

OVERALL OVERVIEW OF THE STUDY

Relevance of research topic and degree of elaboration. In the last two decades, the economic processes in the world have had a global character and affected the economy of Azerbaijan to a certain extent. The current state of the national economy is characterized by dynamic and stable development trends, despite negative global influences. According to the economic indicators of recent years, our country's economy has reached the leading position in the world due to its growth rate. However, as a result of the decrease in oil prices in the world market since 2014, the economic crisis in partner countries with which our country has intense commercial relations, and the increase in political and economic tensions between global powers, the national economic growth rate has slowed down a bit. However, as a result of the decrease in oil prices in the world market since 2014, the economic crisis in partner countries with which our country has intense commercial relations, and the increase in political and economic tensions between global powers, the national economic growth rate has slowed down a bit. The global negative effects that have occurred in the country's economy since the second half of 2015 have manifested themselves primarily in the balance of payments. The increase in the exchange rate of the US dollar against the national currency has created certain risks to food security. In order to eliminate the problem, systematic and continuous measures have been started at the level of the higher state administration. As the national economy enters a qualitatively new era, the issues of raising the level of food security, protecting local agricultural producers, developing the agrarian sector, and increasing its competitiveness have become even more topical.

To solve the problem, the state began to take operational measures, and as a result, the Decrees of the President of the Republic of Azerbaijan and State Programs, concepts, and strategic roadmaps were adopted and implemented. This process continues today. Among such program and conceptual documents, it is possible to mention the declaration of 2015 as the “Year of Agriculture” in the Republic of Azerbaijan and the Decrees of the President of the

Republic of Azerbaijan “On additional measures in the field of improving the activity of the agricultural and food products market” [9], “State Program for the socio-economic development of the regions of the Republic of Azerbaijan in 2014-2018” [5], “On additional measures in the field of improving the activity of the agricultural and food products market” [9], “State Program for the socio-economic development of the regions of the Republic of Azerbaijan in 2014-2018” [5], “On additional measures in the field of improving the activity of the agricultural and food products market” [9], “State Program for the socio-economic development of the regions of the Republic of Azerbaijan in 2014-2018” [5]. In addition, “State Program for ensuring food security in the Republic of Azerbaijan for 2019-2025” [4] and Orders of the President of the Republic of Azerbaijan “On additional measures in the field of protecting the social welfare of the population” [8], “On the approval of Azerbaijan 2030: National Priorities for socio-economic development” [6], “On additional measures in the field of improving the functioning of the agricultural and food products market” [9] and other program documents can be mentioned. Furthermore, many important Laws, Programs and other documents have been adopted in this direction. Among these documents are the Laws of the Republic of Azerbaijan “On Food Products” [14] and “On Grain” [13], the Decision of the Cabinet of Ministers on approving the “Rules of Maintenance and Use of the State Grain Fund” [7], “Food Security Program of the Republic of Azerbaijan” [2], “The State Program on a reliable supply of food products to the population in the Republic of Azerbaijan in 2008-2015” [15] was adopted and implemented. These processes have given impetus to certain works in the field of ensuring food security and the development of the agro-food market in our country.

One of the main causes of food security problems in the world is the rapid growth in population. This trend is also observed in our country and the population of the Republic of Azerbaijan is increasing at an average rate of 1.2-1.3% every year. In Azerbaijan, which has a high rate of natural growth, it is extremely important to continue fundamental reforms based on innovative development in

the agricultural sector in order to provide the population with the production of local food products, reduce dependence on the import of agricultural products, strengthen the country's food security and expand the export opportunities of agricultural products. The agrarian sector is one of the strategic sectors of the country's economy and is a complex system operating under the influence of natural-climatic, social, and economic factors. The development of this field can be guarantee of providing food security at the appropriate level and solving the main economic and social problems of the country.

Ensuring food security also has an important role in the system of raising and ensuring the level of economic and national security of the country. In countries with great agricultural production potential, including Azerbaijan, this role is especially highly valued. The fact that the agricultural sector is accepted as one of the main priority sectors in the development of the national economic system once again proves the importance of this sector in the general security system. The agricultural sector is becoming a priority sector in the development of the national economic system. It should be noted that, despite the existing and sufficiently large resources and production potential, the efficiency of the "production-processing-sales" chain in the agricultural sector is not at the desired level. In recent years, the continuous and stable development of the country's economy, and the structural changes and reforms carried out in our country constitute a reason to look optimistically towards the development prospects of the agricultural sector.

The liberation of our territories from occupation by our heroic army under the leadership of Commander-in-Chief Ilham Aliyev in the 44-day Second Karabakh War further increased the agricultural potential of our country and laid the foundation for a new stage of development. The effective use of the natural-climatic potential of these areas and the inclusion of agricultural products in the production cycle will allow to ensure a higher level of food security, improve the situation in the field of food supply, and raise the level of self-sufficiency with food products and minimize dependence on imports. The rational use of the potential of these areas will ensure

the formation of regional agricultural markets and the rapid integration of the country into the agricultural market system.

