



AGRICULTURAL PRODUCTION VOLUME IN POLAND AND IN BELARUS AND ITS PROSPECTS

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JEL Classification: F13, Q13, Q17.

Key words: agricultural production volume, trade policy, Poland, Belarus.

Abstract

The aim of this study was to identify changes in the agricultural production volume for selected branches in 2013-2017 and to estimate the future trends in Belarus and in Poland. The following comparative analyses used selected *per capita* intensity indices, the change rate index and a logistic function. The study found that in both countries the greatest decrease took place in the plant production volume, while animal production volume remained more stable. The fact that its foreign trade is heavily dependent on Russia is the greatest problem for Belarus. Foreign trade in Poland is more stable and less dependent on Russia owing to the influence of the European Union.

WIELKOŚĆ ORAZ PERSPEKTYWY PRODUKCJI ROLNICZEJ W POLSCE I NA BIAŁORUSI

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Słowa kluczowe: wielkość produkcji rolniczej, polityka handlowa, Polska, Białoruś.

Abstrakt

Celem badań było zidentyfikowanie zmian w wielkości wybranych branż produkcji rolniczej w latach 2013-2017 oraz oszacowanie trendów rozwoju na Białorusi i w Polsce. W analizach porównawczych wykorzystano wybrane wskaźniki natężenia *per capita*, wskaźnik dynamiki zmian oraz funkcję logistyczną. W wyniku przeprowadzonych badań stwierdzono, że największe spadki w obu krajach dotyczą produkcji roślinnej. Produkcja zwierzęca jest bardziej stabilna. Największym problemem na Białorusi jest zależność handlu zagranicznego od Rosji. W Polsce większą stabilizację handlu zagranicznego i mniejszą zależność od Rosji zapewnia Unia Europejska.

Introduction

Due to a lack of self-sufficiency in food production, geographic position and historical considerations; Russia trades in food products with countries of the former eastern bloc. It is the main trade and economic partner of Belarus; its commercial exchange with Poland is also significant. However, there is a recurring issue of lobbying by individual sectors of the Russian economy as well as holdings and concerns with Russian capital. Protectionist support from the Russian government has had a negative impact on the financial situation of food and agricultural produce exporters in Belarus. In particular, this manifests itself as the imposition of bans and sanctions against imports to Russia (Gribov, 2018, p. 27-29). Belarus exported to Russia approx. 90% of its agricultural produce in 2010 (Instytut Sobieskiego, online). According to Statistics Poland (formerly known as the Central Statistical Office or GUS in Polish), Russia was only the tenth highest export market for Poland; however, the growth rate of the Polish exports to Russia was high until 2013 (Batyk, 2014, p. 7-14). After Poland's accession to the European Union, the EU became their main trade partner, which does not mean that there is no cooperation with third countries, which is based on relevant agreements (Matysiak-Pejas, 2010, p. 80-90). When Western countries imposed economic sanctions on Russia in 2014, the latter responded with retaliatory measures. It affected the level of commercial exchange between Poland and Russia (especially in some groups of products), as well as with Belarus, which was suspected of providing false

countries of fruit origin. However, Batyk (2014, p. 7-14) claims that because Polish agricultural produce is highly esteemed in the Russian market, exports may continue to grow.

Therefore, there is a question of how these problems of exports to Russia will affect the production volume in both countries in the near term. The authors realise that agriculture development is affected by numerous factors, not fully recognised and variable in time. This study focused only on assessing the trade relations with Russia and the agricultural production volume now and in future; without analysing the mutual relations.

This study identified the changes in the agricultural production volume in selected branches from 2013-2017 and estimated future trends in Belarus and in Poland.

Study methodology

The study covered secondary data on plant and animal production volume in Belarus and Poland from 2013-2017 and the prospects for the following 5 years¹. Belarus and Poland, which share a common geographic position, were chosen because of the need to compare the problems faced by one country which is an EU member, and by another remaining under the strong influence of Russia. The data were taken from public statistical information: the Belorussian Statistical Yearbook and Statistics Poland. Data were listed comparing the situation in Belarus and in Poland. The comparative analyses used selected *per capita* intensity indices and the change rate index. Forecasts were prepared with mathematical models based on assumed process continuity and predictability, and on the use of historical data (Struzak, 2009, p. 36). The current situation is likely to remain unchanged within the predictability horizon (Peitgen *et al.*, 2002, p. 556). The logistic function, used for modelling various growth processes, was applied in this study. According to this function, the growth rate was initially high, but then decreased with time to reach an unsurpassable limit in the final phase. The logistic function matched well to historical data. This was a decisive argument for applying it in the study. In its simplest form, the function can be written in the following manner (Struzak, 2009, p. 45):

$$y = \frac{1}{1 + \exp(-t)},$$

where:

- y – growth function (maximum value 1),
- t – time.

