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### Modeling the Expansion of Agricultural Markets\*

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#### ABSTRACT

*This research aimed to develop methodological approaches that can be applied by agricultural entities to select economic activities in the context of effective and efficient foreign economic cooperation. Based on scenario forecasting, the Republic of Bashkortostan's possible agricultural output was calculated. If the potential is fully realized, exports of farm products could increase by \$108.3 billion or 68,1 % by 2024. A mechanism for agro-food producers to overcome external and internal market barriers by choosing strategic export products in the region was developed. This will help users predict possible problems of entering foreign markets, estimate the accessibility of a particular market, and the feasibility of foreign economic activities. A step-by-step assessment revealed challenges in formulating the agricultural products export policy for the Republic of Bashkortostan. The identified hurdles require government intervention so that agricultural producers and state authorities can jointly address the challenges.*

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#### INTRODUCTION

The world economy is currently characterized by intense competition for agricultural markets and strong players with available economic and political resources. Furthermore, each competing party seeks to derive the maximum benefit and inflict the most significant damage on their opponent by interpreting international law in their favor. As the international and domestic experiences have shown, the Russian Federation can enter the path of sustainable development only if the economy is open and the foreign

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economic factor is actively used. However, Russia's penetration into the global economy has not been easy, and agricultural producers play a significant role in this process.

The present-day farming enterprises are developing in two ways: some focus on narrow product lines while others expand their activities and look for new markets. Despite the different pathways, both are involved in the same process, which implies choosing the most commercially attractive markets to improve agricultural enterprises' financial condition. In a market economy, where sales are not guaranteed, diversification of production, entailing the market expansion, becomes an essential condition for the economic well-being of an enterprise.

Let us consider the most significant studies of foreign scientists on this issue. Puertas et al. (2020) suggested multiple tools (organizational, technical, financial, and legal) for risk prevention. These rely on the socio-economic and institutional conditions of exporting countries to rank grain crop suppliers. The authors advocate for three decision-making methods - TOPSIS, ELECTRE, and CE to reveal possible associated risks (food quality, corruption, environmental sustainability in agriculture, and logistics). Their methodology provides supplier search strategies (Puertas et al., 2020).

A number of researchers have analyzed the impact of general trade terms and trading conditions of the leading commodity groups in the case of Pakistan. The studies confirmed a positive long-term relationship between general terms of trade and economic growth. Country-by-country results showed that common conditions for sale with Australia, Bangladesh, Canada, Hong Kong, Japan, Kuwait, Malaysia, Singapore, Sri Lanka, the United Kingdom, and the United States have a significant positive impact on economic development. Conversely, they have a negative effect with China and the UAE. Trade terms with India, Norway, Saudi Arabia, and Switzerland present little influence on Pakistan's economic growth. Analysis of products showed that a group of commodities, namely chemicals, fuel, and lubricants, had a considerable positive impact. Beverages and transport-related groups of items affected the economy adversely, while food and live animals had an insignificant effect. On the whole, easy trade conditions are supposed to favor economic growth (Jawaid et al., 2020).

Karipidis et al. (2020) paid great attention to the study of supply chain relationships that affect the efficiency of export operations. They conducted an online survey of 83 Greek firms and assessed the importance of relationship characteristics in the supply chain using the best - worst method. The authors concluded that quality, purchasing costs, and producer prices were the most important characteristics. Relationships between members of the supply chain and inter-organizational business systems and management mechanisms were of average importance. Qualities associated with the adoption of differentiation strategies were found to be the least essential. Accordingly, manufacturers should pay the greatest attention to the quality and price of products and establish cooperation with suppliers. Public authorities should involve stakeholders in this supply chain to meet quality and price requirements.

Well-known Russian researchers in this field include Altukhov et al. (2019), Minakov and Nikitin (2019) and others. Osipov et al. (2020) used an original theoretical and methodological platform - the concept of growth poles. The scholars conducted regression modeling using the least-squares method to estimate industry-specific and inter-industry investment multipliers. They analyze the regional economy and its branches regarding the gross output sensitivity for investment in different sectors. This makes it possible to determine the growth poles of regional economies. The study rejected the working hypothesis of processing and mining industries, exports of fuel, and energy sector's products, traditionally recognized as the key areas of Russian industrial specialization being the regional growth poles. None of the industries for domestic consumption acts as a growth pole, emphasizing the completed adaptation to the globalization conditions. The regional growth poles are the export of food products and agricultural resources, the gross value added created in transport and communications. This indicates the successful implementation of the transit potential of the Russian economy.

The competitiveness of Russian agricultural products on domestic and international markets has been a subject of research by scientists such as Altukhov et al. (2019). They claim that the visible increase in agricultural products, raw materials, and food is faced with faster growth in the supply of more competitive imported products. Countries with high agro-economic potential use special mechanisms to promote the export of agricultural products and food, thereby "unloading" onto the internal market and creating additional advantages for domestic producers in exporting countries.

There are many authors have studied this subject at the regional level, offering a cluster approach for the strategic development of rural territories. They believe the cluster approach provides a fundamentally new view of regional industries' progress based on the proportional advancement of agriculture. It is an effective tool that can stimulate territorial development and improve rural areas' competitive status and sustainability in the region. Russian foreign economic policy should aim to develop new internal markets for agricultural raw materials, improve the competitiveness of commercial agricultural products and food on external markets, and ensure the availability of financial instruments for domestic exporters (Kolesnikov et al., 2020; Small and Warn, 2019).

