

---

## Modern Trends of Sustainable Development in the Sugar Market

---

Submitted 12/09/22, 1st revision 25/09/22, 2nd revision 14/10/22, accepted 30/10/22

Bartosz Mickiewicz<sup>1</sup>, Igor Britchenko<sup>2</sup>

**Abstract:**

**Purpose:** Sugar is the most common food product necessary for human life, the main component of which is sucrose and other impurities. The exchange-based nature of the sugar trade makes it easier to enter the market and helps to remove market barriers. The world sugar market is one of the most important in the system of food markets.

**Approach/Methodology/Design:** Within the study, general scientific methods of analysis and synthesis, such as generalization, comparison, abstract-logical analysis, index method, etc. were used.

**Findings:** At the present stage, the world sugar market is characterised by significant qualitative changes, which occur due to the influence of factors determining the conjuncture, and the development of international globalisation processes. The correlation between supply and demand in different regions and countries and the structure are changing, and there is regional redistribution of cane and beet sugar exports and imports. Today, people are interested in production of classic white sugar, pressed or molded lump sugar, candy sugar, powdered sugar and water sugar syrup. Alternative uses of raw sugar have emerged that have a significant impact on market trends and price volatility (primarily bioethanol, biogas, and sugar substitute markets), price volatility has increased.

**Practical Implications:** The results of the performed analysis are necessary for assessing the level of food security of sugar market and for the growth of export of that product, taking into account the trends and conditions for the functioning of the agro-food sector. The main trends in the development of the world sugar market are changes in the structure of its consumption, characterised by an increase in demand for sugar from the food industry and a decrease in consumption by the population, as well as the increased role of bioethanol production.

**Originality/Value:** The results of the analysis are necessary to assess the level of food safety and to develop a strategy that takes into account the current trends in the global sugar market. Prospective directions for the sustainable development of the sugar market have been developed.

**Keywords:** Agro-food sector, sugar market, sustainable development of agricultural production, trends and current states, forecast, efficiency, export.

**JEL classification:** Q10, Q13, Q18.

**Paper Type:** Research article.

---

<sup>1</sup>West Pomeranian University of Technology Szczecin, Faculty of Economics,  
ORCID ID: 0000-0002-4787-2477, [bmickiewicz@zut.edu.pl](mailto:bmickiewicz@zut.edu.pl);

<sup>2</sup>The University of Security Management in Košice, Institute of Security Sciences, ORCID ID:  
0000-0002-9196-8740, [igor.britchenko@vsbm.sk](mailto:igor.britchenko@vsbm.sk);

## **1. Introduction**

According to the United Nations, the world's population is currently about 7.7 billion people and will reach about 9.6 billion by 2050. Food supplies and production are expected to double from current levels and grow by 15% over the next decade (Monitoring of Food Security – 2020). Global food security is one of the key trends of the modern world economy.

A large part of the digital technology, such as aerial surveillance and big data, has been introduced in the agro-food sector. At the same time, the relevant part of the global sustainability agenda is fully integrated into agriculture. It is transition to the production of organic food, the use of agricultural opportunities for fuel production, etc.

Sugar is the most common food product necessary for human life, the main component of which is sucrose and other impurities (in white sugar their allowed content is up to 0.25%, in refined sugar – up to 0.1%). Sugar is a product with high added value, the supply of which to foreign markets will contribute to the effective development of the economies of different countries. The exchange-based nature of the sugar trade makes it easier to enter the market and helps to remove market barriers. The world sugar market is one of the most important in the system of food markets.

At this stage, world per capita sugar consumption continues to grow, having reached high levels in developed countries. In South America and some Asian sugar-producing countries, the growth rate is low. In Africa and a large part of Asia, consumption levels are low and expected growth is trending upward.

The COVID-19 pandemic has a strong impact on the demand for sugar, and as such, its consumption has dropped significantly as a result of physical distancing measures and other restrictions. It is now recognised that high levels of sugar consumption can contribute to the development of illnesses (diabetes, overweight and obesity) and health problems.

The objective is to study the main trends of the dynamic development and forecast of the world sugar market as well as elaboration of perspective directions of its sustainable development.

