

Effective management of the sale of agricultural products as the basis for food security in the region

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Abstract. This study formulated the concept of food security in the region and analyzed the food independence of the Vologda Oblast and the economic availability of food. It is believed that in order to solve the problems associated with the provision of food to the population of the region, it is necessary to effectively manage the sale of agricultural products. The role of a commodity brand, or rather its participants-producers of agricultural products, in ensuring the food security of the region is modeled. Calculation of coefficient estimates of indicators of food security factors, their integration in the form of four main indicators of the role of the brand, and an aggregated comprehensive assessment of the role of the brand. Along with this, a methodology was tested for assessing the role of product brand participants, agricultural producers, in ensuring food security and the quality of life of the population of the region based on the results of a consumer survey. The practical significance of the study follows from the importance of solving financial and economic issues of agricultural development to ensure the food independence of the region.

1 Introduction

Food security is one of the most important elements of a country's national security. Its provision implies control of the entire chain of formation and movement of food products in the country - agricultural production, food production, wholesale trade, retail trade, consumption, as well as the creation of conditions for the availability of food products for citizens [1]. In the considered "chain" in the first place is the link "agriculture". It is the agricultural production of food products, in our opinion, that is able to solve the problems of providing the population with food to a greater extent.

Whole milk, fresh vegetables and meat, dietary eggs as sources of complete protein, vitamins, mineral salts and other biologically active substances are indispensable in a balanced diet [2]. Thus, the development of agriculture is an integral part of solving the food problem in the world [3]. Achievements in agriculture can increase the level of self-sufficiency of the country and individual regions with the necessary food resources.

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It is the considerations of ensuring social stability and security that force all developed countries to regulate the situation in the food market, supporting the solvent demand of food buyers and supporting their agricultural producers [4]. Solving the problem of stable and safe food supply for the population is important not only at the global level - the world community, but also at the national and regional levels [5].

In addition to the availability of food, it is necessary to consider the aspects of its physical and economic accessibility for the population, as well as the criterion of food safety [6]. If the food security of the country is based on the concept of self-sufficiency with basic types of food, then the food security of the subjects of the state is determined by the degree of satisfaction of the population's needs for basic foodstuffs, taking into account their own production, in accordance with rational consumption standards [7]. In the Vologda Oblast, over the past 18 years, this task has been successfully solved by the Voluntary Certification System "Real Vologda Product". Raw materials and products that have passed this certification receive the right to be labeled with the trademark of the same name. At the same time, the "Real Vologda Product" has the status of one of the recognized regional product brands, being the hallmark of the region [5].

So, the food security of the region is such a state of the regional economy, in which the volume of economically efficient production of high-quality food in the region and its rational distribution ensure the physical and economic availability of consumption for the population and guarantee the quality and safety of food.

2 Materials and methods

The purpose of this study is to assess the food independence of the Vologda region and the economic availability of food. The relevance of the study is indicated by the strategic task of achieving food security in the regions and the Russian Federation as a whole, as one of the components of the quality of life of the population and has a priority direction of state policy. The implementation of the research goal is based on solving the following tasks:

- To analyze and evaluate the food availability and independence of the Vologda region.
- Present as a model the product brand of the Vologda region as a unity of food security indicators that appear in the Food Security Doctrine, approved by Decree of the President of the Russian Federation dated January 21, 2020 No. 20.
- Calculate a comprehensive indicator for assessing the role of the "Real Vologda Product" brand in ensuring food security of the region's population.
- To develop recommendations to increase the influence of the brand "Real Vologda Product" on the food security of the region under study.

In the course of the study, methods of scientific knowledge were used in combination, such as analysis, synthesis, induction, deduction, methods of statistical analysis, and a survey of consumer preferences.

The results of this study are of practical importance for government bodies in the management of agro-industrial production and the priority of supporting agricultural producers in order to ensure the food security of the region.

3 Results and Discussion

As part of the study, the food independence of the Vologda Oblast and the economic availability of food were analyzed and evaluated.