Thus, the strategic importance of agriculture attributes to its role in production relations, strong export potential, and its contribution to food security. The agricultural sector has a high impact on the socio-economic development of regions. It is necessary to consider the increasing market volatility in the current business environment, which complicates management decisions at the micro- and macro-levels and may create additional barriers to agro-industrial development (Arkhipova et al., 2020; Karlova and Serova, 2020).

The issue of relevance and limited knowledge of its individual theoretical and practical aspects determined the choice of research direction. The research goal is to develop methodological approaches for effective and efficient foreign economic cooperation of agricultural entities. The stipulated goal was achieved by solving the following tasks: developing an authors' algorithm of the export-oriented strategy for the agroindustry advancement in the region; formulating methodical approaches for strategic forecasting of farm production output to promote export activities; making a forecast model of agricultural production to understand the region's export potential for specific products; classification and assessment of entry barriers to foreign markets for regional producers; justification of the priority tools to improve the accessibility of foreign markets, minimize risks at expanded export activities and provide the maximum export potential of the region.

## 1. METHODS AND MATERIALS

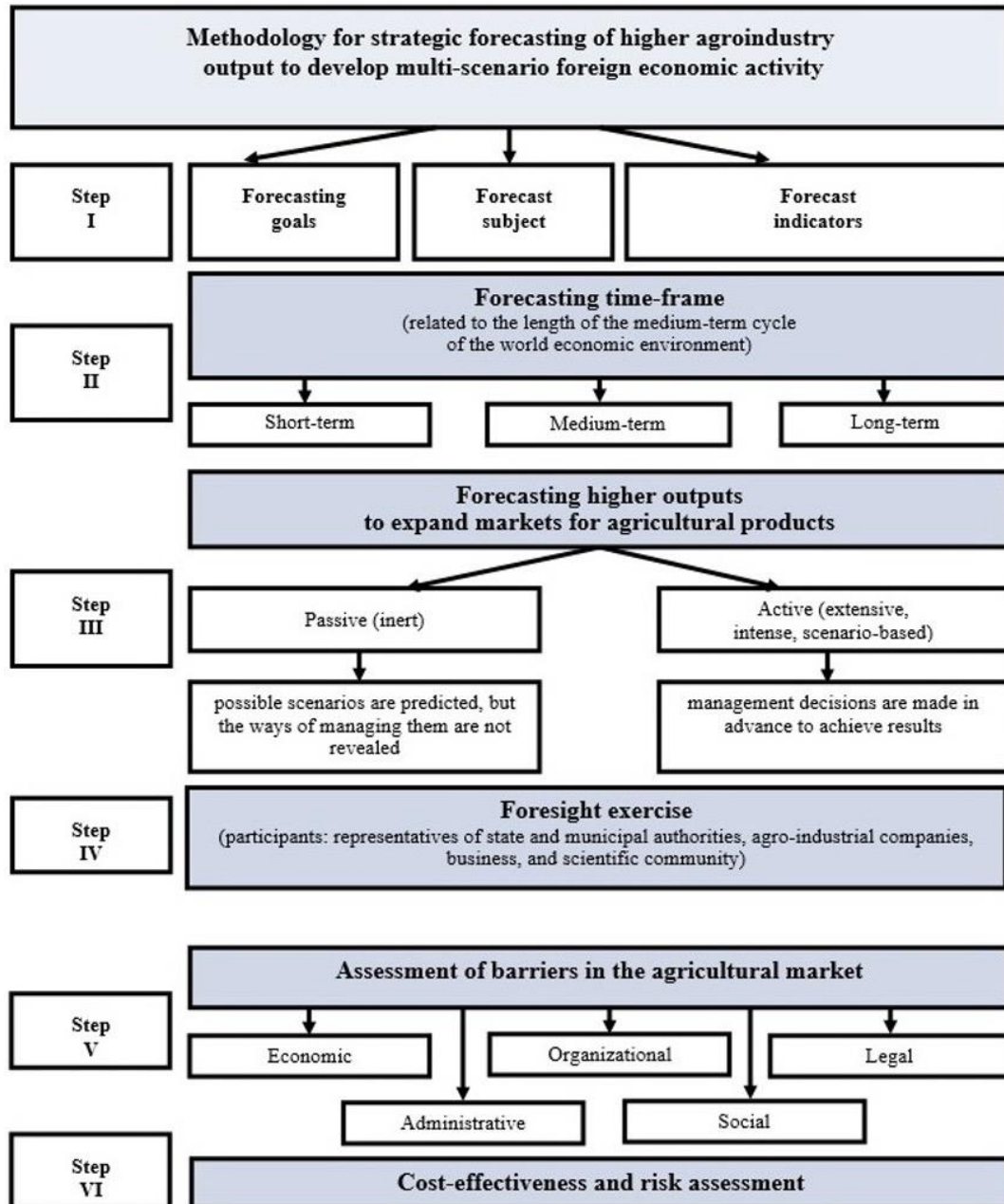
Working out a methodology for strategic forecasting of increased output of agricultural products to enhance foreign trade activities at multiple bases relies on the assumption that emerging economic relations in the present-day Russian Federation manifest a new qualitative change in the external sphere: the establishment of international economic relations in regions. Regarding public property demonopolization, the region acts as a full-fledged economic entity, and its interest is expressed and implemented in the form of regional foreign economic relations.

Russia's various regions are beginning to play an increasingly important role in the country's economic reforms that require studies of their foreign economic relations. Attention will be focused on the results of foreign economic relations of Bashkortostan, which contribute to the economic recovery of the republic and the country as a whole, develop new productive forces, and improve internal economic indicators. Within the Republic of Bashkortostan's strategy for social and economic development until the year 2030, an algorithm to generate a developmental strategy for its agro-industrial sector was created.

