systems, and effective state support programmes ensure stable export growth. The seasonal advantage allows Chile to occupy key positions in the Chinese market during the period of cherry shortage in the Northern Hemisphere. Uzbekistan is actively expanding production, focusing on the Commonwealth of Independent States and Chinese markets. With state support programmes, modernisation of irrigation systems and the introduction of high-yielding varieties, the country is strengthening its position in international trade.

Other countries, such as Tajikistan, Canada, and Kyrgyzstan, have substantially lower production volumes. Tajikistan produces 35 thousand tonnes of cherries per year, but weak infrastructure and unstable exports limit the development opportunities of the industry. Canada focuses on exports to the United States and China, but its production (60 thousand tonnes) is constrained by harsh climatic conditions. Kyrgyzstan remains the smallest producer among the analysed countries with an indicator of 4.12 thousand tonnes per year, which is due to weak investment, logistics restrictions, and difficulties in entering international markets. Australia takes advantage of seasonality, which allows it to export cherries to China during periods of low supply from the Northern Hemisphere. In addition to the world's leading producers, a number of countries are increasing their export potential, adapting production processes to global market needs (Kim *et al.*, 2025). Serbia is the main European producer of sour cherries, a substantial part of which is exported to the EU. The main problems are dependence on weather conditions and yield fluctuations (Kljajić *et al.*, 2024). Moldova is also focused on processing and exporting cherries to the EU and Commonwealth of Independent States, but the development of the industry is hindered by a lack of investment and limited access to modern technologies (Ceban & Lucaşenco, 2023). Iran is experiencing an increase in production due to government programmes to support horticulture and expand irrigation systems, which contributes to an increase in exports to the Persian Gulf and Europe, but competition from Turkey and the United States remains substantial (Kazempour Kahriz *et al.*, 2025).

Italy is a traditional cherry producer in Europe, focusing on the domestic market and exporting to EU countries. Despite the stable level of production, Italian farmers face competition from cheaper suppliers. The strategy of exporters is aimed at expanding their presence in the EU countries through marketing campaigns and focusing on premium product quality (Della Casa *et al.*, 2019). Argentina takes advantage of its seasonal advantage by supplying cherries to the world market during a period of product shortages in the Northern Hemisphere. The main buyer of Argentine cherries is China, which buys considerable volumes in winter (Jaureguiberry & Tappata, 2022). South Korea is a small producer but a large-scale importer, focusing on supplies from Chile and the United States. Consumers in Korea have high requirements for the quality and environmental standards of products, which forces exporters to comply with strict labelling and quality control requirements (Shin & Ji, 2021). Pakistan has considerable potential for the development of the cherry sector, but a lack of investment, weak infrastructure, and limited logistics opportunities do not allow this potential to be fully realised. Further development of the industry will depend on improving transport corridors, attracting investors, and adapting to international certification standards (Spies, 2023).

The global cherry market continues to expand, concentrating in countries with favourable agroclimatic conditions and access to major markets. Turkey, the United States, and Chile remain the largest producers and exporters, while countries with less developed logistics infrastructures, such as Kyrgyzstan and Pakistan, face difficulties in entering global markets. China remains the main driver of demand, encouraging manufacturers to adopt the latest technologies, improve logistics, and meet strict quality standards.

Cherry demand in China and its impact on the international market. China is the world's largest importer of cherries, which determines global trends in the production and trade of this product. The structure of consumption in the Chinese market differs substantially from other countries and is characterised by seasonality of demand, the influence of consumer preferences, and the specific features of customs regulation. The main suppliers to the Chinese market are Chile, the United States, Australia, and Uzbekistan, with Chile occupying the dominant share of imports (Lei, 2018). The Chinese cherry market shows clearly defined seasonal dynamics, which affects pricing and import volumes. The main period of increased demand occurs during the winter months, especially during the Chinese New Year period, when cherries are associated with well-being and prosperity. This creates a high demand for premium products supplied by Chile, taking advantage of the seasonal benefit (Ye, 2023).