## **2. Materials and Methods**

Within the study, general scientific methods of analysis and synthesis, generalisation, comparison, abstract-logical analysis, etc. were used. The information base of the study were the databases of the FAO, the International Monetary Fund, the Organisation for Economic Cooperation and Development, the European Union, and the U.S. Department of Agriculture.

### **3. Results and Discussion**

The role of countries and regions of the world in the global agro-food system is determined by the level of development of productive forces and production relations, geographical location, the availability of agricultural production factors and other factors. In the structure of international food trade, there are several characteristic trends: first, the United States of America (USA), the European Union (EU) and China are the largest both exporters and importers of food, with China's position in international trade strengthening the most, while the EU share continues to decline significantly; in world food exports a group of fast-growing exporters from developing states has appeared (besides China, Brazil, India, Indonesia and Thailand); in world food imports the position of Japan has declined, but Russia, South Korea have, for example, become importers of food.

Europe remains the largest exporter of food. Apart from Great Britain, Italy, Russia, and Japan, the rest of the countries are both food exporters and importers, which shows a high degree of diversification of their product range of food. However, in international trade there is an expansion of the position of Asian countries, which, becoming exporters of food, actively import it. Asia's food imports rose even during the global food price crisis, as the region experienced a high rate of income growth. There has been an increase in food imports in North Africa and in the Middle East because of rising oil revenues, but it is trending downward. In Sub-Saharan Africa, net food imports have increased by more than 60 percent in recent years. There was a further increase in the deficit in the food trade when population growth exceeded the growth of its production (Mintusov, 2016).

The importance of foreign trade in agricultural raw materials and food in the world is constantly growing. In recent years, its share of total exports has increased from 7.8% (2012) to 8.4% (2019), with global agro-food exports reaching 1.6 trillion USD. Given the FAO's forecasts of global agricultural and fishery production growth of about 20% by 2027 and significant increase in inter-regional differentiation in its location, the importance of food trade will increase (OECD-FAO Agricultural Outlook 2018–2027).

Methodological approaches used in assessing the condition and development of the world sugar market should take into account its features and specifics:

- 1) high concentration of goods producers;
- 2) features of products supply in the market, including the seasonal nature of production and its low elasticity, regional differences in soil and climatic conditions that determine the location of sugar production enterprises, the composition of their raw material zones;
- 3) the structure of aggregate demand for sugar (including the stability and non-elasticity of domestic consumption of the product, the unevenness of its distribution);

4) various market barriers (administrative, economic, technological, strategic).

Access to the market for new participants is limited by the following barriers: high capital intensity of production with a long payback period of investments; seasonal nature of the main production; administrative barriers associated with the formation of the raw material zone of the company; high level of concentration of producers in this market; state regulation of prices in the domestic market; access to financial resources (state support is provided to the companies); scale effect; product differentiation, which forms consumer loyalty; system of relationships between beet raw material suppliers and the processing company, etc., (Dovnar, 2019).

Overall, there are more than 120 countries that produce sugar in the world. Brazil, India, the European Union, Thailand and China were among the world's top five sugar producers in 2019. Herewith Brazil, India and Thailand account for 65% of world sugar exports (in monetary terms). This season, Brazil will maintain its leadership as the world's largest sugar producer (ahead of India), which has produced about 32.5 million tons of sugar. In 2019–2020 India produced 28.9 million tons of sugar, about 17% of total world sugar production. The dynamics of global sugar production is given in Table 1.

**Table 1.** Dynamics of global sugar production

Description	2000	2018	2019	2020	Growth rate, % 2020 /2000	Growth rate, % 2020 /2019
Beet	32.0	38.8	39.9	35.9	112.2	89.9
Cane	108.2	135.5	131.2	133.3	123.2	101.6
Total	140.2	174.3	171.1	169.2	120.7	71.3

**Source:** Own creation on the base of Agriculture of the Republic of Belarus: statistical collection 2021.

The data presented in Table 1 show that there was a 20.7% increase in sugar production in 2020 compared to 2000, and a 28.7% decrease in sugar production compared to 2019. At the same time, there is an increase in cane sugar production: in 2020 as compared to 2000 – by 23.2% and by 1.6% compared to 2019. Beet sugar production decreased by 10.1% in 2020 compared to 2019.