Obstacles in the import of various types of food products and other factors create certain impediments to the improvement of the country's food security level. In the existing conditions, it is necessary to improve the factors and indicators that increase the level of the economic security of the country, the factors of the development of the agro-food market, the methods and tools of the development of the food security mechanism, and to specify the main directions of the development of the agro-food market. The fact that agriculture is one of the priority areas of the country's economy determines that development problems have become the subject of comprehensive and complex scientific research.

The development of the agricultural sector in Azerbaijan and the ways to increase its role in ensuring food security have not been sufficiently considered and complex scientific-theoretical and practical researches have not been conducted at an adequate level. In particular, the determination of the factors and indicators affecting the level of food security, the use of economic-mathematical modeling in the evaluation of food security, the competitive stability of food supply, state support, and regulation have not been adequately addressed and systematic research has not been conducted. The topic of our dissertation work is devoted to these aspects of ensuring food security, resonates with modern challenges, and can be considered very relevant.

The development of the agricultural sector in the world and in our country and the role of the agricultural sector in ensuring food security have always been the subject of certain studies. Some leading economists of Azerbaijan have conducted research and obtained some results on the general development aspects of the agricultural sector and the agro-food market, including various aspects of the role of the agricultural sector in solving food security problems. In this direction, valuable research was conducted by Z.A. Samadzadeh [64], R.A. Balayev [25], E.A. Guliyev [51], B.Kh. Atashov [22], I.H. Ibrahimov [47], I.H. Aliyev [19], M.J. Huseynov [45], S.V. Salahov [62], A.F. Abbasov [16], V.T. Amrahov [42],

H.A. Khalilov [46], A.H. Aliyeva [34] and other Azerbaijani scientists should be mentioned.

The role of the development of the agricultural sector in ensuring food security and its importance in raising the level of the economic and national security system, as well as the indicators of determining and evaluating the level of food security, have been widely studied by foreign scientists such as E.N. Krylatykh, I.G. Ushachev [86], V.K. Senchakova [84], B.A. Ryzberg [82], A.M. Galiakhmetova [71], R.A. Fatkhutdinov [87], N.V. Yashkova [93], T.A. Khubayev [91], N.L. Matsenovich, N.Y. Mityurina [80], A.I. Kostyayev [75], A.A. Lysochenko [77], O.A. Rodionova [83], B.L. McDonald [100], J.M. Alston [112], P. Pinstrup-Andersen [123], D.T. Mollenkamp [118] and others. As a result, reasonable provisions have been formulated for solving problems in this area.

The research suggests that the issues of increasing the level of food security should be constantly studied according to the changing times and conditions, and the importance of the factors and indicators affecting its level should be focused. To this end, we want to emphasize the importance of conducting scientific research in the field of the development of the agricultural sector in Azerbaijan now and in the future and ensuring the food security of the country based on this.

The object and the subject of research. The object of the study is the agrarian field and its related activities that have a key role in improving the food security system.

The subject of the research is the organizational and economic relations that arise in the process of increasing the country's food security based on the development of the agricultural sector.

Research goals and objectives. The goal of the research is to develop scientific-theoretical and empirically important suggestions to increase the level of food security by ensuring the development of the agricultural sector and to create a sustainable food supply system.

In order to achieve the set goal, the following specific objectives were defined and fulfilled:

- to study the theoretical-methodological basis of ways to increase the role of the agricultural sector in increasing the level of food security;

- to determine the essence and content elements of ensuring food security and clarify them by explaining;
- to identify and systematize the main factors affecting the improvement of the food security level and assessment indicators;
- to analyze and assess the modern level of development of the agrarian sector and to determine ways to solve problems;
- to determine and evaluate the impact of reforms and structural changes in the agrarian field on the elements of the food security system;
- to identify the main threats and dangers to the food security system and to determine the mathematical and economic methods used in the evaluation of the food security level;
- to determine directions for increasing the competitiveness of the agro-food market, which is an important element of the agrarian sector, and to prepare practical recommendations for its improvement;
- to classify the main factors that enable the intensive development of the agrarian field and to determine directions for the formation and strengthening of a sustainable food security and food supply system based on innovative development;
- to substantiate the main principles of state regulation and priority directions of state support in strengthening the level of food security.

Research methods. A systematic approach, economic-statistical analysis, comparison, economic-mathematical modeling, generalization, and synthesis methods were used in the research.

The theoretical and methodological base of the research is made up of the works of economists of our country and foreign countries dedicated to the problems of increasing the level of the food security system, as well as the laws, decisions, decrees, orders, and normative documents of the higher legislative and executive bodies of the Republic of Azerbaijan and statistical summaries, data, reports and other related materials of State Statistics Committee [141], Customs Committee [140], Ministry of Agriculture [137; 143], Ministry of

Economy [142], Ministry of Finance [145], Ministry of Taxes [144] and other ministries of the Republic of Azerbaijan, as well as agricultural production and processing enterprises.