¹ 5% forecast error assumed.

In order to apply this function in practice, it was modified by introducing three temporally constant numerical parameters determining the function course – a , b and c (Grzegorek & Wierzbicki, 2009, p. 119):

$$y = \frac{a}{1 + b \exp(-c \cdot t)},$$

where:

$a, b, c \geq 0$,

a – saturation of the phenomenon under study, determined heuristically,

b, c – function parameters chosen through statistical estimation.

The time series in the study was five years (Grzegorek, 2012, p. 32). The parameter a , which determines the natural saturation level, was taken as 100%. In this case, 100% denoted the largest production volume in Belarus or in Poland during the time sequence of 2013-2017 under analysis, for each type of production.

Agricultural policy in Russia and its impact on the import of agricultural produce from Belarus and Poland

The agricultural production volume in Russia decreased severely after the socioeconomic transformations of the 1990s. For example, the total agricultural production volume in 1998 in Russia decreased to 56% of the 1990 level, with plant production decreasing to 66% and animal production dropping below 50%. Some positive trends have been observed since 1999 and the subsidising of agriculture from the state budget returned. Despite considerable growth in production volume in Russia, its growth has lagged behind quickly growing internal demand. The import of agricultural produce and of food increased 2.4-fold from 2000-2005 and exceeded USD 17.4 billion. The implementation of a programme entitled “Development of APK²” started in Russia in 2005. It was regarded as the first stage of a strategy aimed at overcoming the crisis in agriculture and creating conditions for stable growth. The period of carrying out the project in question (2005-2007) proved to be very good for agriculture. The annual growth rate of agricultural production volume was 3.4%. Another programme, entitled “Agriculture development and regulation of markets for agricultural produce, raw materials and food” was implemented in 2008-2012 (Furkin, 2008, p. 140-150). Agriculture in Russia generates approx. 3.7% of GDP, employs 9.2% of the country’s labour force and generates approx. 6% of its exports. This sector has proven highly resistant to widespread economic turbulences.

² An inter-sectoral complex, bringing together companies involved in the production and processing of agricultural products.

Although the food and agriculture sector has a huge potential to play a greater role in the Russian economy, it suffers from relatively low productivity and an obsolete technological base (Kuzminov, 2018, p. 52-57).

The comparative advantage in the current Russian export is achieved mainly by cereal crop (wheat, barley) cultivation, their by-products (wheat bran) and products from their processing, such as grouts, flour, etc. (Bensova, 2017, p. 318-330). In animal production, countries exporting to Russia have suffered great losses because of trade bans as a consequence of African swine fever. The effects of the import ban have been studied extensively by Blanchard and Wu (2019, p. 173-195). They also discuss possible factors related to cross-border disease transmission through trade. Russia makes use of Article 6 of "Agreement on applying sanitary and phytosanitary measures" (Inspekcja Jakości Handlowej Artykułów Rolno-Spożywczych, online) to implement its trade policy, although it often constitutes an instrument of arbitrary and unjustified discrimination against signatories to the agreement. One must not forget that Russia has implemented retaliatory measures for the sanctions imposed by the West. An embargo was imposed in 2014 on imports from the EU, the USA, Canada, Australia and Norway. The embargo applied to a range of food products. In 2014, Russia started to follow a policy of import substitution. The objectives of the state programme include the development of subsectors for import and agriculture substitution, including the cultivation of vegetables, fruit and breeding dairy and meat cattle. The import policy and the Russian embargo initially led to a deterioration of the country's economic situation. The consequences included the devaluation of the ruble, an increase in the inflation rate and a rapid decrease in purchasing power, which was especially painful with the deficit of cheap imported goods. Now, the Russian economy is gradually reviving (Tsutsieva *et al.*, 2019, p. 2781-2787). In April 2019, Russia imposed a temporary ban on the import of apples and pears from Belarus, suspecting that they, in fact, came from Poland. The ban was lifted in July 2019 after many inspections of Belorussian apple producers.