It includes a statement of farming's mission and aims; the use of design-structural and economic-mathematical methods; databases and strategic pre-design assessment analysis of the internal and external environment, strengths and weaknesses; forecasted parameters of the system development; design elements and system components in the scenario staging; qualitative and quantitative characteristics of the system components; strategy development; calculation and designing development scenarios; economic assessment of the selected scenarios and risk estimation.

The research was based on the results of foresight sessions conducted at the state and municipal administration levels in 2016-2018 (3 sessions at the regional level, six at the level of sub-regions, 23 at the municipal districts of the republic). The participants were state and municipal government bodies (ministries and departments, state committees, administrations of cities and districts of the republic), heads of agro-industrial enterprises, business people, academics from educational and scientific institutions, representatives of public organizations, and engaged citizens.

A total of 562 stakeholders participated in the foresight sessions. The foresight sessions were moderated by members of SKOLKOVO management school and the Institute for strategic studies of the Republic of Bashkortostan. The sessions were implemented in several stages. Stage I: building up a methodology – defining principles to select regional priorities, formulating selection criteria, choosing expert methods. Stage II: analysis of economic, scientific, and innovation spheres, identifying the strengths and weaknesses of the regional economy, future challenges, and issues in science and innovation. Stage III: selecting innovation priorities, forming expert groups, surveying experts, and focus groups. Stage IV: discussion of identified priorities. The foresight session included workshops on the "Real sector of the economy," "Human potential," "Territorial development," "Development of the investment and information environment," "Development of public administration."



**Figure 1.** Methodology for Strategic Forecasting of Increased Output of Agricultural Products to Enhance International Economic Activity on a Multivariate Basis.

Source: Developed by the authors.

The authors of the given paper present a methodology for strategic forecasting of increased output of agricultural products to enhance foreign economic activity on a multivariate basis (Figure 1).

To increase exports, it is necessary to select and provide arguments for strategic agricultural products produced in all six agricultural zones of the Republic of Bashkortostan. Each zone is distinct in natural and climatic conditions, landscape, soil, and vegetation. Farming is conducted in different ways, and farmers have much potential to expand markets.

Within the framework of the Russian Foundation Basic Research project No. 19-410-020016 "Strategic planning of socio-economic development of rural territories of the Republic of Bashkortostan based on foresight methodology", the authors prepared a scientific groundwork that provides recommendations for the territorial development of the Republic of Bashkortostan, including a set of long-term sub-regional and national activities.

Calculating the forecast values of agricultural production for 2020 – 2030 according to the developed formula, taking into account all the main parameters necessary for predicted figures of farm products:

$$VP = a + b * S_k \quad (1)$$

where VP stands for forecast values of plant growing (animal breeding);  
a and b are coefficients that characterize the relationship between the variables under study;  
 $S_k$  is forecast values of cultivated lands under crops (number of farm animals) in the k-th forecast period.

Coefficients a and b are calculated using the formulas:

$$b = \frac{\sum_{i=1}^n S_i * VP_i - n * \overline{S} * \overline{VP}}{\sum_{i=1}^n S_i^2 - n * \overline{S}^2} \quad (2)$$

$$a = \overline{VP} - b * \overline{S} \quad (3)$$

where n is the number of the measured values;

$\overline{VP}$  – the average value of crop production (livestock production);

$\overline{S}$  – the average value of cultivated lands under crops (number of farm animals).

Let us calculate the forecast values of agricultural production shown in Table 1, contributing to the expansion of markets. To calculate the a and b coefficients for product types, the average values of gross crop and livestock production, cultivated lands under crops, and the number of farm animals for previous years were used from the statistical collection:

$$b_{\text{grain crops}} = (60187305.9 + 67548209.6 + 53528216.1) - 181161870.4 / (9529509.0 - 9527641.2) = (181263731.5 - 181161870.4) / 1867.8 = 101861.1 / 1867.8 = 54.5$$

$$a_{\text{grain crops}} = 33885.5 - 54.5 * 1782.1 = -63304.0$$

$$b_{\text{sugar beet}} = (689864.0 + 839520.0 + 656052.0) - 2181267.7 / (7484.5 - 7460.1) = (2185436.0 - 2181267.7) / 24.4 = 4168.3 / 24.4 = 170.6$$

$$a_{\text{sugar beet}} = 14580.7 - 170.6 * 49.9 = 6071.2$$

$$b_{\text{oil crops}} = (478149.6 + 642100.2 + 730062.1) - 1844134.7 / (151038.5 - 150796.9) = (1850311.9 - 1844134.7) / 241.6 = 6177.2 / 241.6 = 25.6$$

$$a_{\text{oil crops}} = 2741.8 - 25.6 * 224.2 = -2990.1$$

$$b_{\text{milk}} = ((544320.0 + 521993.3 + 501135.5) - 1567518.7) / (313300.5 - 312922.4) = (1567630.7 -$$

$$1567518.7) / 378.0 = 112.0 / 378.0 = 0.3$$

$$a_{\text{milk}} = 1617.8 - 0.3 * 323.0 = 1522.2$$

The calculation of the correlation coefficient determines the close relationship between the indicators taken into account and the accuracy of the forecast:

$$r = \frac{\sum_{i=1}^n S_i * VP_i - n * \overline{S} * \overline{VP}}{\sqrt{(\sum_{i=1}^n S_i^2 - n * \overline{S}^2) * (\sum_{i=1}^n VP_i^2 - n * \overline{VP}^2)}} , \quad (4)$$

