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## STRATEGIC FORECASTS OF PRODUCTION AND CONSUMPTION OF PRODUCTS PER CAPITA

Research article

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### Abstract

The problem of the balance of supply and demand at the level of rational consumption standards for each citizen of the country is investigated. To assess its solution, indices of the formation of physical and economic availability of products are offered. They characterize the ratio of the level of domestic production (domestic consumption) per capita with rational norms. The information support was provided by a joint report by OECD and FAO specialists on the trends and prospects of the main agricultural commodity markets evaluated by the AGLINK-COSIMO model system. The results of the study show that there are not enough trends to ensure the desired level of physical and economic accessibility for a number of significant products (especially fruits, vegetables, milk). In some cases (grain, potatoes, meat, eggs) there is no mutual binding of the rate of their formation. Conceptual provisions are proposed based on the convergence of physical and economic availability of products. These provisions are integrated into the agri-food market forecasting system.

**Keywords:** strategic forecasts, food security, physical accessibility, economic accessibility, rational norms.

## СТРАТЕГИЧЕСКИЕ ПРОГНОЗЫ ПРОИЗВОДСТВА И ПОТРЕБЛЕНИЯ ПРОДУКЦИИ НА ДУШУ НАСЕЛЕНИЯ

Научная статья

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### Аннотация

Исследуется задача равновесия спроса и предложения на уровне рациональных норм потребления для каждого гражданина страны. Для оценки ее решения предлагаются индексы сформированности физической и экономической доступности продукции. Они характеризуют соотношения уровня отечественного производства (внутреннего потребления) на душу населения с рациональными нормами. Информационным обеспечением выступил совместный отчет специалистов ОЭСР и ФАО о тенденциях и перспективах основных сельскохозяйственных товарных рынков, оцененных системой моделей AGLINK-COSIMO. Результаты исследования показывают, что недостаточно сложившихся тенденций для обеспечения желаемого уровня сформированности физической и экономической доступности по ряду значимой продукции (особенно фрукты, овощи, молоко). В некоторых случаях (зерно, картофель, мясо, яйца) отсутствует взаимоувязка темпов их формирования. Предлагаются концептуальные положения, основанные на конвергенции физической и экономической доступности продукции. Эти положения встраиваются в систему прогнозирования агропродовольственного рынка.

**Ключевые слова:** стратегические прогнозы, продовольственная безопасность, физическая доступность, экономическая доступности, рациональные нормы.

### Introduction

Today, Russia's strategic priorities in the field of food security are focused on the formation of physical and economic accessibility of products for each citizen of the country not lower than the level of rational consumption standards. The new version of the Food Security Doctrine of 2020 [7] formats target settings for solving the problems of self-sufficiency in demand. Healthy eating standards come to the fore. In this context, the task for strategic planning comes down to the need to balance supply and demand at a fundamentally new level [1, P. 18]. Therefore, in order to assess the current and prospective trends, it is methodologically correct to analyze the level of production and the level of consumption of products per capita in comparison with rational norms. This will allow us to characterize the current situation and determine the dynamics of the formation of physical and economic availability of products on the way to achieving the desired results.

### Research methods and principles

Currently, the methodology of the Economist Research Center (New York, USA) is the most popular in Western countries to assess the level of physical and economic accessibility. It is based on the corresponding indices. Their meaning is, on the one hand, to identify the ability of consumers to buy food, on the other hand, to measure agricultural production and food supply opportunities [10]. In total, the measurement results give an overall picture in the context of a particular state on the current state and dynamics of physical and economic accessibility [11, P. 276]. Meanwhile, there is a need for research on specific types of products that make up a healthy diet for each citizen of the country and its compliance with rational consumption standards. The purpose of the study is to prepare forecasts of the formation of the level of physical and economic availability of the main types of products.