Research of consumer preferences in China shows that the main criteria for choosing cherries are size, colour, freshness, and sweetness. Large, dark red varieties with a high sugar content are most popular, which affects the pricing policy and competitive advantages of suppliers (Zhang *et al.*, 2024). The growing demand for organic and environmentally certified products remains an important factor. Consumers in major cities such as Beijing, Shanghai, and Guangzhou are willing to pay a higher price for premium cherries, which encourages producers to adapt their products to market requirements (Chen *et al.*, 2023). Chile remains the undisputed leader among cherry exporters to China, providing more than 90% of the imports of this product. Due to optimised logistics solutions, specifically, the Cherry Express programme, Chilean manufacturers substantially reduce transportation time, which allows them to maintain the quality and freshness of products when entering the Chinese market (Lei, 2018). The United States ranks second in terms of cherry shipments, but faces trade barriers and high duties that limit the competitiveness of American products. Despite the high quality and safety standards, additional costs of import customs clearance make products less accessible to Chinese consumers, which reduces their market share (Ye, 2023). Australia occupies an important place among suppliers, focusing mainly on the premium segment. The proximity to China and short transport route provides competitive advantages in the speed of delivery, which helps maintain quality and increase the sales time of products. Australian cherries are in demand among Chinese consumers due to their high cultivation standards and strict quality control (Li *et al.*, 2022). Central Asian countries, particularly Uzbekistan, are seeking to expand their presence in the Chinese market, but face numerous logistical difficulties. The lack of efficient infrastructure, the long duration of transportation, and strict sanitary requirements limit the ability of these countries to enter large-scale sales markets (Chen *et al.*, 2023). Argentina is gradually expanding its presence in the Chinese market, using a seasonal preference strategy similar to the Chilean export model. Since Argentine production falls between December and February, deliveries coincide with peak demand in China, especially during the holiday period. Despite this, the country's export opportunities still remain limited because of the high logistics costs, distance from major commercial ports, and the need to adapt products to Chinese sanitary standards (Jaureguiberry & Tappata, 2022). However, the Argentinian government is actively working to sign new trade agreements and improve transport infrastructure, which can contribute to the growth of exports to China (Table 6).

***Table 6**. Major cherry suppliers to the Chinese market (2024)*

Country	Share in China's imports (%)	Main advantages	Main restrictions
Chile	90.2%	Seasonal advantage, fast logistics	High transportation costs
USA	5.3%	High-quality products	Trade barriers, high duties
Australia	2.5%	Geographical proximity, premium quality	Limited production volumes
Uzbekistan	1.2%	Low production cost	Logistical difficulties, strict standards
Argentina	0.8%	Seasonal advantage, strategic export in winter	High logistics costs, the need to adapt to Chinese standards

***Source:** compiled by the authors based on W. Li et al. (2022)*

China's customs policy is one of the critical factors regulating cherry imports. For some countries, in particular, the United States, customs rates remain high, which reduces the competitiveness of products. For example, in 2023, customs duties on American cherries were 25%, which substantially limited their availability to Chinese consumers. As of 2024, China's customs tariffs on imports of American Cherries remain high, which continues to limit its competitiveness in the Chinese market. For Chile, which has favourable trade agreements with China, customs tariffs were reduced, which provided for a substantial increase in exports. This allows Chilean manufacturers to compete on price and increase their market presence. In addition to duties, China imposes strict sanitary and phytosanitary requirements on imported products. Cherries must meet safety standards, pass thorough phytosanitary control, and meet the requirements for residual pesticide levels. This creates additional barriers for countries seeking to enter the Chinese market.

China remains the biggest driver of global cherry demand, and this trend will continue in the coming years. Further market growth will be driven by an increase in the share of premium and organic products, which corresponds to changing consumer preferences and increased quality requirements. An important factor will be the optimisation of logistics supply chains, which will help reduce delivery time and improve product safety. Therewith, China will actively strengthen the role of domestic production, expanding the area under cherry orchards and introducing new agricultural technologies. Much attention will be paid to the development of marketing strategies aimed at the younger generation of consumers who demonstrate a high demand for high-quality and branded products. Despite substantial opportunities, the market remains highly

competitive, and countries seeking to expand exports to China must adapt their strategies to meet demand and regulatory requirements. In the future, it is possible to further increase the share of Uzbekistan and other Central Asian countries in Chinese imports, which may change the distribution of the market and increase competition among exporters.