Let us calculate the correlation coefficient and find its level:

$$r_{\text{graincrops}} = \frac{(181263731,5 - 181161870,4)}{\sqrt{(9529509,0 - 9527641,2) * (3471494203,8 - 3444674553,7)}} = \frac{101861,1}{223813,9} = 0,46$$

$$r_{\text{sugarbeet}} = \frac{(2185436,0 - 2181267,7)}{\sqrt{(7484,5 - 7460,1) * (640631044,0 - 637787521,3)}} = \frac{4168,3}{8334,1} = 0,50$$

$$r_{\text{oilcrops}} = \frac{(1850311,9 - 1844134,7)}{\sqrt{(151038,5 - 150796,9) * (23044865,2 - 22552401,7)}} = \frac{6177,2}{10908,2} = 0,57$$

$$r_{\text{milk}} = \frac{(1567630,7 - 1567518,7)}{\sqrt{(313300,5 - 312922,4) * (7852263,4 - 7852154,1)}} = \frac{112,0}{41315,5} = 0,55$$

The correlation coefficients obtained revealed a strong relationship between the considered indicators. The area of cultivated lands under crops by 2030 was predicted using the function "Forecast" in Excel. The values  $\overline{S}$  for crop production were as follows: for grain crops - 1990.6 thousand ha in 2020, 2254.6 thousand ha in 2025 and 2384.2 thousand ha in 2030; for sugar beet - 69.9 thousand ha in 2020, 72.4 thousand ha in 2025, and 84.6 thousand ha in 2030, for oil crops - 266.2 thousand ha in 2020, 286.7 thousand ha in 2025, and 297.2 thousand ha in 2030. The predicted figures for milk production in the livestock industry were 1259.9 thousand heads, 1641.1 thousand heads, 2206.7 thousand heads.

Forecast values of agricultural production were broken down into short-term periods. It helps to consider and adjust the planned indicators while implementing this method due to changing economic conditions and the likelihood of risks. Here are the forecast values of grain production for 2020 – 2030:

$$VP_{2020} = -63304.0 + 54.5 * 1990.6 = 4525.6 \text{ thousand tons}$$

$$VP_{2025} = -63304.0 + 54.5 * 2254.6 = 5965.4 \text{ thousand tons}$$

$$VP_{2030} = -63304.0 + 54.5 * 2384.2 = 6672.1 \text{ thousand tons}$$

Forecast values for sugar beet production were as follows:

$$VP_{2020} = 6071.2 + 170.6 * 69.9 = 1799.9 \text{ thousand tons}$$

$$VP_{2025} = 6071.2 + 170.6 * 72.4 = 1842.6 \text{ thousand tons}$$

$$VP_{2030} = 6071.2 + 170.6 * 84.6 = 2050.8 \text{ thousand tons}$$

Forecast values for oil crops production were as follows:

$$VP_{2020} = -2990.1 + 25.6 * 266.2 = 381.6 \text{ thousand tons}$$

$$VP_{2025} = -2990.1 + 25.6 * 286.7 = 433.9 \text{ thousand tons}$$

$$VP_{2030} = -2990.1 + 25.6 * 297.2 = 460.8 \text{ thousand tons}$$

Here were the forecasted values of milk production:

$VP_{2020} = 1522.2 + 0.3 * 1259.9 = 1950.5$  thousand tons

$VP_{2025} = 1522.2 + 0.3 * 1641.1 = 2080.1$  thousand tons

$VP_{2030} = 1522.2 + 0.3 * 2206.7 = 2272.4$  thousand tons

The scenario method implies various options to implement internal potential under external economic conditions (Table 1).

**Table 1.** Forecasting Mid-term and Long-term Agricultural Production, Thousand Tons.

Years	Agricultural products			
	Grain	Sugar beet	Oil crops	Milk
2020	4525.6	1799.9	381.6	1950.6
2025	5965.4	1842.6	433.9	2080.1
2030	6672.2	2050.8	460.8	2272.4

Source: Compiled by the authors.

Statistical modeling of the extensive-intensive agriculture development scenario identified the potential output of main farm products for agricultural enterprises of the Republic of Bashkortostan. Compared to 2020, the forecasted increase in 2030 amounted to 47.4% for grain crops, 13.9% for sugar beet, 20.8% for oil crops, and 16.5% for milk yield.

The developed methodical approaches were used to evaluate the strategic export potential of the region's agroindustry, predict the higher output of export-oriented agricultural products to promote multivariate international economic activity, and designate production values recommended for certain export products. Methods of the semantic grouping of barriers and correlated selection of the most significant ones provided the basis for developing procedures to evaluate the accessibility of external markets.

## 2. RESULTS

During the study, principal reference positions for enhancing agricultural production emphasizing the indicators of economic growth were considered. Ensuring efficiency was the most important among the indicators for growth in producing certain agricultural products in the sub-regions since it is the degree of effectiveness in managing the structure of farm products that determines the goal achievement. Analytically, there were identified regional areas for developing certain products in the sub-regions of the Republic of Bashkortostan (Table 2).

**Table 2.** The Structure of Agricultural Production According to Areas, %.

Products	For the Republic	Areas				
		Central	Northwestern	Southern	Western	Ural
Grain	100	24.5	16.2	28.7	16.3	14.2
Sugar beet	100	44.5	-	25.3	30.2	-
Sunflower	100	24.7	0.5	53.0	19.7	2.0
Potato	100	27.9	18.7	23.2	14.5	15.7
Vegetables	100	37.5	9.9	17.1	28.7	6.7
Meat of livestock and poultry	100	47.4	9.6	21.0	10.4	11.7
Milk	100	18.4	20.0	25.4	13.4	22.7
Eggs	100	79.8	4.9	4.7	6.6	4.0
Wool	100	15.4	22.2	23.6	11.7	27.1

Source: a report on the Russian Foundation Basic Research project No. 19-410-020016 "Strategic planning of socio-economic development of rural territories of the Republic of Bashkortostan based on foresight methodology".