Gusakov *et al.* (2018, p. 263-285) pointed to a potential external threat associated with the growing deficit of resources on agricultural produce, raw materials and food markets, the instability of the economic situation; as well as using protectionist measures and regulations by major exporters. This is the case with Russia.

The current state and prospects for agricultural production volume in selected branches in Belarus and Poland

Agriculture in Belarus generates over 9.2% of GDP, with 2.6% in Poland and 4% globally³. As much as 60% of the land in Belarus is used for agriculture. In Poland, agricultural land accounts for slightly more than 50% of its area. Major crops in Belarus include cereals, cannabis, tobacco, hop, flax, potato, sugar beet, forage crops, fruit and vegetables. Cattle, pigs and poultry are also bred. The major crops in Poland include cereals, rapeseed, potatoes, fruits, vegetables and many others. Animals bred in Poland include mainly pigs, cattle and poultry.

Table 1

Production volume per capita (kg per person) of major agricultural products

Country	Years					2017/2013 [%]
	2013	2014	2015	2016	2017	
Grain						
Belarus	803	1009	912	785	842	104.9
Poland	634	631	711	644	659	104.0
Potato						
Belarus	624	663	632	630	675	108.2
Poland	185	193	168	224	216	116.7
Vegetables						
Belarus	172	183	178	199	206	119.8
Poland	131	113	126	118	119	90.8
Fruit						
Belarus	48	66	58	74	50	104.2
Poland	109	111	107	107	83	76.15
Livestock (post-slaughter weight)						
Belarus	124	113	121	123	127	102.4
Poland	132	153	160	172	172	130.0
Milk						
Belarus	701	707	743	751	771	110.0
Poland	340	347	351	352	357	104.9
Eggs						
Belarus	407	407	395	380	370	90.9
Poland	286	242	221	247	260	90.9

Source: prepared by the author based on the Statistical Yearbook of the Republic of Belarus (2018).

³ 2017 data

Swinnen *et al.* (2012, p. 127-144) analysed changes in the results of agricultural activity in Central and Eastern Europe and in former Soviet republics from the beginning of the transformation process. The government-run Program of Rural Area Revival and Development for 2005-2010 brought positive results in the form of a quite high production volume growth rate (Belskiy, 2019, p. 56), and Belarus achieved a positive trade balance in food and agricultural produce (Matuszewicz, 2008, p. 167-173; Saihanau & Kazakevich, 2008). Since Poland's accession to the European Union, the country's agriculture has been governed by the Common Agricultural Policy, which affects the production volume. Joining the EU has had a positive effect on foreign trade in products (Terszeszczuk, 2010, p. 192-197). Poland also has a positive trade balance in agricultural produce⁴.

Considering the *per capita* volume from 2013-2017, a decrease was observed only in eggs, which was also observed in Poland. However, the greatest decrease per capita was observed for fruit (Tab. 1). A growing trend was observed for the other products under analysis. The highest was for vegetables in Belarus and livestock in Poland.

Considering the simulations performed with logistic functions assuming that the production volume level remains unchanged, a drop in fruit production in Belarus and in Poland should be expected, although Poland is the undisputable leader in the EU. Other expected decreases include the production of cereal crops in Belarus, although the country is a significant producer of these crops in Europe and of vegetables in Poland (Fig. 1).