The main clauses defended are:

- the need to clarify the theoretical and methodological bases of increasing the role of the agricultural sector in increasing the level of food security;
- substantiation of the interaction and connection between food security and economic security and their role in the formation of the national security system;
- determination of the essence and main elements of ensuring food security;
- the importance of identifying the main factors and assessment indicators influencing the improvement of the level of food security;
- raising the level of development in the agrarian field and determining ways to solve problems;
- the importance of the impact of agricultural reforms and structural changes on the food security system;
- the significance of the development of mathematical-economic methods, which are necessary to use in assessing the main threats and dangers to the food security system, as well as the level of food security ;
- specification of directions for increasing the competitiveness of the agro-food market;
- substantiation of priority aspects of state regulation and state support in forming and strengthening a reliable food security and supply system by developing the agricultural sector.

The scientific novelty of research. In the dissertation, the ways of increasing the level of food security based on the development of the agricultural sector in Azerbaijan were comprehensively studied and the following scientific innovations were obtained:

- the main elements of food security have been defined, its interaction with economic security and its role in the formation of the national security system have been substantiated;
- the main factors and indicators influencing the improvement of

the food security level have been identified and a method of evaluating the food security level has been proposed based on those factors and indicators;

- the development problems of the modern agricultural sector and the agro-food market have been identified, and the ways to eliminate the main obstacles to development have been indicated;
- as a result of analyses and evaluations, the main threats and dangers to the food security system, their causes and origins have been determined, and ways to prevent and eliminate them have been proposed;
- possibilities of using economic-mathematical methods for regular assessment of food security level and prompt identification and elimination of negative trends have been studied and directions for their implementation have been substantiated;
- directions to increase the competitiveness of the agro-food market have been identified and recommendations have been made to increase its role in improving food security;
- The principles of economic, administrative, and social regulatory measures in the formation and strengthening of a sustainable food security and food supply system based on the development of the agrarian sector have been clarified, and the priority directions of state support in this field have been determined.

The theoretical and practical significance of the research. The results, propositions, and empirically important suggestions and recommendations summarized and theoretically substantiated in the dissertation are important as a fundamental base in identifying factors determining the development of the agrarian sector and increasing its role in increasing the level of food security and improving the food supply system or factors negatively affecting the level of food security, and in solving problems in this field, expanding and developing theoretical-methodical and practical knowledge in the field of ensuring food security. The main provisions of the research can be used in the development of the

agrarian sector and the agro-food market, in the study of food, economic and national security problems, in the preparation of targeted development programs and other documents in these areas, and in various stages of the personnel training and education process in the agrarian sector.

The issues referred to can be considered an indicator of the theoretical and practical importance of the completed dissertation.

Approval and implementation. The candidate's 16 scientific works of the applicant on the subject of the dissertation, including 6 articles and 10 theses, of which 1 article and 6 theses were published abroad in prestigious local and foreign journals recommended by the Higher Attestation Commission. The main provisions of the research are in the materials of the international scientific conference on "The current situation of increasing agricultural processing products in Azerbaijan and the directions of increasing transparency in its effective management" (Chamber of Auditors, 2017), "Evaluation of the production and resource potential of agriculture of the Republic of Azerbaijan" (Odlar Yurdu University, 2018), "Influence of the development and improvement of the food market on the level of self-sufficiency in agricultural production" (Mingachevir State University, 2021), "Assessment of the level of payment of food supply to local production in Azerbaijan" (Italy, 2021), "Elimination of existing problems to improve food security in Azerbaijan" (Canada, 2021), "Food security and development tendencies of agrarian market" (Germany, 2021), "Increasing the competitiveness of the food market as an element of the economic security system" (USA, 2022) theses have been published.

In addition, the plaintiff's "Evaluation of the production and resource potential of the agriculture of the Republic of Azerbaijan" (2018), "Factors affecting the level of food security in the development of the agro-food market" (2018), "The socio-economic nature of the categories of economic security and food security" (2019)), "Analysis of structural changes in the agricultural sector of Azerbaijan and assessment of import dependence" (2020) and "Diagnosis of the agricultural food market and major threats to food security" (2021) published in Tbilisi, Georgia.

The institution where the dissertation was accomplished. The dissertation work has been accomplished in the chair of “Economy and economic relations” at Odar Yurdu University.

The total volume of the dissertation with a sign indicating the volume of the structural sections of the dissertation separately: The dissertation consists of an Introduction (18898 characters), 3 Chapters (Chapter I - 67833 characters, Chapter II - 50679 characters, Chapter III - 67048 characters), a Conclusion (7065 characters), a List of references used in 158 titles and an explanation of Abbreviations. The dissertation contains 14 tables, 10 pictures, and 1 graph. The research paper consists of 143 pages (211523 characters), excluding figures, graphs, tables, and the list of references.

BRIEF OVERVIEW OF THE DISSERTATION

In the Introduction of the dissertation, the relevance of the research topic and degree of elaboration, the object and the subject of research, research goals and objectives, research methods, the main clauses defended, the scientific novelty of the research, the theoretical and practical significance of the research, approval, and implementation and the total volume of the dissertation have been explained.

In the first chapter on the study of the theoretical and methodological bases of the impact of the development of the agricultural sector on the level of food security, the socio-economic nature of the elements of “economic security” and “food security” in the general security system is explained and their interrelationships are studied, then the factors influencing the level of national food security and the indicators of food security level assessment are characterized and the methodical aspects of the analysis and assessment of the level of the modern development of the agrarian field are studied.