In the work, the authors were based on the provision that in the conditions of unprecedented sanctions it is advisable to strive for the formation of physical accessibility of products primarily on the basis of domestic production [5, P. 19], [6, P. 4]. Thus, the index of the formation of physical accessibility (economic accessibility) is defined as the ratio of the level of domestic production (level of consumption) of products per capita with rational norms:

$$IFPA = P/RCR \quad (1)$$

$$IFEA = C/RCR \quad (2)$$

where IFPA(EA) – is the index of the formation of physical accessibility (economic availability); P – the level of domestic production of products per capita; C – the level of consumption of products per capita; RCR – rational consumption rates.

To interpret the results, one should be guided by the fact that if the index value is equal or exceeded 100%, the level of formation of physical (economic) availability of products will be considered achieved.

A joint report of OECD and FAO specialists on the trends and prospects of the main agricultural commodity markets evaluated by the AGLINK-COSIMO model system was used as input data [9]. The report contains the basic and forecast values of the total production and consumption of the most important types of agricultural products. The main products available in the report (wheat, corn, beef, poultry, pork, milk, dairy products) for the period 2010-2031 were selected for Russia [12]. The data on products are combined into the usual groups: grain (wheat, corn), meat (beef, pork, poultry), milk (milk and dairy products).

### Main results

The results of the study indicate that currently neither production nor consumption for many types of products has reached the level of rational standards and have weak dynamics in this direction (Table 1).

Table 1 - Dynamics of indices of formation of physical and economic availability of products

Formation index	Products	2011	2014	2017	2018	2019	2020	2021	Trend
Physical Accessibility Economic Accessibility	Potato, %	212	184	164	170	167	149	139	
		104	102	100	99	99	62	58	
	Fruits and berries, %	19	23	22	27	28	25	27	
		58	62	59	61	62	77	72	
	Vegetables, %	71	70	75	76	77	68	66	
		79	81	83	85	86	74	72	
	Meat and meat products, %	70	84	96	99	101	98	99	
		95	102	103	104	104	126	128	
	Milk and milk products, %	66	63	64	65	66	67	68	
		81	81	78	77	79	84	81	
	Eggs, %	108	109	118	118	118	118	118	
		102	104	109	109	110	92	90	

Note: compiled by the authors on the basis of [1], [2], [3]

Problems with achieving rational standards persist in the production of fruits, vegetables and milk. When consuming, the problem of achieving rational standards is absent only for meat. For other types of products, there have been no significant shifts towards healthy eating standards. For potatoes, vegetables and eggs, the vector is aimed at reducing the level of consumption, which is primarily due to a drop in the purchasing power of the population's incomes.

The general trend is developing in such a way that during the study period for many types of products in the next decade, food needs will not be met at the level of rational food standards only due to domestic production, the dynamics of development of which lags behind the dynamics of product consumption, which is clearly not enough to solve the raised food problems (Figure 1).

