

Agro-Industrial Complex: Specifics of Formation

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Abstract: *The problems of economic security play an important role in the period of systemic crises and the exacerbation of internal and external systemic threats. Food security threats require special attention. The purpose of the article is to consider the threats to the agro-industrial complex of Crimea and propose approaches to neutralize them. The impact of the agro-industrial complex on the economic security is reflected in food independence and economic or social availability of food for the population. The disadvantages of this field can be seen from the results of the latest political events that are directly related to the economic sanctions imposed on Russia in 2014.*

Index Terms: *agro-industrial complex, region, Republic of Crimea, food security, state regulation.*

I. INTRODUCTION

The world's attention has been drawn to food problems in the recent years. A number of factors determined the increase in prices for food, which has now reached their highest level since the 1970s. This circumstance has seriously affected the food security for the world's poor population. Food security is a condition when there is enough food year round; and healthy food and a productive lifestyle are secured. It is based on the level of consumption; thus, it can describe the food security of individuals, families and the whole nation. The link between land ownership and food security can be direct (when food is produced) or indirect (when food is purchased) [1].

The purpose of the article is to consider the threats to the agro-industrial complex of Crimea and propose approaches to neutralize them.

II. METHODS

A. Formation of threats influencing the development of the agro-industrial complex of the Republic of Crimea

The problems of economic security play an important role

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in the period of systemic crises and the exacerbation of internal and external systemic threats. Analysis of the problems associated with ensuring the economic and, accordingly, the national security of the Russian Federation is of particular importance in the context of the aggravating international situation, the introduction of anti-Russian sanctions, and the reciprocal use of the food embargo by the Russian Federation. This situation necessitates a pragmatic and objective analysis of the current situation, finding the most efficient mechanisms to counter new dangers and threats and predicting them, identifying and preventing early stages of their formation, as well as reducing damage while updating these dangers and threats.

The impact of the agro-industrial complex on the economic security is reflected in food independence and economic or social availability of food for the population. The disadvantages of this field can be seen from the results of the latest political events that are directly related to the economic sanctions imposed on Russia in 2014.

The reunification of the Republic of Crimea with the Russian Federation expanded the geography of the agro-industrial complex of Russia. However, the general situation in the agrarian sector of the Republic of Crimea during the reunification period was not in very good condition [2,3].

The region is located in a temperate continental climate with subtropical conditions within the southern coast of Crimea, with high values of heat supply, black soil occupying over 40 % of the region's area, and a high proportion of agricultural land, which allows to grow various types of crops in the Republic [4 – 6].

The Republic of Crimea occupies a leading position among the Russian regions in some subsectors of agriculture. Plant growing and animal husbandry developed significantly in 2015, and agricultural products accounted for 11 % of the exports from the Republic of Crimea. The main export items were crops, oilseeds, and fruits [7].

B. Algorithm

The Republic of Crimea has significant advantages that can serve as a basis for the further development of the agro-industrial complex in the region (Figure 1).