Evaluation and forecast of the development of world sugar production (OECD-FAO Agricultural Outlook 2018–2027) are shown in Table 2. The data presented in Table 2 show that according to FAO forecasts, global sugar production in 2021–2022 will total 174.6 million tons, an increase of 3.01% over the previous year.

World sugar consumption tends to grow and will reach the level of 200 million tons by 2020. At the same time, the level of sugar consumption per capita will increase from 22.5 kg to 23.5 kg, although there are significant differences between regions

and countries. In terms of sugar consumption per capita in 2018–2019, Brazil and Russia are the leaders, while China has a low level of consumption (Otinova and Polunina, 2019).

**Table 2.** Assessment and forecast of the development of world sugar production

Description	2019/2020	2020/2021 (assessment), million tons	2021/2022 (forecast), million tons	Growth rate, % 2021/2022 compared to 2020/2021
Global balance				
Production	171.0	169.5	174.6	3.01
Trading	62.2	60.1	59.0	-1.75
Total consumption	164.9	170.5	172.8	1.33
Stocks at the end of the period	104.5	103.6	105.3	1.69
Supply and demand indicators				
Per capita consumption:				
in the world (kg/year)	21.4	21.9	22.0	0.27
low-income food- deficit countries (kg/year)	12.2	13.0	13.1	0.38
Ratio of global reserves to consumption, %	63.4	60.8	61.0	0.35
Average price according to ISA (US cents/lb)	2020	2021	2022 January–May	Change: January–May 2022 to January–May 2021, %
	12.85	17.67	18.84	17.21

**Source:** Own creation on the base of Agriculture of the Republic of Belarus: statistical collection 2021.

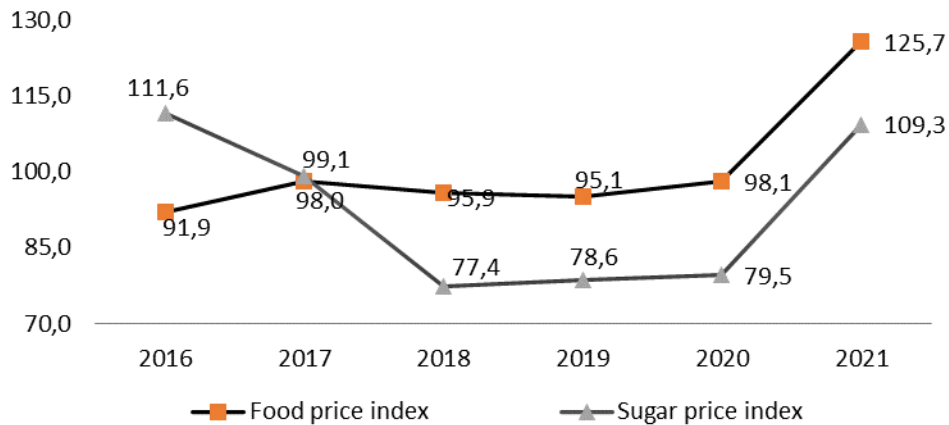
Production of white sugar in the EU in the period of 2021–2022 will increase by 7% (about 15.5 million tons) compared to the previous period; stocks of sugar amount to 1.4 million tons.

World food prices, including sugar, are highly volatile due to the dominance of several exporting and importing countries, as well as restrictive trade policies. Figure 1 shows the FAO food and sugar price index during 2016–2021 (OECD-FAO Agricultural Outlook 2018–2027).

The data in Figure 1 shows that the average annual sugar price index in 2021 is 109.3%, which is 29.8% lower than in 2020, and lower by 2.3% than in 2016. The main sugar beet producers in the world are Germany, the United States and France. The European Union ranks third in sugar production. In 2019/2020, the EU

produced 17.25 million tons of sugar and is the world's largest producer of sugar beet (20% of the world's total sugar production).

**Figure 1.** *FAO Food and Sugar Price Index*



**Source:** *Own creation on the base of Agriculture of the Republic of Belarus: statistical collection 2021.*

Sugarcane is one of Thailand's most important crops, used for seven years and harvested twice a year. The country produced nearly 8.25 million tons of sugar in 2019–2020. Thailand is also a major producer of sugar in the world and a major exporter (about 70% is exported). Despite the fact that sugar yields from sugar cane and sugar beet are almost the same, sugar cane processing is much cheaper. The stalks (cane bagasse) remain during its processing and are burned, replacing natural gas.