The food security of the Russian Federation reflects the state of its economy, which ensures one or another level of food independence [8].

Appeal to the problems and prospects of sustainable development of the agro-industrial complex is due to the fact that it is the leading backbone sector of the country's economy, ensuring its food and economic security [9].

The level of self-sufficiency in relation to milk (Table 1) shows the high food independence of the Vologda Oblast for this product, which is adequate. The level of self-sufficiency is more than 2 times higher than the norm, since this food product is exported outside the region, while milk consumption is growing within the region.

Table 1. The level of milk self-sufficiency in the Vologda Oblast in 2019-2021.

Year	Production, thousand tons per year	Consumption, thousand tons per year	Level of self-sufficiency, %	Security rate, %	Deviation of the level of self-sufficiency from its norm, p.p. (+, -)
2019	560.6	274.5	204.2	90	114.2
2020	587	283.6	207.0		117.0
2021	587	305.4	192.2		102.2

A similar situation is observed in the self-sufficiency of the region in relation to grain, but a significant difference is noticeable in the multiple excess of the level of self-sufficiency over the norm.

The region also copes well with the supply of potatoes. There is a certain trend towards a decrease in production volumes and an increase in consumption. It can be assumed that the population of the Vologda Oblast reduced the cost of food by increasing the consumption of less expensive products during the COVID-19 pandemic.

The level of self-sufficiency in vegetables and gourds indicates that consumption is 2 times higher than production and in the same ratio is less than the provision rate. During the entire period of the study, these ratios remain approximately at the same level.

Fruit consumption is 10 times higher than its production, which corresponds to the fact that the region is a natural zone of risky farming. The population replenishes the required volume of consumption with imported fruits in order to satisfy their dietary preferences.

The lowest level of self-sufficiency of the Vologda Oblast among the assessed food products, or rather, its absence, turned out to be in relation to vegetable oil, which is quite consistent with the agricultural specialization of crop production in the region.

The situation of self-sufficiency in meat products is also negative - only a third of the region independently covers the consumption of meat products, which is 2.5 times lower than the provision rate (Table 2).

Table 2. The level of self-sufficiency in meat products in the Vologda Oblast in 2019-2021.

Year	Production, thousand tons per year	Consumption, thousand tons per year	Level of self-sufficiency, %	Security rate, %	Deviation of the level of self-sufficiency from its norm, p.p. (+, -)
2019	30.1	89.9	33.5	85	-51.5
2020	33.6	92.5	36.3		-48.7
2021	31.8	87.1	36.5		-48.5

As part of the assessment and analysis of the economic affordability of food in the Vologda Oblast, the actual volume of consumption of the studied products was compared with their rational norms (table 3) in accordance with the Order of the Ministry of Health of the Russian Federation dated August 19, 2016 No. meeting the modern requirements of a healthy diet.

Table 3. Economic accessibility of food in the Vologda Oblast in 2019-2021.

Indicators	2019	2020	2021	Growth rate for the period, %
Milk				
consumption per capita, kg per year	236	245	249	-
rational consumption rate, kg per year	325			-
economic affordability, %	72.6	75.4	76.6	105.5
Potato				
consumption per capita, kg per year	91	94	102	-
rational consumption rate, kg per year	90			-
economic affordability, %	101.1	104.4	113.3	112.1
Meat products				
consumption per capita, kg per year	77	80	80	-
rational consumption rate, kg per year	73			-
economic affordability, %	105.5	109.6	109.6	103.9
Vegetables				
consumption per capita, kg per year	102	107	104	-
rational consumption rate, kg per year	140			-
economic affordability, %	72.9	76.4	74.3	102.0
Fruits				
consumption per capita, kg per year	77	79	80	-
rational consumption rate, kg per year	100			-
economic affordability, %	77	79	80	103.9
Vegetable oil				
consumption per capita, kg per year	12.8	13.2	12.9	-
rational consumption rate, kg per year	12			-
economic affordability, %	106.7	110.0	107.5	100.8
Bread products				
consumption per capita, kg per year	106	108	106	-
rational consumption rate, kg per year	96			-
economic affordability, %	110.4	112.5	110.4	100.0

Among the studied food products, bread products have the highest level of economic accessibility. More than 10 percent of per capita consumption is above the rational consumption rate, which is typical for cheaper food products.