As shown in Table 2, the composition of priority types of agricultural production is usually focused on existing industries traditionally implemented in the territories of the sub-regions, based on the production system formed in the previous economic conditions. The central sub-region is a growth point for sugar beet, potatoes, vegetables, the meat of livestock and poultry; the southern one - for grain, sunflower, and milk; Ural – wool. The north-western and western sub-regions do not have any leading position in the production of certain agricultural products. However, their potential determines possible new growth points through the rational use of land, raw materials, water, and other resources. The existing economic and geographical capacity is characterized by reserves resulting from the effective use of transport and geographical location due to well-developed transportation networks, proximity to food, raw materials, and resource bases.

To expand markets, it is necessary to select and provide arguments for strategic agricultural products produced in the Republic of Bashkortostan that have a high export potential (Stovba et al., 2019). The choosing of strategic products from the region is impossible without assessing market entry barriers that prevent agricultural companies from organizing effective export production. Barriers to entering external agro-food markets should be assessed comprehensively.

**Table 3.** Classification of Barriers in the Agricultural Market.

Barrier type	Large integrated structures and holdings		Agro-industrial entities that include processing industries		Large and medium-sized farms		Independent small businesses	
	External	Internal	External	Internal	External	Internal	External	Internal
<i>Economic</i>								
Market capacity limits	+	+	++	+	+++	+	+++	++
The economic policy of the country	+	-	++	-	+++	-	+++	-
The level of spending	+++	-	+++	-	+++	+	+++	+
Access to information	+++	+	+++	+	+++	++	+++	+++
Access to marketing channels	+	+++	++	+++	+++	+++	+++	+++
<i>Organizational</i>								
Integration strategy	-	-	+	+	++	++	++	+++
Market infrastructure development level	+	-	+	-	++	-	++	-
<i>Legal</i>								
Legislative	+	+	+	+	++	+	++	+
Authorities and business structures	+	-	+	-	+	-	+	-
Criminogenic	+	+	++	+	++	++	++	+
Political stability	+	-	+	-	+	-	+	-
<i>Administrative</i>								
Rules established by state bodies	++	++	++	++	+++	+++	+++	+++
<i>Social</i>								
Development of the labor market	+	-	++	-	+++	-	+++	-
Communication	+	+	+	+	++	++	++	++
Education	-	-	-	+	+	+++	+	+++

Notes: "-" – no barrier; "+" – readily surmounted barrier; "++" – surmounted barrier; "+++” – formidable barrier. The foresight session result analysis did not reveal any insurmountable barriers typical for a group of farms as a whole.

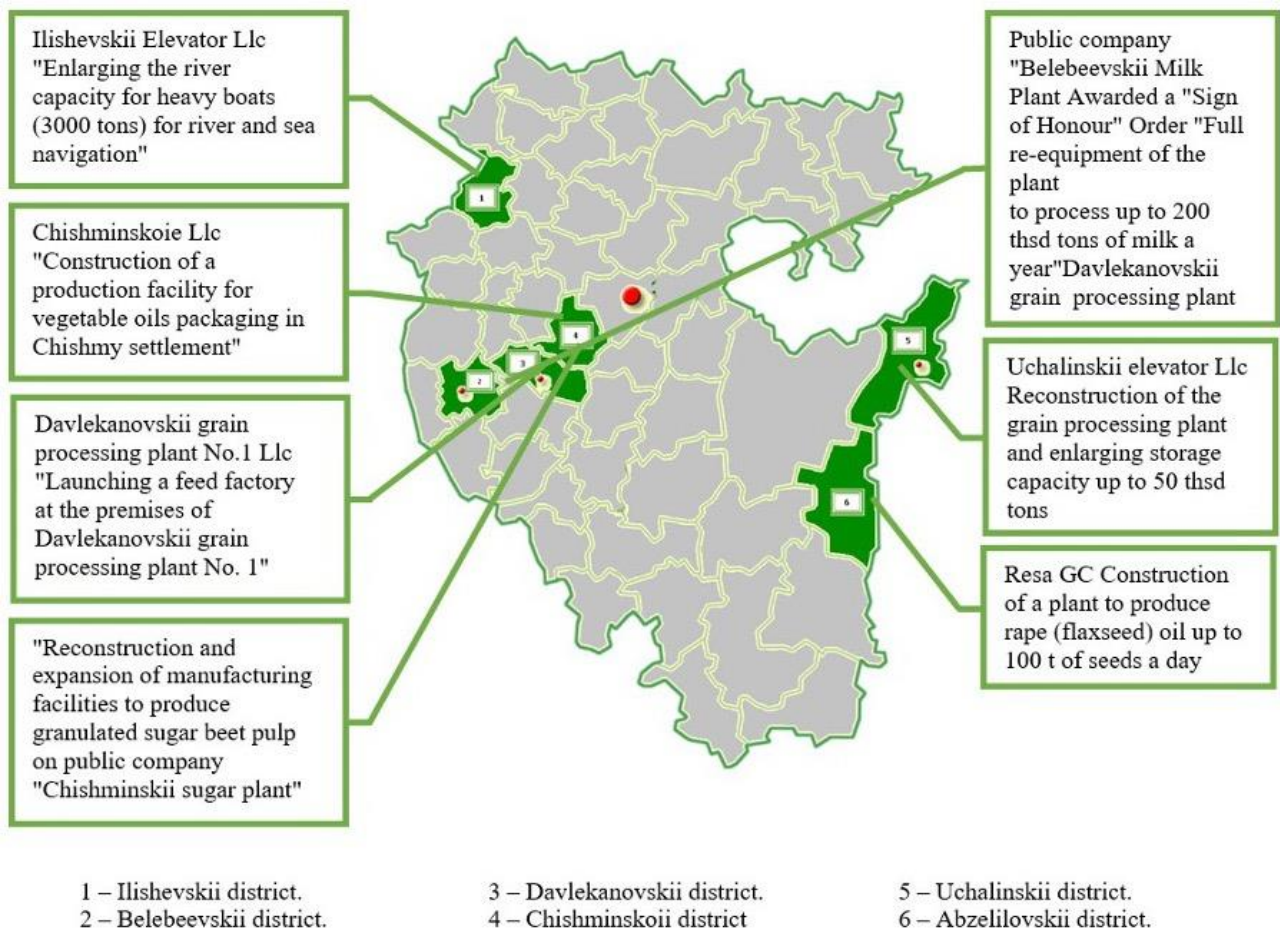
Source: Compiled by the authors.