World sugar exports in 2020 amounted to 35 million tons, an increase of 23% compared to 2019. Meanwhile, Brazil accounts for 75% of exports, Thailand and India for 13%, Guatemala, South Africa and El Salvador for a total of 5.7%, and other countries for 6.2%.

The following countries lead in the ranking of major sugar importers: China (4.8 million tons), Indonesia (4.8 million tons), USA (2.7 million tons), Malaysia (2 million tons), Korea (1.9 million tons), EU (1.6 million tons), India (1.5 million tons).

The most important aspect of increasing export potential is the competitiveness of products. In international trade, the competitive advantages of products based on lower costs, the desire of consumers to buy a variety of quality products, as well as taking into account the specialisation of agriculture, climatic factors and seasonality of production, necessitates the optimisation of foreign trade parameters, the ratio between production, import and export of food. In determining the parameters of

foreign trade, it is necessary to take into account the processes associated with the international division of labour within production chains and the policies of states to protect domestic food markets.

Innovative technologies associated with the development of digital agriculture will be the drivers of increased production efficiency by reducing costs and losses. It will also increase the efficiency of interaction between producers and processors and consumers by making information more accessible and open, reducing transaction costs, increasing trade channels, etc., (Ushchachev, Maslova, and Avdeyev, 2020).

The comprehensive approach to the problem of food security in the Republic of Belarus includes: public and private investments to increase agricultural productivity; improved access to production resources, services, technologies and markets; measures to promote rural development; social protection, including strengthening the resilience of food systems to risks; targeted nutrition programs aimed at solving problems of micronutrient deficiencies, etc., (Monitoring of Food Security, 2020-2021).

In 2020 the Republic of Belarus exported agricultural goods and food products to foreign markets for the amount of 5,771.8 million USD (an increase of 4.2% over the level of 2019). The foreign trade balance of the Republic in trade in agricultural goods and food reached 1500 million USD, the total trade turnover in 2020 was 10,043.6 million USD. Currently, the Republic is an export-oriented country in terms of agro-food products (including sugar).

In 2020, the specific weight of Belarus in the structure of world trade in certain types of products was: animal butter – 4.4% (7th place), rapeseed oil – 3.1 (9th place), cheese and cottage cheese – 3.1 (10th place), skimmed milk powder – 2.8 (10th place), sausage products – 1.6% (15th place), white sugar – 1.3% (18th place) (Monitoring of Food Security, 2020-2021).

Sugar industry is one of the priority sectors of social and economic development of the Republic of Belarus, providing food security of the country, contributing to the sustainable development of agro-industrial production. More than 370 agricultural companies in Brest, Grodno, Minsk and Mogilev regions are engaged in industrial beet farming (Agriculture of the Republic of Belarus: statistical collection, 2021). The trend of sugar beet production is shown in Table 3.

The data given in Table 3, show that in 2015-2020 there was a 17.5% decrease in cultivated areas. During the study period there was an increase in sugar beet yield by 46% and gross yield by 21.5%.

The Republic of Belarus is currently fully self-sufficient in sugar. There are currently four factories in Belarus that process beet raw materials: Open Joint Stock Company (OJSC) Slutsk Sugar Refinery, OJSC Gorodeya Sugar Refinery, OJSC