The factors that determine the development of the agri-food market, which have a significant impact on the level of food security, can be classified as political, socioeconomic, technological, and

natural. Political factors include the system of normative-legal acts, state regulation and control, conditions and sanctions, and internal economic policy priorities. The impact of socio-economic factors is observed in the mechanism of economic relations, investment resources, the level of dependence on imports, and the income of the population. Technological factors may include energy security, innovation activity, material and technical base level, fertilizer use level, etc. Natural factors should include natural conditions, soil quality, the possibility of natural disasters, and other such factors.

Competitive stability is based on rich resources and their efficient use, and the entity with such capabilities has a comparative advantage. As an obvious indicator of comparative advantage, the net export index should be described¹, and this indicator is calculated with the following formula:

$$RCA = \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}} \quad (1)$$

where,

X_{ij} – is the export of product i by country j,

M_{ij} – is the import of product i to country j.

It is important to know the reaction of the market to changes in the price of agricultural products. For this, the efficiency and competitiveness of the agro-food market should be evaluated. In the calculation of these indicators, the productivity of agricultural areas, livestock and poultry farming, the cost, labor consumption, profit and profitability level of product production, the payback period of investments and other indicators should be taken into account. It has been deemed appropriate to calculate the effectiveness of these indicators using the formula below.

$$P_A = P_{A1} - P_{A2} \quad (2)$$

where,

P_A – is an additional profit due to the implementation of the achievements of scientific and technical progress;

¹ Чистый экспорт. Финансовая энциклопедия. <https://nesrakonk.ru/netexports>

P_{A1} –is the profit obtained after the implementation of scientific and technical progress;

P_{A2} – ETT-nin is the profit until the implementation of scientific and technical.

To accurately determine the consumption rate, the country's population should be grouped according to the following criteria:

- consumption intensity (high, medium and low);
- age (children, schoolchildren and students, able-bodied people, pensioners);
- place of residence (city or village).

Then, the consumption standards for each specified criterion are determined, and in the future they can be applied in the assessment of the market size and are calculated by the following formula²:

$$S_{f.m.} = R_{cons.1} \times N_{popul.1} + R_{cons.2} \times N_{popul.2} + R_{cons.3} \times N_{popul.3} \quad (3)$$

where,

S_{f.m.} – is food market size;

R_{cons.1} – is consumption rate for one person;

N_{popul.1} – is number of population by groups.

The sufficiency and accessibility of consumption of food products are also criteria for assessing the level of development of the agro-food market.

In our opinion, the consumption sufficiency of food products should be evaluated together with the consumption sufficiency index. This enables us to assess the level of supply of the domestic agro-food market with its own production products and the level of its competitive stability in relation to imported goods.

The recommended sufficiency index³ for basic food consumption can be taken as an indicator of food self-sufficiency.

² Минаев А.М. Развитие агропродовольственного рынка как инструмент повышения уровня продовольственной безопасности. Автореф....к.э.н. 08.00.05. Москва, 2015, 24с.

³ Adalberta Alberti¹, Daniela Fruttini, Flaminio Fidanza. The Mediterranean Adequacy Index: further confirming results of validity. 2009.Jan;19(1):61-6. doi:10.1016/j.n

$$I_{\text{cons.}} = \frac{R_{\text{real}}}{R_{\text{req}}} * 100 \quad (4)$$

where,

$I_{\text{cons.}}$ – is consumption sufficiency index;

R_{real} – is the real per capita consumption rate;

$R_{\text{req.}}$ – is the required per capita consumption rate.

In the calculation of competitiveness in terms of national food security in relevant sources, the Lafay index is calculated as follows⁴:

$$LFI = 100 \left[\frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}} - \frac{\sum_i^n (X_{ij} - M_{ij})}{\sum_i^n (X_{ij} + M_{ij})} \right] \left[\frac{X_{ij} + M_{ij}}{\sum_i^n (X_{ij} + M_{ij})} \right] \quad (5)$$

where,

X_{ij} – is export volume of product i of state j;

M_{ij} – is import volume of product i of country j;

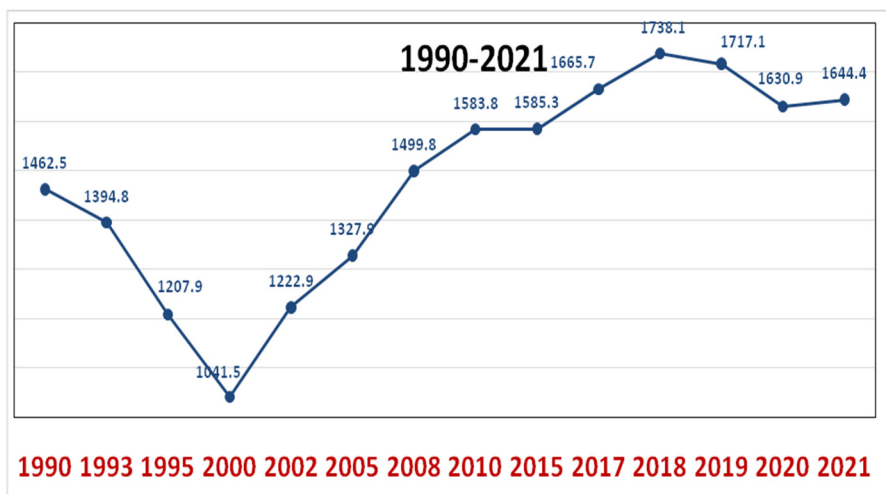
n – is the number of product types.