Table 3 offers the authors' assessment based on the results of foresight sessions with state and municipal government bodies, agro-industrial entities, business and scientific community on working out the strategy for socio-economic development of the Republic of Bashkortostan until 2030 and similar

strategies of 23 municipal districts of the Republic (December 2019). With the active participation of many stakeholders, the foresight laid the basis for the region's advancement, providing better coordination of specific plans for rural territories and agricultural enterprises, setting priorities for long-term development focusing on competitiveness and increased exports. The participants elaborated on a shared vision of strategic tasks facing the republic's agro-industrial sector. Moreover, they discussed and agreed upon their roles in solving them.

The assessment of threats in the agricultural market is presented as classifications, where barriers are divided into five basic groups: legal, administrative, organizational, economic, and social. Groups of factors were formed based on the nature of threats, taking into account the procedure for analyzing the state of competition in the commodity market (order of the Federal Antimonopoly Service of Russia No. 220 of April 28, 2010). Barrier types were identified in the same way. Barriers are considered in terms of the influence of the external and internal environment to assess their level of significance.

The data in Table 3 indicate significant differences in the levels of success in overcoming barriers for different classification groups. Hard-to-overcome external barriers are inherent mainly for large and medium-sized enterprises as well as independent small-scale enterprises. These are mainly economic and administrative barriers. Therefore, when developing regional export development programs, state authorities should recognize this fact and provide agricultural enterprises with the necessary information and financial assistance in choosing foreign markets. In general, each farm classification group has its own set of difficulties to overcome barriers. The complete or partial elimination of these impediments will enhance the increasing use of the export potential by this particular enterprise group.



**Figure 2.** Major Export-Oriented Investment Projects.

Source: Compiled by the authors.

Greater focus by the state on the discussed barriers brings a significant cost reduction for trade, information management, and implementation of marketing tools. It provides reduced transaction costs in the form of lost earnings, lower registration costs; minimizes the expenditure of time and resources due to lack of resources; eliminates the risk of incorrect management decisions, and cuts organizational costs. Major investments in the region's economy have been due to both attractive conditions created by the regional authorities for implementing investment projects and a number of favorable trends in foreign economic factors. Border districts play a significant role in the region's trade activities, and therefore the republic's foreign policy should be aimed at enhancing interregional cooperation (Figure 2).

Border districts significantly dominate in matters related to the development of trade relations. They are peculiar because they are remotely located, far from the central markets of the republic, and, in turn, close to the markets of neighboring regions, which gives them additional opportunities for the successful development of trade. This fact is clearly shown in Figure 2, where the largest export-oriented investment projects of the Bashkortostan Republic are implemented in border districts (Abzelilovskii, Uchalinskii, and Ilishvskii districts), as well as in districts near major logistics centers (Chishminskii, Davlekanovskii, and Belebeievskii districts).

High production rates of certain agricultural products and export-oriented investment projects make it possible to increase exports. The authors of the given paper forecasted exports of agricultural products as part of the research work on “Assessing market expansion potential for agricultural products produced in the Republic of Bashkortostan” within the priority research work of the Bashkortostan Republic's Science Academy on “Optimization of land use and agricultural production” for 2019. By late 2024, agricultural exports are expected to reach \$ 108.3 billion. The republic's government and, in particular, the Agriculture Ministry of Bashkortostan is going to achieve this value within their competences by creating products with high added value, eliminating tariff and non-tariff barriers to ensure access of agricultural products to target markets, creating an export-oriented commodity distribution infrastructure, and a system for positioning and promoting agri-food products (Table 4).

**Table 4.** Exports of Agricultural Products, Billions of Us Dollars.

Indicator name	Years							
	2017	2018	2019	2020	2021	2022	2023	2024
Exports of agricultural products	37.0	57.9	73.7	78.8	84.5	91.3	99.5	108.3
Exports of finished food products	7.8	9.5	10.5	12.8	13.0	13.6	14.4	15.5
Exports of cereals	11.4	25.0	26.0	27.0	29.0	30.0	32.0	35.0
Exports of fat and oil industry products	5.7	14.4	27.4	28.0	30.0	34.0	38.0	40.0
Exports of meat and milk	1.2	0.7	0.8	1.0	1.2	1.4	1.6	2.2
Fish and seafood exports	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Exports of other agricultural products	10.6	8.0	8.7	9.7	11.0	12.0	13.2	15.3

Source: Report on “Assessing market expansion potential for agricultural products produced in the Republic of Bashkortostan” within the priority research work of the Bashkortostan Republic's Science Academy on “Optimization of land use and agricultural production” for 2019.