Logistics and trade barriers to cherry exports: A comparative analysis of Kyrgyzstan and Chile. Logistics and trade barriers are crucial factors for successful cherry exports, especially to strategic markets such as China. They cover aspects of transportation, storage, sanitary, and phytosanitary requirements, customs procedures, and marketing strategies. Chile has a well-established logistics system and a well-developed infrastructure to support exports, while Kyrgyzstan faces substantial obstacles that limit its opportunities in the international market. Transportation is one of the most important stages of the cherry supply chain. Chile has a state-of-the-art maritime logistics network, which enables efficient delivery of products to China and reduces delivery time by sea. This minimises product losses and improves its quality at the time of receipt to consumers. The use of cold chains and a modified gas medium during transportation can substantially extend the shelf life of cherries, which is a crucial factor for long-distance export (Cabañas *et al.*, 2023). Kyrgyzstan, on the contrary, mainly uses motor transport due to its remoteness from seaports and an insufficiently developed logistics infrastructure, which substantially increases the delivery time up to 40 days. Transportation costs in Kyrgyzstan remain substantially higher, reaching USD 900/tonne, which is almost twice the logistics costs of Chile, where this figure is USD 500/tonne. This substantially reduces the competitiveness of Kyrgyz exports on the international market. The lack of specialised warehouses with cooling systems leads to high product losses during transportation.

Sanitary and phytosanitary barriers are another challenge for cherry exporters. Chile has a well-developed quality control system that allows its products to meet international standards. The country has modern methods of pre-harvest monitoring, strict control of pesticide residues and pest control technologies, which lower the risks of returning products from customs (VanWoerkom *et al.*, 2022). Kyrgyzstan has serious problems with compliance with China's phytosanitary requirements. The lack of modern laboratories, long certification procedures, and cases of detection of quarantine organisms in product batches caused delays and even refusal to import Kyrgyz cherries to China in 2023. In 2024, the volume of exports to China decreased by 86.32%, which indicates increased control and non-compliance with the requirements of the importer (Table 4). Customs procedures and regulatory barriers also play an important role in determining the competitiveness of exporters. Chile has favourable terms of trade with China, including preferential tariffs and simplified customs procedures. Due to the signed free trade agreements, Chilean products quickly pass customs clearance, which ensures the stability of supplies. Instead, Kyrgyzstan faces high customs tariffs and lengthy certification procedures, reducing its competitiveness. In 2023, several shipments of Kyrgyz cherries were returned due to non-compliance with China's phytosanitary standards, which led to a further reduction in exports. Analysis of sanitary compliance and customs clearance refusals shows substantial differences between Chile and Kyrgyzstan (Fig. 1).

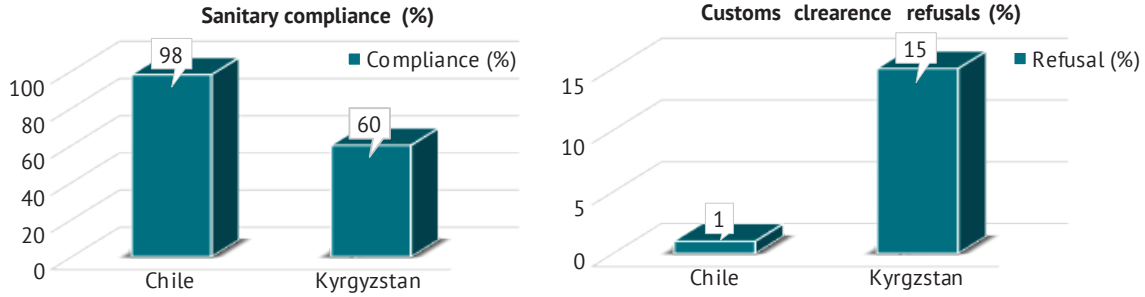

Figure 1. *Comparison of sanitary compliance and customs clearance failure rate (%) between Chile and Kyrgyzstan*
Source: *compiled by A.H. VanWoerkom et al. (2022)*