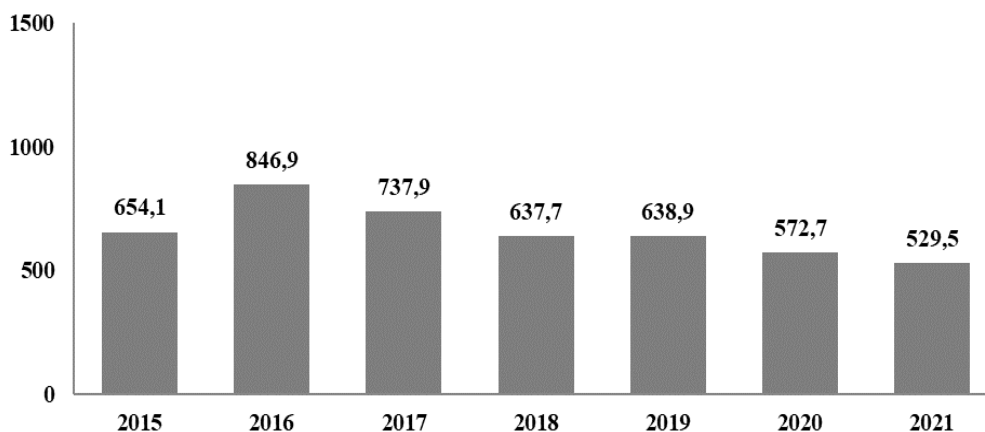
Skidel Sugar Refinery, OJSC Zhabinka Sugar Refinery, with a total capacity of 39.5 thousand tons of sugar beet processing per day. The trend of granulated sugar production in the Republic of Belarus is shown in Figure 2.

**Table 3.** Trends in sugar beet production

Description	2015	2016	2017	2018	2019	2020	Growth rate, 2020 /2015
Cultivated area, thousand ha	103	97	101	102	96	85	82.5
Yield, cwt/ha	330	446	500	477	521	482	146.0
Gross yield, thousand tons	3300	4279	4089	4809	4945	4011	121.5

**Source:** Own creation on the base of Agriculture of the Republic of Belarus: statistical collection 2021.

**Figure 2.** The trend of granulated sugar production in the Republic of Belarus thousand tons



**Source:** Own creation on the base of Agriculture of the Republic of Belarus: statistical collection 2021.

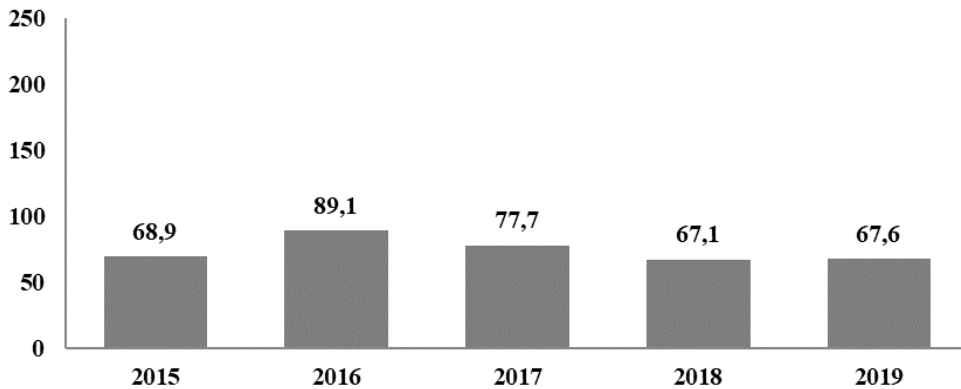
The data shown in Figure 2 indicate that in 2021 as compared to 2015 there was a decrease in sugar production in the Republic of Belarus by 19%.

Per capita sugar production trends are shown in Figure 3.

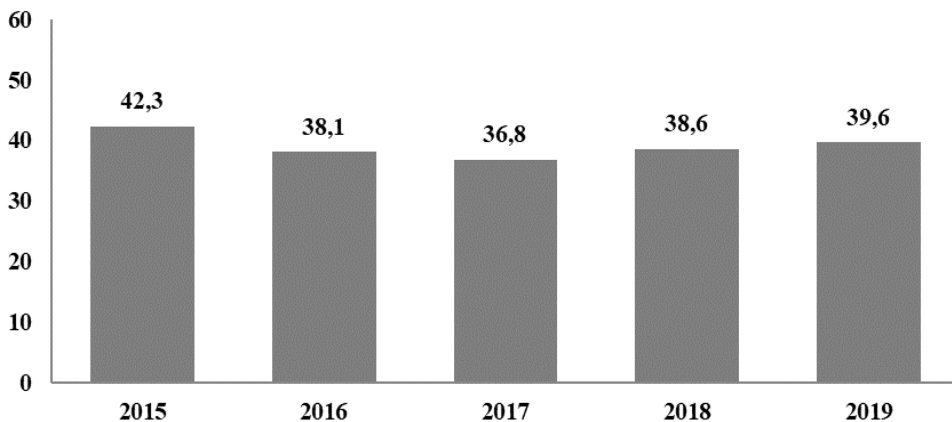
The data in Figure 3 show that sugar production per capita in the Republic of Belarus decreased by 1.9% in 2019 compared to 2015.