The export of farm products could reach \$ 108.3 billion if the republic's agricultural sector realizes its full capacity. There is a proposal to raise the export of finished food products by 47.6%, cereals by 34.6%, fat and oil products by 46.0%, meat and milk by more than 2.5 times by 2024.

There are certain risks associated with expanding the export of the republic's agroindustrial products. The implementation of the export development project is long-term and requires reasonable protectionism measures from the state. This policy should provide the necessary infrastructure and institutional support to promote domestic products to foreign markets (Kabir et al., 2020).

As part of the above-mentioned foresight session, the authors of the given paper conducted a survey among representatives of municipal authorities and agro-industrial enterprises on risks in implementing foreign economic activities. The survey involved selecting risk types and their assignment to a priority group (1 or 2) and identifying the probability of their occurrence (up to 0.5). A step-by-step assessment of

the resulting data revealed the most significant risks in formulating the export policy of agricultural products in the Bashkortostan Republic (Table 5).

**Table 5.** Risk Assessment.

<i>Risk type</i>	<i>Probability</i>	<i>Priority</i>	<i>Weight</i>	<i>Points</i>	<i>Values, %</i>	<i>Ranking</i>
Risk of failure to achieve bilateral cooperation agreements on exports of agricultural products	0.3	1	0.15	0.05	17.9	2
Spread of especially dangerous diseases and unfavorable epizootic situation	0.2	1	0.15	0.03	10.7	3
Tariff restrictions imposed by foreign countries and strengthened sanitary and technological requirements for agricultural products	0.5	1	0.15	0.08	28.6	1
Risk of reduced state support for exporting enterprises due to other more important priorities	0.3	1	0.15	0.05	17.9	2
Information risks that lead to losses as a result of unreliable data.	0.1	2	0.08	0.01	3.6	6
Implementation risks arising under the influence of competition and changes in the supply-demand balance	0.3	2	0.08	0.02	7.1	5
Innovation risks arising from introduced technologies	0.1	2	0.08	0.01	3.6	6
Risks of interrupted supply of imported machinery and equipment, breeding material, vaccines, and fertilizers	0.2	1	0.15	0.03	10.6	4
Total				0.28		

Source: Compiled by the authors.

Let us determine the weights of the risk groups under consideration:

$$W_2 = \frac{2}{K * (f + 1)} = \frac{2}{2 * \left( \frac{0.3 + 0.2 + 0.5 + 0.3 + 0.2}{0.1 + 0.3 + 0.1} + 1 \right)} = 0,25 \quad (5)$$

$$W_1 = 1 - W_2 = 1 - 0.25 = 0,75$$

where: f is the ratio of the weight of the first priority to the second one;  
K is a priority number.

Risk weights in the first group:  $0.75 / 5 = 0.15$ , in the second group:  $0.25 / 3 = 0.08$ . Based on the above data, it can be concluded that the level of risks in the first priority group is 75% and is considered to be critical.

The next section of the survey at the foresight session included questions about preventing or neutralizing identified risks. Participants were given a choice of ways to respond to risks and prevent them. The analyzed results of the most significant risk types are presented in Table 6.

**Table 6.** Risks in Developing a Policy for Export of Agricultural Products.

<i>Risk</i>	<i>Response in case of risk occurrence</i>	<i>Risk prevention</i>
Risk of failure to achieve bilateral cooperation agreements on exports of agricultural products	search for alternative markets	timely response to changes in the legislation of importing countries, changes in the possible volume of exports to these countries, taking these changes into account when choosing priority areas
Tariff restrictions imposed by foreign countries and strengthened sanitary and technological require-	planning the selection of priority areas, adjusting the planned supply by country	timely consideration of the needs of importing countries for domestic agricultural products, changes in possible exports to

ments for agricultural products		these countries, and consideration of these changes when choosing priorities
The spread of especially dangerous diseases and the unfavorable epizootic situation lead to the failure to achieve export targets, reduced domestic production, and closed foreign markets for agricultural products produced in the Bashkortostan Republic	revision of the export program for agricultural products that do not fall under epizootic bans; stricter quality control of products at all stages of production; insurance against risks of dangerous diseases, soil contamination, etc.	conducting periodic work to create a favorable phytosanitary and epizootic situation in the Republic of Bashkortostan
Risk of reduced state support for exporting enterprises due to other more important priorities	a developed public-private partnership system is conducive to attracting resources. Creating export support tools through a preferential lending scheme	constant cooperation of government agencies with business structures
Sanctions and restrictions lead to the risk of interrupted supply of imported machinery and equipment, breeding material, vaccines, and fertilizers	search for alternative supply routes of the specified equipment and materials to the territory of the Russian Federation through countries that are not subject to sanctions banning deliveries	financing programs to develop and allocate productions of domestic machinery and equipment in the region

Source: Compiled by the authors.

The estimated probability of their occurrence determines the choice of a strategy for responding to risks. Risk analysis and management will help agricultural enterprises timely estimate the situation and avoid negative consequences. However, formulating an export policy for agricultural products requires addressing risk challenges by joint efforts of agricultural producers and state authorities (the Ministry of Agriculture). Table 6 indicates that the risk of failure to achieve bilateral cooperation agreements on exports of agricultural products (17.9%) and the risk of not reaching export targets (10.7%) are directly prevented by agricultural entities themselves. The rest requires a response from the state. Consequently, state authorities play a substantial role in export policy development.

### 3. DISCUSSION

Few Russian scientific research works analyze the economic efficiency of regional international economic relations. In this regard, the position of the current Russian economy in the system of world economic relations requires a substantially international economic model that ensures its rational interaction with the economic systems of other countries to solve its strategic tasks. Simultaneously, the Russian economy is facing the problem of developing a complex of international economic relations considering the regional dimension, where regional foreign economic relations are an attribute of the regional economy. The emergence of Russian regions as international economic players is essential as the weakening of economic ties with the "center," enhancing the autonomy and territorial "gaps" between the Russian Federation's subjects promote international relations and their further development (Puertas et al., 2020; Vysotskaya et al., 2020).