The results confirm key issues limiting cherry exports from Kyrgyzstan. The high level of refusals in customs clearance and the low level of compliance with sanitary standards require the implementation of measures to improve the quality control system, adapt to international standards, and optimise logistics procedures. It is necessary to expand cooperation with international certification organisations and introduce modern technologies for packaging and storing products to increase the competitiveness of Kyrgyz cherries. Marketing strategies are an important element of export support, and in this aspect, Chile is substantially ahead of Kyrgyzstan. Chilean manufacturers actively use advertising campaigns and partnerships with major retail chains in China. The "Cherries from Chile" campaign includes promotion through social networks

WeChat and Douyin, online sales, and cooperation with Chinese electronic platforms (Chiang *et al.*, 2021). This ensures high brand awareness and consumer confidence. In turn, Kyrgyz exporters do not have well-established marketing strategies and are practically absent from the information space of China, which substantially complicates the promotion of their products.

An analysis of logistics and trade barriers to exports showed a substantial advantage of Chile in all key aspects. Chilean producers have access to efficient transport infrastructure, international marketing, and simplified customs procedures, which allows them to maintain stable export volumes. Instead, Kyrgyzstan faces challenges such as inefficient logistics, a lack of specialised laboratories for product certification, high customs costs, and weak marketing policies. It is necessary to invest in the development of logistics, adaptation of products to international standards and promotion of Kyrgyz cherries in foreign markets through marketing initiatives to improve the situation.

Strategies for the development of cherry exports from Kyrgyzstan: Adaptation to the requirements of the Chinese market. Expanding cherry exports from Kyrgyzstan to China is a promising direction for the development of the country's agricultural sector. However, successful entry into the Chinese market requires adaptation to its regulatory, logistics, marketing, and trade requirements. The analysis of world experience, in particular, the example of Chile, allows identifying effective approaches to improving the production and sales chain, which will contribute to increasing the competitiveness of Kyrgyz products (Nikolić *et al.*, 2021). One of the main requirements of China for cherry imports is compliance with sanitary and phytosanitary standards. Products must meet international standards for the absence of pests, pesticide residues, and phytopathogens. Sanitary certification is a prerequisite for export, and the process of obtaining it is often complicated due to the lack of proper laboratory facilities for product quality control in Kyrgyzstan (Uzenbaev *et al.*, 2019). In addition, China imposes strict packaging requirements: containers must be sealed, transport-resistant, and contain appropriate markings indicating the country of origin, harvest date, and storage conditions (Kantaroğlu & Demirbaş, 2020). Given that consumers in China prefer large, juicy fruits with a high sugar content, selection research and the introduction of modern storage technologies can be key factors for successful export development.

Logistical challenges remain one of the most substantial barriers to Kyrgyz cherries entering the Chinese market. Unlike Chile, which has an efficient sea transportation system, Kyrgyzstan is forced to use road and rail transport, which substantially increases delivery time and logistics costs (Ivanova *et al.*, 2023). Optimisation of logistics chains, in particular, the use of refrigerated containers, will allow maintaining the quality of products on the way to the consumer. One possible solution is to create direct trade routes, which will reduce the costs and risks associated with transit through third countries. Marketing strategies also play an important role in export development. Kyrgyz cherry currently has no established brand on the international market, which limits its attractiveness to consumers (Song & Shi, 2020). Adapting marketing campaigns to the preferences of Chinese consumers who prefer premium products increases demand. Effective methods can be to promote products through Chinese online platforms, such as JD.com and Alibaba, cooperation with local distributors, and participation in international food exhibitions. In addition, cultural aspects should be accounted for: in China, cherries are often associated with luxury and festive events, which can become the basis for developing marketing campaigns aimed at the premium market segment.

Trade mechanisms play an important role in ensuring sustainable exports. Conclude bilateral agreements that simplify the import and export procedure would reduce customs barriers. The successful example of Chile demonstrates that government support for exporters, subsidising certification, and developing transport infrastructure substantially contribute to the expansion of sales markets. Kyrgyzstan can adapt this experience by expanding cooperation with Chinese regulators, implementing state support programmes for producers, and attracting international investment in the field of agricultural studies. The experience of Chile, as well as other major exporters, such as the United States and Turkey, shows the need for an integrated a Ivanova approach to the development of the industry. The main areas of reform may include improving cultivation technologies, increasing the level of mechanisation of farms, creating modern logistics hubs, and integrating into international trade networks. Studies show that high export efficiency is achieved through a combination of state regulation, investment promotion, and the introduction of innovative horticultural management methods (Canan & Torun, 2025).