Per capita sugar consumption trends are shown in Figure 4.



**Figure 3.** Per capita sugar production trend, kg/year

**Source:** Own creation on the base of Agriculture of the Republic of Belarus: statistical collection 2021.

**Figure 4.** Per capita sugar consumption trend, kg/year

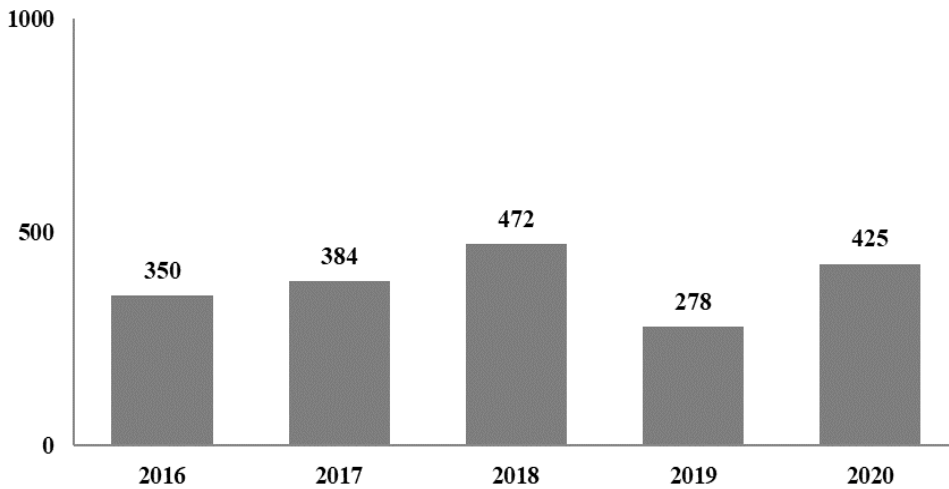
**Source:** Own creation on the base of Agriculture of the Republic of Belarus: statistical collection 2021.

The data in Figure 4 shows that sugar consumption per capita in the Republic of Belarus decreased by 6.4% in 2019 compared to 2015.

In 2018-2020, sugar refineries in Belarus implemented modern technologies and purchased equipment, which allowed to reduce sugar losses during storage and processing of sugar beet, reduce costs, electricity per ton of finished product, to activate the sales markets, etc. The dynamics of beet sugar exports for 2016–2020 is shown in Figure 5.

The data shown in Figure 5 indicates that sugar exports in the Republic of Belarus increased by 21.4% in 2020 compared to 2016, and in relation to 2019 there is a downward trend.

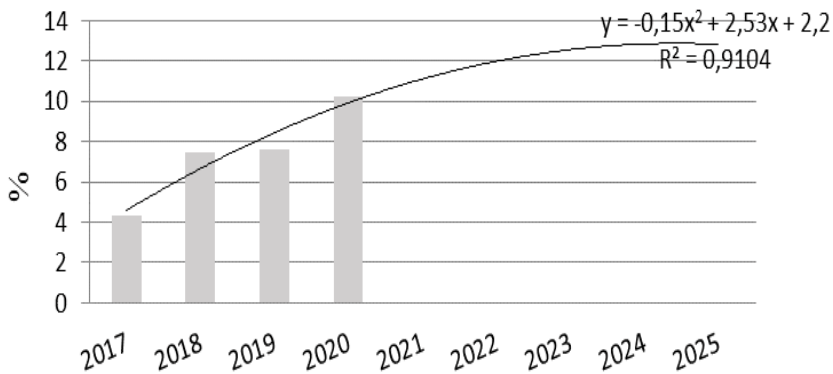
**Figure 5.** Dynamics of beet sugar exports, thousand tons



**Source:** Own creation on the base of Agriculture of the Republic of Belarus: statistical collection 2021.

We make a forecast of the profitability of sugar sales up to 2025. Let's build a trend equation; for this purpose we chose polynomial growth curve of the second degree, as it more accurately reproduces the dynamics of the original time series (Figure 6).