The Lafay index ranges from –50 (negative fifty) to +50 (positive fifty). A positive value of the Lafay index indicates a competitive advantage. The higher the value of the Lafay index, the higher the competitive stability.

In the second chapter, where the effects of structural changes and reforms on the level of food security in the agricultural sector are examined on the basis of factual materials, the effect of the reforms made in the national agrarian sector on the level of food level of food supply and import dependence was evaluated. The diagnosis of the main threats to national food security and the development of the agro-food market was carried out. At the end of the chapter, the possibilities of using economic-mathematical modeling in assessing the level of food security were studied and calculations were made on the basis of actual data. During the years 1990-2000, the total cultivated areas of agricultural crops in Azerbaijan decreased year by year (graph 1), starting from 2000, cultivated areas and production of vegetable products increased. At the end of the chapter, the

⁴ Филиппов А.М. Методические подходы к оценке конкурентоспособности агропродовольственного сектора. Аграрная экономика. 2021;(4):60-68, s.63-64.

possibilities of using economic-mathematical modeling in assessing the level of food security were studied and calculations were made on the basis of real data. During the years 1990-2000, the total cultivated areas of agricultural crops in Azerbaijan decreased year by year (Graph 1), and since 2000, cultivated areas and production of vegetable products increased.



Graph 1. The total cultivated area of agricultural crops (ha)
Source: Developed by the author based on statistical indicators of AR

The continuous increase in the production volume of agricultural products between 2000-2021 should be considered a serious positive in terms of ensuring national food security. In addition, the fact that the production of local food and agricultural products has an increasing share in the food supply of the country's population is a logical result of the government's efforts to ensure national food security.

In the period of 2016-2021, the country's self-sufficiency level with the main agricultural and food products increased with certain fluctuations. While the level of dependency on imports has decreased in many product types in the supply of basic agricultural and food products of the population, the level of dependency on imports has increased in some product types.

A number of different approaches can be used to assess the overall level of food security in a country. Based on a comparative analysis of existing approaches, it is recommended to use the referenced source⁵, including the following formula:

$$\text{OLFS} = (1 - (I - E) / \text{FCP}) \times 100$$

where,

I – is the value of import;

E – is the value of export;

FCP – is the value of food consumption by the population in the country.

Among the factors affecting food security and the development of the agro-food market, consumer spending on food products should also be taken into account. In order to determine the total consumer spending on food products at the country level, factors such as the amount of consumption expenditure on food products per capita in households and the number of the population in that period should be used (Table 1).

Table 1

Consumer spending on food products

Years	Population, (thousand people)	Monthly per capita consumption expenditure on food products, (manats)	Monthly consumer spending on food products, (thousand manats)	Annual consumer spending on food products, (million manats)
2013	9356,5	91,8	858926,7	10307,1
2014	9477,1	95,6	906010,8	10872,1
2015	9593,0	99,4	953544,2	11442,5
2016	9672,3	102,6	976014,1	11747,5
2017	9593,0	109,4	993998,6	12948,7
2018	9898,1	119,7	118480,6	14217,6
2019	9981,3	123,8	1235684,9	14828,2
2020	10067,1	129,2	1300669,3	15608,0
2021	10137,8	134,6	1375395,3	16504,7

Source: https://stat.gov.az/source/budget_households/

⁵ Балдов Д.В., Сулов С.А. Методика расчета уровня продовольственной безопасности // Вестник НГИЭИ. 2016. №1 (56). URL: <https://cyberleninka.ru/article>.

Calculating the level of dependence on imports for various food products using the following formula is recommended:

$$LDI = (PV/VP) \times 100 \quad (7)$$

where,

PV – is production volume + change in reserves (the difference between the reserves at the beginning and the end of the year);

VP – is the total volume of personal and production-consumption within the country.

Considering referred reserves, the fact that the volume of actual production for a specific food product is greater than the volume of consumption indicates that food security is ensured. The food security coefficient for various products, calculated by formula 7, determines which part of the amount of domestic consumption is provided by local production.

The degree of the inferiority of the volume of food products produced in the country to the required norms per capita reflects the limit of dependence on imports. In Table 2, the level of dependence on imports for the main food products in our country is indicated.

The system of economic-mathematical models that reveal the possibilities of increasing the level of food security should include a number of important directions. The index of the sufficiency of consumption of basic food products (F_{ss}) can be considered as a conditional indicator of self-sufficiency with food products:

$$F_{ss} = \frac{A_{sh}}{L_{cons}} \times 100 \quad (8)$$

where,

A_{sh} – is share of actual consumption per capita;

L_{cons} – is the required per capita consumption level.