The authors of the given paper find the methodological approach developed by researchers Stovba E. and Stovba A. (2019) of scientific interest. They propose introducing foresight technology into the strategic management of sustainable rural development to serve as a target guide for regional policy and rural municipalities' functioning. The scholars suggest applying cluster analysis and scenario forecasting to form the main trends in the sustainable long-term economic development of rural areas. However, their research does not consider the sales of agricultural products within and outside the region (Stovba et al., 2017; Stovba et al., 2019). The issues of production and marketing activities of agricultural enterprises, in general, are not sufficiently developed and require further studies.

In scientific literature, risk assessment is an essential condition for the effective management of enterprises, particularly when working in foreign markets. Few works study some provisions on multi-criteria risk management tools based on the socio-economic conditions of exporting countries. The production potential of agricultural producers is not considered (Gusakova et al., 2019; Osipov et al., 2020). The given research presents a step-by-step risk analysis based on a quantitative and qualitative assessment

of risk indicators. It includes recommendations for identifying the main types of risks in export policy, determining the probability of a risk event, and responding or preventing them. Only comprehensive risk management can help choose the most appropriate tactics and strategies for dealing with individual risks and their totality.

Having studied markets for agricultural products, Bogoviz (2020) comes up with the idea of further improving the economic mechanism in agricultural production, including measures to recover the financial health of enterprises, strengthen the economy of low-profit and unprofitable farms, and rationalize pricing for agricultural products sold only by state order. However, these studies do not consider the existing barriers in the agricultural market and do not help assess the degree of their overcoming. Most scientific works on this problem focus on regulating agricultural production relations only based on extensive or intensive production (E. Stovba and A. Stovba, 2019; Wegren, 2020). The scenario method that implies different ways to realize internal potential under external economic conditions is not studied well (Table 1).

The scenario forecast and analytical calculations conducted by the authors of this paper have revealed the following features in the development of agricultural export activities. Firstly, the achievement of goals and tasks to intensify agricultural production in the long term will be provided by the existing potential of farming entities, better territorial distribution of agricultural raw materials, forecasting the production and consumption structure by balancing supply and demand. Secondly, timely state regulation will help domestic producers enter new internal and external markets concerning the developed mechanisms for overcoming the agri-food market's barriers.

## CONCLUSIONS

The main methodology for strategic forecasting of increased agricultural output to enhance multivariate foreign economic activity is unidirectional, determined by the need to produce a certain amount of farm products to expand sales channels. Modeling the expansion of markets for agricultural products of the Republic of Bashkortostan in methodological terms led to the identification of the main interests of agricultural entities in the region, forecasts of higher production volumes, and their analysis to increase exports of agricultural products.

Statistical modeling of the extensive-intensive agriculture development scenario revealed the potential output of main farm products for agricultural enterprises of the Republic of Bashkortostan. Compared to 2020, the forecast increase in 2030 will amount to 47.4 % for grain crops, 13.9% for sugar beet, 20.8% for oil crops, and 16.5% for milk yield. This will distinguish basic sub-regions with key products and enable public authorities to rationally allocate funding when developing regional projects to increase agricultural production and expand sales markets.

As calculations showed, under the most favorable economic conditions, the agricultural sector of the Republic of Bashkortostan can achieve indicators of the regional project "the Export of agricultural products in the Republic of Bashkortostan," as well as reach exports of agricultural products of \$ 108.3 billion, that is, increase by 68.1% by 2024 if it realizes its full capacity. By 2024 it is proposed to raise exports of finished food products by 47.6%, cereals by 34.6%, fat and oil products by 46.0%, meat and milk by more than 2.5 times.

To select strategic export products in the region, barriers to entering the market were classified and divided into five basic groups: legal, administrative, organizational, economic, and social. Each farm classification group has its own set of the most difficult to overcome barriers. The complete or partial elimination of these impediments will enhance the increasing use of the export potential. The developed mechanism for breaking external and internal market barriers by agri-food market players allows identifying the main problems and making the necessary management decisions.

A step-by-step assessment revealed risks in formulating the export policy for agricultural products of the Bashkortostan Republic. The significant risks identified in the course of the study mainly require a response from the state in case of their occurrence. Therefore, formulating an export policy for agricultural products requires addressing risk challenges by joint efforts of agricultural producers and state au-

thorities (the Ministry of Agriculture).

Further research on this issue aims to develop agricultural entities in two sub-regions of the republic (north-western and western). The implementation of the Russian Foundation Basic Research project No. 19-410-020016 "Strategic planning of socio-economic development of rural territories of the Republic of Bashkortostan based on foresight methodology," found out that rural territories have sufficient potential to increase agricultural production and expand sales markets: the North-West by 29.8% in milk production, the Western by 77.3% in sugar beet and by 50.5% in sunflower.

It should be noted that the study has several limitations:

Firstly, the final forecast values of agricultural production in the republic are presented for the long-term period while their projected export volume is given for the medium-term period. Such a situation could create some distortion in the studied dependencies. However, this problem was solved by bringing intermediate forecast values of agricultural production broken down into short-term periods. It will make it possible to consider and adjust the planned indicators depending on changing economic conditions.

Secondly, despite the foresight session involved a large number of stakeholders, some of the indicators considered when assessing the probability of risks, such as the choice of risk types and assigning them to a priority group, are subjective and may not sufficiently reflect the real situation.

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