Thus, the development of cherry exports from Kyrgyzstan to China is possible if the production and logistics processes are comprehensively adapted to international standards. Introduction of modern agricultural technologies, optimisation of logistics, effective marketing, and active state support are key factors for the country to reach a competitive level. Based on the experience of Chile, Kyrgyzstan can implement a strategy for the long-term development of the industry, which will contribute to economic growth and strengthen the country's position in the international market.

DISCUSSION

The global cherry market continues to grow, and China remains its major consumer, defining requirements for exporters. Chile's experience shows that successful entry into the Chinese market depends on efficient

logistics, compliance with sanitary standards, and strategic marketing. Kyrgyzstan has natural prerequisites for increasing exports, but faces a number of restrictions that require a systematic solution. The results of the study showed a substantial gap in the scale of cherry production and exports between Kyrgyzstan and Chile. The dynamics analysis confirmed stable production growth in Chile, where in 2024, the volume reached 641 thousand tonnes, which was consistent with the conclusions of P. Bamber and K. Fernandez-Stark (2016), who emphasised the effectiveness of government support, mechanised harvesting, and access to infrastructure. Thereby, Kyrgyzstan did not show similar growth, maintaining low production indicators, which coincides with the data obtained by A. Shaiyldaeva *et al*. (2024), stressing the impact of a lack of investment, a small area of plantings, and the absence of modernised cultivation technologies.

Logistical barriers remained a substantial problem for Kyrgyzstan. The transportation time to China reached 40 days, which was substantially higher than in Chile (22 days). This was consistent with the conclusions of V. Tudela *et al*. (2023), who underlined the importance of developed infrastructure for the competitiveness of fruit exports. The high failure rate in customs clearance of Kyrgyz products (15%) confirmed the need to improve quality control, which was in line with the study by S. Yunusov and H. Demirsoy (2024), where it was noted that Central Asian countries face similar problems due to non-compliance with importer standards. The findings of the study confirmed that the competitiveness of cherry exporters was determined not only by production volumes but also by the ability to adapt to the requirements of international markets. Turkey, as noted by H. Arısoy *et al*. (2023), took advantage of its geographical location and developed agricultural infrastructure to boost exports. A similar strategy was used by the United States, which, according to G. Lang (2017), focused on the premium market segment. Chile, due to efficient logistics, increased export supplies, which was consistent with the results of this study. Moldova and Serbia, according to A. Ceban and E. Lucaşenco (2023) and N. Kljajić *et al*. (2024), gradually expanded exports using strategic partnerships with the EU. In this context, Kyrgyzstan had the potential to expand exports, but, unlike other countries, it remained poorly integrated into international trade networks (Dooranov *et al.*, 2024). It is necessary to modernise production, simplify logistics, and improve state support to increase competitiveness. In Italy, as stated by R. Della Casa *et al*. (2019), improving marketing strategies and logistics solutions contributed to the expansion of sales markets. Argentina, as presented by F. Jaureguiberry and M. Tappata (2022), used public-private partnerships to support exports, which ensured the stability of the sector. In South Korea, according to S. Shin and S. Ji (2021), the demand for imported cherries was formed due to consumer preferences focused on quality and environmental standards, which gave a competitive advantage to countries with high cultivation technologies. As presented by M. Spies (2023), Pakistan developed agricultural exports through infrastructure projects, while Kyrgyzstan had similar difficulties, but did not implement system solutions to overcome them.

An important factor in shaping global demand remained the structure of China's imports, which, as stated by L. Lei (2018), continued to show dynamic growth. However, as the results of this study showed, Kyrgyzstan was not represented among stable suppliers due to the lack of trade agreements and limited compliance with sanitary standards. Advantages of Chinese consumers in the cherry segment, examined by Z. Ye (2023), confirmed that the growing demand was focused on high-quality products that had a clear market position. Chile used these characteristics to strengthen its presence, while Kyrgyzstan did not implement targeted marketing strategies, which did not allow it to compete on equal terms. This confirmed the need to develop specialised adaptation programmes to the Chinese market to improve export potential.