Using the Lafay index when considering the national food security position as an indicator of competitiveness is more appropriate. A positive value of the index indicates that product i has a competitive advantage. The higher the ratio, the higher the competitive stability.

Table 2

Level of dependency on imports for basic food products in 2021 (as %) (Population in 2021 is 10,137.8 million people)

Product	Annual actual consumption per capital, kg	Total consumption, thousand tons	Production, considering leftover				Dependency on import, %
			Leftover at the beginning of the year, Thousand tons	Leftover at the end of the year, thousands tons	Production, thousand tons	Total	
All types of meat and meat products	41,2	417,6	13,6	11,1	357,6	360,1	13,8
Milk and milk products	253,3	2567,9	33,0	32,8	2223,4	2223,6	13,5
Eggs (thousands)	170	1723,4	37,0	36,1	1838,8	1839,7	-
Sugar and confectionery products	27,3	276,7	497,9	559,9	339,5	277,5	-
Vegetable oils	9,4	95,2	29,1	10,4	72,9	91,6	3,8
Fish and fish products	7,4	75,0	3,3	3,3	59,5	59,5	20,7
Butter	3,8	38,5	2,5	3,0	26,9	26,4	31,5
Bread and bakery products	126,2	1279,3	15,0	14,9	1278,1	1278,2	0,1
Potato	84,2	853,61	636,1	700,3	1053,4	989,2	-
All kinds of vegetables	138,2	1401,0	275,2	313,0	1698,1	1660,3	-
Fruits and berries	83,7	848,5	61,5	38,8	1204,8	1227,5	-

Source: https://stat.gov.az/source/food_balances/

When studying the level of food security across the country, the volume, composition, and consumption of basic food products should be compared with the population's demand for basic food products. Therefore, reference should be made to the annual per capita consumption rate and the volume of actual consumed products for the main food products (Table 3).

Table 3

**Coefficient of competitiveness of basic agricultural products
(LFI; in %)**

Product	2015	2016	2017	2018	2019	2020	2021
Potato	-3,47	-4,57	-3,48	-3,39	-3,40	-3,37	-3,34
Fresh vegetables	1,52	1,57	3,19	3,45	3,38	3,30	3,39
Fresh fruit	2,36	2,75	3,55	4,15	4,37	3,97	3,84
Milk and milk products	-1,67	-1,75	-1,76	-1,84	-1,80	-1,85	-1,76
Egg	-33,6	-37,5	-31,3	-38,4	-16,9	-18,7	-23,1
Raw sugar and sugar	3,24	3,75	1,55	1,37	1,56	1,53	1,49
Bighorn meat	-1,76	-1,86	-1,95	-2,51	-2,49	-2,41	-2,49
Butter	-22,6	-25,5	-28,18	-30,51	-30,55	-33,22	-34,1
Vegetable oils	-16,3	-15,51	-27,51	-26,82	-27,95	-24,51	-25,3

Source: The figures in the table were calculated by the author.

Based on the annual per capita consumption norm of basic food products and the volume of actual consumed products, the sufficiency ratio of consumption of basic food products for 2015-2021 can be calculated (Table 4).

Table 4

**Sufficiency ratio of consumption of basic food products for
2015-2021 (in %)**

Product	2015	2016	2017	2018	2019	2020	2021
All types of meat and meat products	106,3	106,0	118,7	126,3	129,5	129,5	130,7
Milk and milk products	105,9	106,1	102,4	103,3	106,0	110,9	109,0
Egg	100,6	100,0	103,3	100,0	107,8	114,4	111,1
Sugar and confectionery products	124,7	149,7	151,1	145,4	151,1	154,6	156,8
Vegetable oils	128,6	110,2	163,3	154,1	164,3	156,1	95,9
Fish and fish products	90,9	93,5	102,6	96,1	98,7	94,8	96,1
Butter	65,7	70,1	50,7	49,2	49,2	46,7	56,7
Bread and bakery products	98,5	98,8	98,6	98,6	99,6	101,8	100,0
Potato	141,5	143,3	148,6	142,5	162,4	164,6	166,4
All kinds of vegetables	113,8	111,3	107,3	116,4	131,6	138,4	142,6
Fruits and berries	158,0	145,4	154,8	161,3	174,8	190,4	181,9

Source: The figures in the table were calculated by the author.

According to statistical data, although consumer spending increased during 2015-2021, its growth rate did not exceed income. The coordinate plane of the multi-criteria analysis model of food safety should be divided into four sections⁶:

Section 1: the product is competitive, and the consumption sufficiency of the basic food products is below the acceptable level of the norm;

Section 2: the product is competitive, and the consumption sufficiency of the basic food products is at an acceptable level;

Section 3: the product is not competitive, and needs to be replaced by imports in the domestic market; the consumption sufficiency of basic food products is below the norm;

Section 4: the studied group of food products is not competitive, and the consumption sufficiency of the basic food products is at an acceptable level.