Potatoes, vegetable oil and meat products also have a high level of economic affordability (more than 100 percent).

With the current high level of self-sufficiency in relation to milk, economic affordability does not reach 80 percent, while the indicator is growing over the study period.

The objectives of the study included the task of assessing the role of the Vologda Oblast brand "Real Vologda Product" in ensuring food security in the region. It is not possible to formulate the role of a product brand, or rather its producer participants, with a specific textual formulation. However, in our understanding, this category can be represented as a model, since the role of the brand as a kind of integrated value is the unity of such

indicators of food security that appear in the Doctrine as “self-sufficiency”, “economic accessibility”, “physical accessibility” and “actual security” food (Figure 1).

The indicator of food self-sufficiency is an assessment of the presence in the diet of the population of the region of products produced in the region by local enterprises from agricultural products and raw materials, including those grown in the region [10]. This is one of the conditions for the participation of Vologda manufacturers in the System of voluntary certification "Real Vologda Product" and gives the right to label their products with the appropriate trademark.

The indicator of the economic affordability of food products is an assessment of the possibility of acquiring food products with the trademark "Real Vologda Product" of proper quality at prevailing prices, in volumes and assortment that meet consumer expectations.

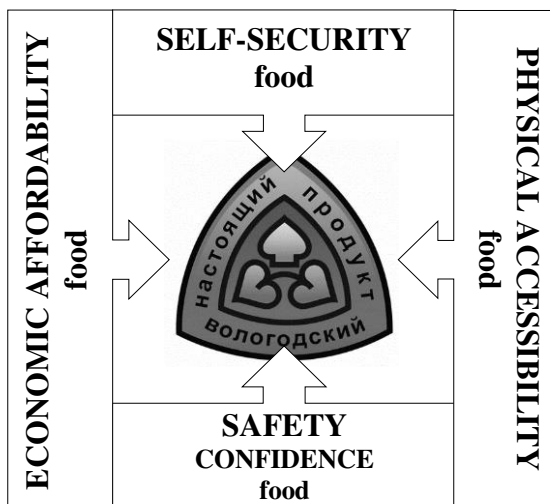


Fig. 1. Model representation of the role of the product brand "Real Vologda Product" in ensuring food security in the region.

The indicator of the physical availability of food products is an assessment of the level of development of the commodity distribution infrastructure, at which in all districts of the Vologda Oblast it is possible for residents to purchase food products produced by members of the "Real Vologda Product" brand. Under the commodity distribution infrastructure is understood not only the presence of outlets selling food products with this trademark, but also the presence in them of a sufficient range of such products from manufacturers from different product groups.

The Food Safety Confidence Indicator is an assessment of consumer satisfaction with the quality of purchased food products labeled with the “Real Vologda Product” trademark.

To calculate a comprehensive indicator for evaluating the role of the "Real Vologda Product" brand in ensuring the food security of the population of the region, based on the indicators considered, a questionnaire was developed and a sociological survey of the population of the Vologda Oblast was conducted in retail outlets. The target audience during the survey were buyers over the age of 14 who came to the grocery store Coverage of the survey - all districts and major cities of the Vologda Oblast (the cities of Vologda and Cherepovets) The number of respondents planned for the survey in each district was approximately proportional to the population density of this district.

To solve the problem of increasing the actual sample received, the questionnaire survey was continued in an online format using the Google service and a questionnaire form. As a

result, in the period from November 1 to November 15, 2022, a total of 904 residents of the Vologda Oblast were interviewed.

The questions included in the research program were designed in such a way as to collect information in the form of the opinion of the consumer of products from manufacturers participating in the "Real Vologda Product" brand, which makes it possible to assess the value of each of the four indicators in the model considered above and to perform an integrated assessment of the role of the product brand in providing food security in the region.