Methods of preserving the quality of cherries and their impact on export competitiveness remain important aspects of international trade. As proven by C. Cabañas *et al*. (2023), the use of a modified gas medium in combination with an antagonistic yeast substantially improved the shelf life of cherries, which ensured successful long-distance export. This technology was widely used in Chile, reducing product losses, while in Kyrgyzstan, such methods were not implemented, which created risks of spoilage during transportation. Phytosanitary control and the use of pesticides were also instrumental in shaping the export strategy, as confirmed by A. VanWoerkom *et al*. (2022), analysing the effect of residual chemicals after cherry processing on export potential. Excessive use of insecticides could restrict access to international markets due to tougher regulatory requirements, which agrees with the difficulties that Kyrgyzstan faced when passing sanitary control in China. Therewith, the Chinese market, according to A. Chiang *et al*. (2021) demonstrated a high sensitivity of consumers to the quality and environmental friendliness of cherries, which contributed to an increase in demand for products with proven cultivation standards.

Research on the economic efficiency of cherry cultivation conducted by S. Nikolić *et al*. (2021) pointed out that countries with a developed system of producer support showed better results in production costs and export profitability. This supplemented the conclusions about Chile's competitiveness, while Kyrgyzstan, due to the lack of systematic support, faced high production and logistics costs, hindering export opportunities. The efficiency of cherry production largely depended

on the management of crop losses and the introduction of modern agricultural technologies. A study by M. Kantaroğlu and N. Demirbaş (2022) confirmed that substantial product losses in Turkey were due to insufficient mechanisation and low investment in post-harvest processing, which limited the country's export potential. A similar situation was observed in Kyrgyzstan, where transportation and storage losses remained high due to the lack of efficient logistics solutions.

Analysis of the sensory characteristics of cherries performed by I. Ivanova *et al*. (2023) showed that compliance with organoleptic parameters was a determining factor in the success of products on the European market. This aspect could be critical for Kyrgyzstan in expanding exports to China, as Chinese consumers prefer high-quality products with optimal levels of hardness, colour, and sweetness. Climatic factors also affected production efficiency (Ivanova *et al*., 2021). High yields in Chile were achieved through the introduction of irrigation technologies and adaptation of varieties, which is consistent with the findings of G. Bujdosó and K. Hrotkó (2017), which affirmed that technological innovation is crucial for stable production. According to Z. Song and X. Shi (2020), the climate substantially affected yields in north-western China, which stimulated the adaptation of new plant protection methods. This experience can be used in Kyrgyzstan to minimise the risks associated with unstable weather conditions. The analysis of the results obtained confirmed that the success of cherry exports was largely determined by the level of adaptation to international quality standards, logistics capabilities, and state support for production. Comparison with other countries showed that Kyrgyzstan has a substantial potential for expanding exports, but requires comprehensive improvement of cultivation technologies, optimisation of logistics, and increased integration into world trade networks.

CONCLUSIONS

The study identified substantial differences between Chile and Kyrgyzstan in cherry production and exports due to the level of mechanisation, logistics, and government support. Kyrgyzstan, despite its natural potential, has limited opportunities to enter the international market, while Chile shows stable export growth due to the integrated development of the industry. The dynamics of cherry production indicated a substantial increase in volumes in Chile from 397 thousand tonnes in 2022 to 641 thousand tonnes in 2024, which confirms the effectiveness of the implemented agricultural technologies. Kyrgyzstan, on the other hand, showed stagnation, reducing production from 6.4 thousand tonnes in 2022 to 4.12 thousand tonnes in 2024. The main factors hindering the development of the industry in Kyrgyzstan are insufficient mechanisation, limited investment, and weak integration into the international trading system.