**Figure 6.** Sugar profitability growth forecast, %



**Source:** Own creation on the base of Agriculture of the Republic of Belarus: statistical collection 2021.

Using the equation obtained on the graph, we calculated the forecast for the profitability growth of sugar sales (Table 4).

The calculations showed that the return on sugar sales by 2025 will be 12.82%, and compared to 2021 will increase by 1.72 percentage points.

**Table 4.** Forecast of sugar sales profitability growth

Description	2021	2022	2023	2024	2025	2025/2021, percentage points
Return on sugar sales, %	11.1	11.9	12.5	12.8	12.82	+1.72

**Source:** Own creation on the base of Agriculture of the Republic of Belarus: statistical collection 2021.

#### 4. Conclusion

Studies have shown that the world sugar market is influenced by the conditions of various food and energy markets, changes in exchange rates, logistics, etc. The most important factors affecting sugar demand are population growth, per capita income, price of sugar and alternative sweeteners, and consumer preferences.

The situation in the world market is largely determined by the export-import policy of the countries producing white sugar and raw sugar, the growing share of sugar exports in the total volume of its production. The global sugar production in 2021–2023 will increase by about 3% (up to 193 million tons), due to high demand in China and India.

The gradual recovery of the public catering sector also contributes to the revival of global sugar demand. The share of beet sugar in world production is declining to 20%, while the share of cane sugar is rising to 80%. Over the long term, the volume of world sugar production is expected to grow (growth by 2025 will be 25% – about 210 million tons).

Consumption in Europe is declining annually due to changes in the dietary patterns of the population and the widespread use of sugar substitutes in the food industry.

The global market for sugar substitutes will be growing strongly at an average annual growth rate of 6.3% to reach 10.27 billion USD. In 2018, the market was estimated at 6.35 billion USD (prominent sugar substitute manufacturers include Archer-Daniels-Midland (ADM), Tate & Lyle (TATE), Ingredion Incorporated (INGR) and Whole Earth Brands (FREE)).

The sugar industry in Belarus is export-oriented, with more than half of its production sold in foreign markets. The main trends of the sugar market sustainable development are: improvement of economic management tools to increase the efficiency of its functioning; rational use of sugar resources; optimisation of sugar market balance parameters, taking into account global trends through the implementation of export potential, diversification of foreign markets and development of import-substituting sugar production.

**References:**

- Agriculture of the Republic of Belarus: statistical collection. 2021. National Statistical Committee of the Republic of Belarus. <https://www.belstat.gov.by>.
- Dovnar, L.I. 2019. Organisational and economic mechanism for the effective functioning of the sugar market of the Republic of Belarus. *Agrarian Economics*, 10, 60-72.
- Mintusov, V.K. 2016. Theoretical and methodological aspects of the global food market analysis. *University Newsletter*, 3, 34-39.
- Monitoring of Food Security 2020-2021. In the Context of the Global Trends Impact. Minsk: Institute for System Research in the Agroindustrial Complex of the National Academy of Sciences of Belarus, 241.
- Ushchachev, I., Maslova, V., Avdeyev, M. 2020. Modern trends in the development of foreign trade in agro-food products in Russia. *Agroindustrial Complex: economics, management*, 5, 4-15.
- OECD-FAO Agricultural Outlook 2018-2027. Official website of the UN Food and Agriculture Organisation (Electronic resource). Access mode: <http://www.fao.org>.
- Otinova, M.E., Polunina, N.Yu. 2019. Sugar exports – one of the priorities of the development of the agroindustrial complex of Russia. *Economic Relations*, 9(2), 1071-1084.
- Yefimenko, A.G., Mitskevich, B. 2022. Economic assessment and forecast of the efficiency of food production. Strategic priorities for the development of the economy and its information support: materials of the International scientific conference of young scientists and university teachers (Krasnodar, December 09–10, 2021), comp. by Yu.I., Sigidov, N.S. Vlasova. – Krasnodar: Kuban State Agricultural University, 175-184.