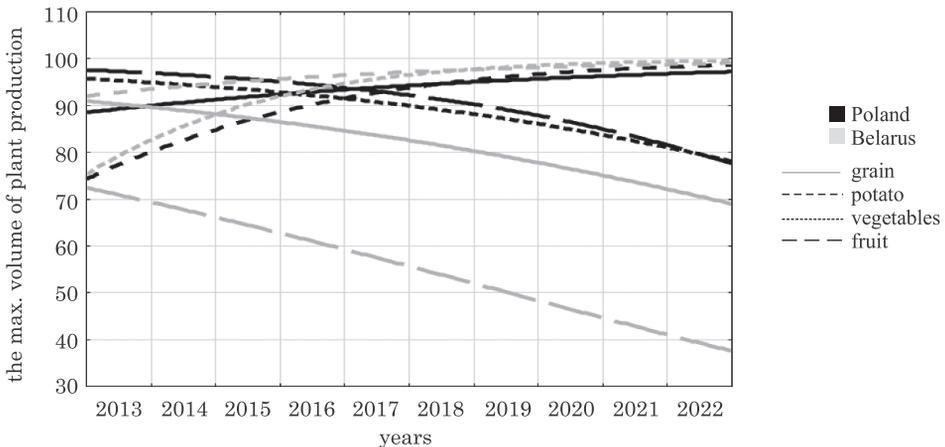


Fig. 1. The volume and forecast of plant production in Belarus and in Poland (100% in the logistic function denotes the maximum production volume from 2013-2017)

Source: prepared by the author based on acquired data.

⁴ Production and foreign trade of agricultural products in 2017 (Główny Urząd Statystyczny, online).

A further decrease in egg production is expected with respect to animal production in Belarus and in Poland. The decrease will be much more rapid in Belarus than in Poland (Fig. 2). The livestock production volume is expected to remain at the present level in Poland and to decrease in Belarus. The milk production volume is likely to remain at the present level in both countries. Nearly all the countries undergoing transformation initially witnessed a decrease in productivity and nearly all of them now enjoy an increase in productivity. However, an increase in productivity is not the only factor affecting production volume forecasts.

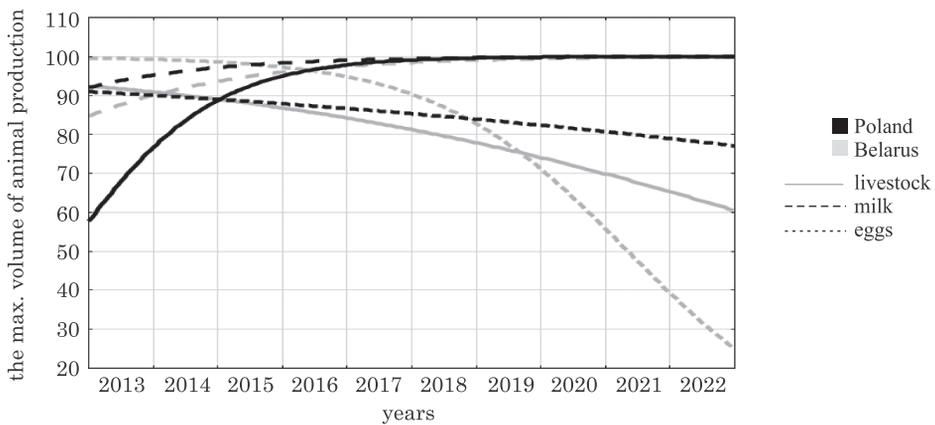


Fig. 2. The volume and forecast of animal production in Belarus and in Poland (100% in the logistic function denotes the maximum production volume from 2013-2017)

Source: prepared by the author based on acquired data.

According to Gorzelak (2013, p. 145-167), both near-term and further forecasts (especially) are mainly affected by the demand for food from a society with purchasing power. Furthermore, socioeconomic and cultural transformations in the society and the profitability of foreign trade in food products also affect these forecasts.

Conclusions

An increase in agricultural production volume in Belarus aggravated the problem of markets for its produce. However, although in late 2017 Belarus signed contracts for the supply of dairy products and meat worth USD 114 million to China, it still struggles to sell its agricultural produce. Poland enjoys a positive foreign trade balance only with respect to animal products, meat, milk and dairy products. According to Koška (2016), Russian sanctions did not

affect foreign trade in Poland. Producers quickly switched to new markets and signed new contracts.

In order to maintain the current position in agricultural trade and agricultural product processing in Belarus, given the volume of production now and in the future, it is necessary to diversify food markets by expanding the area of food supply and by reducing the influence of Russia on the financial situation of Belarusian farmers and food producers. The present system of agricultural industry regulation in Belarus calls for significant changes. The situation in Poland is more stable due to its membership in the EU. Russia is not the main trading partner of Poland, but it is still important. If Poland wants to maintain its trade position with Russia, it should focus on direct trade with the Kaliningrad District (Batyk, 2014, p. 7-14).

Translated by Biuro Tłumaczeń OSCAR
Proofreading by Michael Thoene

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