In accordance with the model representation of the role of a product brand in ensuring food security in the region, the calculation of coefficient estimates of indicators of food security factors, their integration in the form of four main indicators, as well as an aggregate assessment of these indicators (Figure 2) was carried out.

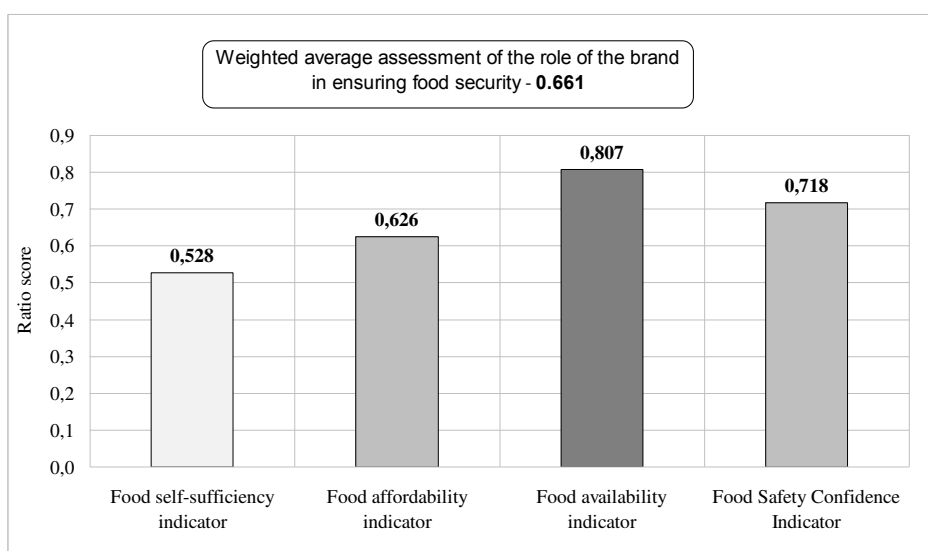


Fig. 2. Assessment of the role of the product brand "Real Vologda Product" in ensuring food security of the population of the Vologda Oblast.

The results obtained allow us to conclude that the role of the "Real Vologda Product" brand in ensuring food security of the population of the Vologda Oblast is significant.

4 Conclusion

Analyzing the values of the four main indicators of food security due to the functioning of the voluntary certification system in the region, a number of important factors can be noted.

The indicator of the physical availability of food products with the brand trademark has the highest value, which indicates a sufficient level of development of the commodity distribution function and a well-functioning marketing policy of food manufacturers that are members of the regional brand. The population of the region is sufficiently provided with the opportunity to purchase branded products within walking distance.

Indicators of confidence in food safety and their economic availability have a noticeable impact on food security. Indeed, as shown by the results of previous studies [5], the consumer trusts and is confident in the quality and safety of products offered by manufacturers participating in the brand.

The indicator of affordability could also have a higher score, but there are many competitive products from non-regional suppliers in urban retail chains. POS owners tend to purchase goods at lower purchase prices and from different suppliers, therefore, in such a competitive environment, local manufacturers participating in the brand can quite understandably lose, while pursuing their goal of selling products as profitably as possible. Therefore, the value of the indicator of economic affordability of food products with a brand name can be considered quite positive and high.

The value of the food self-sufficiency indicator reflects the moderate influence of the Real Vologda Product brand on the food security of the region's population. This fact suggests that in the diet of local residents, only a part of the products is represented by products produced in the region by regional enterprises from agricultural products and raw materials, including those grown on their territory, which have passed the Voluntary Quality Certification System. To increase the value of this indicator, it is necessary to involve local producers, especially those located far from the regional center, to participate in the certification of products in the "Real Vologda Product" system. It is important that brand products go not only outside the region, but also deepen into the region, expanding the coverage of rural areas and not only through the supply of goods from already well-known manufacturers participating in the brand, but also through the involvement of new participants in the voluntary certification system.

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