One important feature of the maximum and minimum value of the Lafay index should be indicated. Thus, a value of -50 (negative fifty) of that coefficient indicates the almost non-existence of specialization in the studied object, and a value of +50 (positive fifty) indicates the existence of competitive stability.

Multi-criteria analysis of food security shows that (Figure 1), sugar and confectionery products, fruits and berries, as well as vegetables belong to the 2nd section, butter, meat and meat products, milk and dairy products, eggs, vegetable oil, and potatoes belong to the 4th section. The multi-criteria analysis of food security for 2015-2018 and 2015-2021 shows that milk and milk products, meat and meat products, eggs, sugar and confectionery, and partially potatoes are not competitive.

According to the data on the agricultural production adequacy ratio, the dynamics of all other basic food products, except butter, fish and fish products, were positive during 2015-2021.

⁶ Минаев А.М. Развитие агропродовольственного рынка как инструмент повышения уровня продовольственной безопасности. Автореф....к.э.н. 08.00.05. Москва, 2015, 24с.

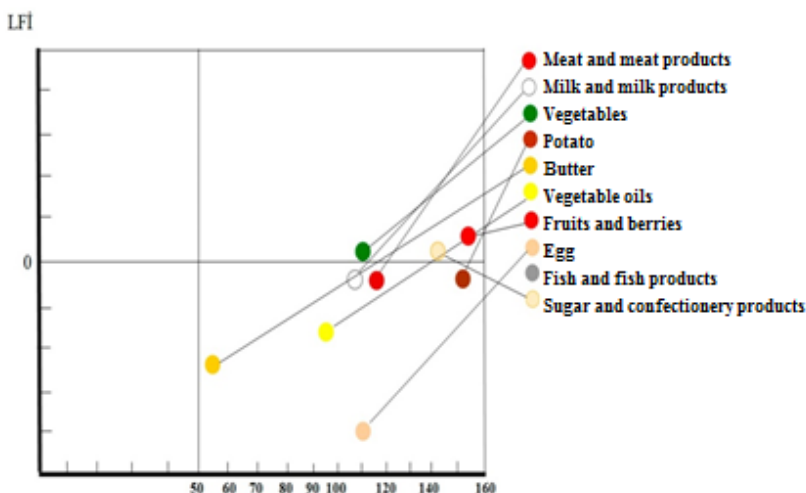


Figure 1. Multi-criteria analysis of food security (2021)

We consider it appropriate to use the following algorithm, which allows us to regulate measures to increase the level of food security.

I. Implementing a multi-criteria analysis of food security to determine the status of the food crop in the long term, allowing us to evaluate the efficiency of the impact of protection and development measures.

II. Comparing the state of the products in the model with the methods of protection of the agro-food market.

III. Selecting additional methods of protection, support, and development depending on the degree of their availability based on available opportunities.

IV. Adopting complex solutions for the extension of active protection, support, and development measures, as well as introducing new ones.

In the third chapter on determining the main directions of increasing the level of food security and supply, the possibilities and tools of increasing the competitiveness of the food market as a component of the national food security and supply system have been studied and a number of generalizations have been made. The directions for the formation and improvement of a sustainable food

security system have been determined and the priority directions for food security and food market state regulation have been substantiated.

Ensuring production quality and adapting it to contemporary standards is one of the basic factors in ensuring food security and establishing competitive stability. For this, the implementation of measures to increase competitiveness should be a priority direction in the regulatory and improvement processes. The concept of sustainable development requires the preservation of resources for future generations in addition to increasing the competitiveness of local products, preventing social tensions and preventing inflation as the main objectives of price regulation.

The measures taken by the state to improve the agricultural regulation system in order to ensure national food security in a sustainable development environment accelerate development. In this context, measures to improve and strengthen the legislative base include the following directions: implementation of necessary irrigation and melioration to increase the fertility of the lands used as agricultural fields; providing financial assistance to producers of field crops for the purchase of new agricultural machinery and equipment; ensuring the purchase of new seed varieties and breeds of breeding animals with the participation of special financial funds created mainly by the state; implementing complex measures related to the fight against pests in the fields at the level of agrotechnical requirements; environmental protection in line with the green economy transition strategy.

Development and adoption of the draft law on the agrarian market, which regulates the economic and legal relations created in the national food security system and the agrarian market is appropriate. The law on the agrarian market should cover the following issues: relations between producers of agricultural products, citizens of the country (mainly consumers) and state authorities in the field of agriculture should be regulated; relations on the use, lease and other issues of agricultural lands should be regulated; recruitment of labor resources, their management and various issues arising in the labor market, in general, should be

regulated; the main directions of development of the agrarian market and the main principles of the operation of the agrarian market should be determined.

To ensure national food security and develop the agri-food market at the level of modern requirements, the following can be attributed to the complex of indirect state regulatory measures: implementation of the price effect in the food and agricultural products market by supporting the prices of agricultural products in the domestic market and by regulating quotas and tariffs and duties and taxes on export and import products; compensation of interest payments on loans taken by agricultural producers to purchase means of production; reimbursement of costs for marketing research, creation and updating of databases, purchase of software tools, implementation of digital technologies at the expense of state budgetary funds.