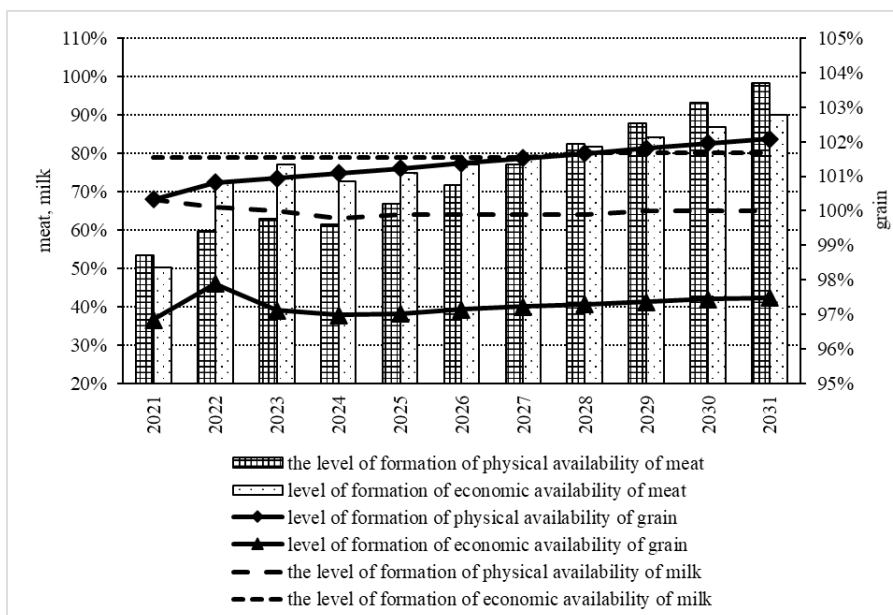


Figure 1 - Trends in the formation of physical and economic availability of grain, meat and milk

A positive trend is observed in grain, where the curves of the levels of formation of physical and economic availability of products move up. Physical affordability is formed at a faster pace than economic affordability (an average of 2,1% versus 0,05% per year). While maintaining these proportions, a significant share of grain production will go to solving global food security problems to the detriment of achieving national strategic priorities.

One of the most pleasant achievements in the field of food security is the balance of domestic demand and domestic supply in the meat market at the point of rational consumption standards. Today, our country has managed to reach the desired level of production and consumption of these products. The full formation of the physical and economic availability of meat should continue in the forecast period. The rate of formation of levels of physical and economic accessibility will average 1,9% and 0,7%, respectively. It should be taken into account in this trend that the coverage of rational norms has occurred more at the expense of poultry and pork meat and less at the expense of beef. With a consumption rate of 20 kg per person/year in 2021, physical and economic accessibility was formed at the level of 11 kg and 13 kg, respectively. Unfortunately, no positive changes in these proportions are expected in the prospective period.

A difficult situation persists for milk, where both curves in the studied and prospective periods do not move towards unity, i.e. the level of absolute formation of physical and economic availability of products.

According to Figure 1, it can be seen that for the entire period of time considered, the supply from domestic producers will not be able to satisfy the entire volume of demand, and even more so to cover the norms of healthy eating. If the level of physical availability is formed at an average rate of 0,02%, then the level of economic availability, on the contrary, will be disbanded at a similar absolute rate. The projected production of this type of product is estimated in 2031 at about 211 kg per person/year against 220 kg in 2021, which will cover about 82% of demand and 65% of rational consumption standards.

For sugar, vegetable oil and eggs, problematic trends in the level of formation of physical and economic accessibility in the current and future periods are not traced. According to forecast data in Russia, the production and consumption of vegetable oil per capita by 2031 will exceed rational norms by almost 5 times and 2 times, respectively.

### Conclusion

Thus, a study of current and prospective trends in the production and consumption of agricultural products per capita showed that for some of its types, the strategic tasks set to achieve the formation of physical and economic accessibility at the level of rational norms in the next decade will not be fully solved. There is a disparate pace of formation of physical and economic availability of products. The rate of production of certain types of products (grain, potatoes, eggs) is accompanied by a lower rate of consumption of these products and vice versa (fruits, vegetables, meat, milk). A higher level of economic availability compared to the level of physical availability will lead to a flow of cheap low-quality imports, and, on the contrary, a higher level of physical availability compared to the level of economic availability will contribute to the export of high-quality products. As a result, for a number of products significant for rational nutrition, there may be a situation for the primary saturation of the global food market, and not the domestic one.

Therefore, in order to achieve priorities to balance agricultural production and consumption at the level of rational norms, the concept of food security is proposed to be supplemented with provisions based on the balance and interconnectedness of physical and economic availability of products. In the implementation of these provisions, it is important to apply such strategic models of foresight that not only copy the current trends, but also allow you to determine the desired level of development of the agri-food sector and identify the course of action for the transition to it.

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**Рецензия**

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**Conflict of Interest**

None declared.

**Review**

All articles are peer-reviewed. But the reviewer or the author of the article chose not to publish a review of this article in the public domain. The review can be provided to the competent authorities upon request.

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