Export analysis confirmed Chile's dominance in the Chinese market. In 2024, China accounted for 92.36% of all Chilean cherry exports, while Kyrgyzstan's contribution remained minimal – only 0.4%. Chilean suppliers increased their exports to China from 358 thousand tonnes in 2022 to 592 thousand tonnes in 2024, while Kyrgyzstan exported only 1.65 tonnes in 2024, which is 86.32% less than in 2023. The reasons for these dynamics were non-compliance with sanitary standards, high cost of logistics, and difficulties in customs clearance. Logistics barriers substantially limit the competitiveness of Kyrgyz products. The time to transport cherries to China from Kyrgyzstan was 40 days, which is almost twice as long as from Chile (22 days). Logistics costs in Kyrgyzstan also remained high at USD 900/tonne, which is substantially higher than in Chile (USD 500/tonne). Sanitary barriers proved to be another substantial problem: the compliance of Kyrgyz products with China's phytosanitary requirements in 2024 was only 60%, which led to 15% of refusals in customs clearance, while in Chile, this figure was at the level of 1%.

The Chilean experience showed that government support, investment in technology, and effective marketing strategies are key factors for successful exports. Chile actively uses advertising campaigns and cooperates with Chinese retail chains, which contributes to increasing demand for its products. However, Kyrgyzstan does not have a developed marketing strategy, which limits its ability to expand the market. It is necessary to introduce technological modernisation, improve the logistics system, and expand international trade agreements to strengthen Kyrgyzstan's position in the international market. Optimisation of transportation, development of product branding strategies, and adaptation to Chinese requirements can increase the competitiveness of Kyrgyz cherries. Further research should focus on mechanisms for integrating Kyrgyz producers into global supply chains and developing effective financial instruments to support farmers. Limitations of the study were incomplete access to detailed Chinese customs reports and limited official data on logistics costs in Kyrgyzstan, which could affect the accuracy of the export potential assessment. Improving the competitiveness of Kyrgyz Cherries requires improving logistics, creating refrigerated warehouses, adapting to China's sanitary requirements, and expanding trade agreements. Simplification of customs procedures and development of marketing strategies will contribute to stable exports. Further studies may assess the impact of government support and market diversification.

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CONFLICT OF INTEREST

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Порівняльний аналіз галузі черешні в Киргизстані та Чилі та стратегії розвитку ринку в Китаї

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Анотація. Мета дослідження – провести порівняльний аналіз виробництва та експорту черешні в Киргизстані та Чилі, оцінити їх конкурентоспроможність на світовому ринку, а також визначити ключові бар'єри та можливості для розширення експорту до Китаю. Аналіз базувався на статистичних даних щодо виробництва та експорту черешні, оцінці логістичних витрат, митних процедур та державної підтримки, а також розрахунку частки експорту та темпів зростання поставок на китайський ринок. Результати показали суттєві відмінності між Киргизстаном та Чилі у розвитку галузі черешні. У 2024 році виробництво черешні в Чилі досягло 641 тис. тон, тоді як в Киргизстані цей показник становить лише 4,12 тис. тон, що відображає суттєву різницю в масштабах виробництва та рівні технологічного розвитку. Чилі забезпечила 92,36 % китайського імпорту черешні, використовуючи ефективні торговельні механізми, оптимізовану логістику та державні стимули, тоді як експорт з Киргизстану залишається нестабільним і обмеженим. Високі логістичні витрати в Киргизстані (900 доларів США за тонну) порівняно з Чилі (500 доларів США за тонну) знижують конкурентоспроможність продукції. Відсутність сучасних транспортних коридорів, складських приміщень та належного холодильного обладнання суттєво ускладнює стабільний експорт до Китаю, що призводить до високих втрат продукції під час транспортування. Аналіз також показав, що жорсткі санітарні вимоги, сертифікація та фітосанітарний контроль створюють додаткові бар'єри для виходу киргизької продукції на міжнародний ринок, що вимагає стратегічних змін у державній політиці та залучення інвестицій у модернізацію галузі. Дослідження продемонструвало, що конкурентоспроможність експортерів черешні визначається рівнем логістичної інфраструктури, ефективністю торговельних механізмів та відповідністю міжнародним вимогам, що свідчить про необхідність оптимізації логістики, створення холодильних складів та спрощення митного оформлення для збільшення експорту з Киргизстану

Ключові слова: конкурентоспроможність; логістика; санітарні вимоги; торговельні бар'єри; митне оформлення; контроль якості