In order to reveal and effectively manage the competitive advantages of agriculture, the following measures are appropriate in the medium-term perspective: conducting regular analyzes to identify highly competitive local commodity producers; strengthening the material and technical basis of agricultural production and processing enterprises through innovative modernization; increasing modern production capacity, which leads to an increase in the volume of production of agricultural and food products and the expansion of the range of products put on the market; strengthening the normative-legal basis; ensuring compliance with national and international quality standards for food and other agricultural products.

The following issues can be attributed to the priorities of the state regulation of the agro-food market in the national economic security system: ensuring national food security; ensuring financial and economic stability for agricultural producers; ensuring price equality between supply, agriculture, agro-processing, wholesale and retail trade enterprises; developing necessary measures to maintain acceptable profitability of basic food products, coordinated adjustment of prices; substantiating general and agreed on policy priorities in the production and sale of the product delivered to the final consumer and the implementing the results of relevant scientific research and project studies; regulating food product quality

management and standardization system; compliance with sustainable development criteria by determining the optimal volume in the creation of insurance reserves; involving agricultural production and processing enterprises in clustering initiatives.

CONCLUSION and RECOMMENDATIONS:

The results of our research and the recommendations we made are as follows:

1. The development of the agricultural sector has an important role in ensuring the country's food security, increasing the physical and economic accessibility of the population to basic food products, improving the state of well-being, and providing food products in accordance with physiological norms. The development of the agricultural sector also gives a serious impetus to the formation, development and improvement of the infrastructure of the agro-food market, and makes it possible to increase the country's level of self-sufficiency in food, to minimize dependence on imports, and to ensure economic and national security.

2. Food security, one of the important results of the development of the agricultural sector, should be considered as a factor that can guarantee access to food products in sufficient quantity and quality for the healthy physical and socio-psychological development of every person throughout the year, provision of food resources, strengthening of the economic and national security system. Furthermore, food security is interconnected with the concepts of economic security and is one of the important elements of national security.

3. Determining and specifying the criteria and indicators for the evaluation of food safety level is one of the important issues. The main indicators affecting the level of food security include the volume of production and import, physical and economic accessibility to products, satisfaction with consumption norms, quality and safety of products, natural-quantity and value quality, general and special (specific) and primary and additional indicators, usability, stability of access to food products, a wide range of

products diversity, food consumption score and coping strategy index.

4. In order to increase the level of food security and to implement preventive measures against possible dangers and threats, the diagnosis of potential hazards should be given priority. The main threats to food security include import pressure in the agro-food market, weak protection of the interests of agricultural consumers, the low scientific and technical potential of agriculture and personnel training, and financial supply problems.

5. The characteristics of political, socio-economic, technological and natural factors affecting the sustainable development of the sector and the improvement of national food security are determined and detailed.

6. In the research study, as an important indicator of the socio-economic evaluation of the development level of the agri-food market, the level of import dependence of the agro-food market, resource provision and food supply, the level of physical and economic access to food for different groups of the population, the sufficiency of consumption and the level of competitive stability of market subjects are considered. Economic-mathematical models for evaluating the level of food security based on these indicators are proposed and their use has been deemed appropriate.

7. Research shows that it would be appropriate to implement para-tariff restrictions in our country in the form of various technical and special requirements. These should be implemented to ensure the quality and safety of products. In order to implement an effective policy in the field of standardization, metrology, certification and consumer rights protection and the compulsory certification process of products should be defined.

8. The qualitative improvement of the current situation in the production of products in the agricultural field requires the creation of a farming system that enables and guarantees the increase of the level of competitive stability in the medium and long-term perspective by rationally using the existing competitive advantages and the creation of agro-food market and food product production areas operating on an innovative basis. In order to solve this problem

and increase the level of food security, the concept of economic and social measures has been substantiated.

9. Raising the level of national food security may require joint implementation of the priorities of the agro-food market, financial, regulatory and legal framework, insurance and customs policy, implementation of measures related to product quality and standardization, significant strengthening of state regulation through economic and administrative influence. In this respect, priority directions for strengthening regulatory influences based on the national level of food security are substantiated.

10. The importance of adopting relevant regulatory legislation to ensure national food security and solve problems specific to the agricultural sector are substantiated. The measures to be taken in order for these laws to have a functioning mechanism to ensure and strengthen national food security, and the priority aspects of state support for the field are indicated.

11. Considering the food security and the specific characteristics and problems of the agricultural market, the importance of adopting a special law on forms of state regulation and agrarian market are substantiated, and it is considered appropriate for the law to be adopted to cover the following issues: relations and mutually beneficial relations between agricultural producers, citizens (mainly consumers) and state bodies in the field of agriculture should be regulated; the legal basis for the realization of the state's socio-economic policy on the implementation of projects for the sale of agricultural products, the provision of various services and the provision of the profitability of the activities of the rural population should be created and its control should be ensured; the relations established on the use, lease and other issues of agricultural lands in use in our country should be regulated, the responsibility and duties of land users should be clarified; labor resources should be involved in the agricultural field and the agro-food market.

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