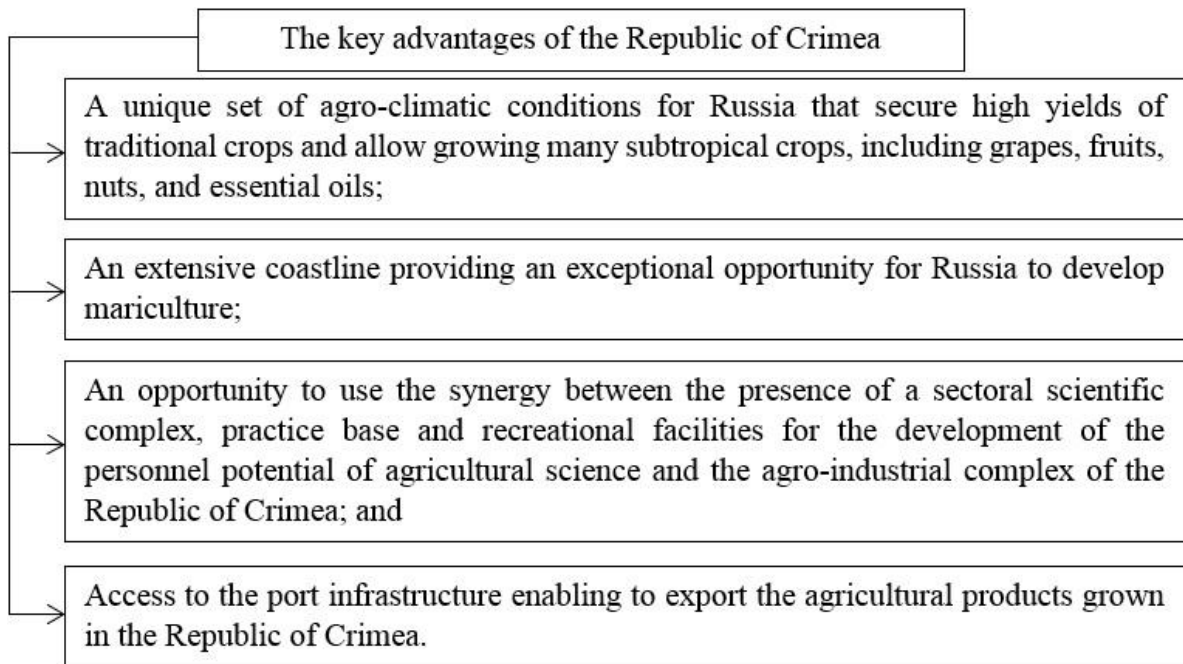


Fig. 1: The Key Advantages Of The Republic Of Crimea For The Development Of The Agro-Industrial Complex [8].

However, there are many current threats that influence the agro-industrial complex of the Crimea and the economic security of the region.

Agriculture of the Republic of Crimea has a number of problems and shortcomings, the main of them being as follows:

1. Dependence on the water supply through the North-Crimean Canal. The Republic of Crimea does not have enough water resources for the comprehensive development of agriculture on its territory; therefore, the closure of the Crimea's main waterway has caused significant damage to the Crimean farmers. Despite this, a record grain harvest was obtained in 2017. However, due to a strong drought, the experts forecasted the harvest of crops at not more than 900 thous. tons in 2018. The Crimean agrarians overcome water scarcity by using groundwater and drip irrigation.

2. Insufficiently developed market infrastructure (system of sale and storage of agricultural products).

3. Wear and tear of the equipment. This is due to the fact that most of the agricultural equipment was purchased and manufactured during the Soviet period.

4. Low productivity of agricultural production. The use of nonmodern technology leads to low agricultural productivity.

5. Sanctions. Political sanctions imposed on the Russian Federation and the Republic of Crimea make it impossible to export agricultural products to European countries [9].

6. Problems related to transport logistics. The Republic of Crimea is in an extremely disadvantageous position from a geographical point of view, as it is located on the southern outskirts of the country, far from Moscow and other large Russian cities. With the commissioning of the Crimean Bridge, the transport accessibility of the Crimean Peninsula will improve significantly, but transport costs for the delivery of products will be still high, which increases the cost.

Consequently, the nearby regions will find it much cheaper to grow and sell their own products at a lower cost and, accordingly, market price [9].

7. High electricity costs.

8. High cost of agricultural products. High electricity costs and logistics problems lead to a significant increase in cost, which repels buyers from other regions of the Russian Federation.

9. Low competitiveness. All of the above factors lead to the fact that the Crimean agricultural products are unable to compete with local products in the markets of other regions of the Russian Federation, primarily because of the high price.

10. Extensive development of the agro-industrial complex. Agriculture – primarily, crop production – is developed by expanding the acreage (mainly in the steppe Crimea) rather than by increasing the yield per unit area.

11. Irrational use of natural resources. A negative trend in using natural resources (water resources, soil fertility) has developed in Crimea over the years, which has a bad effect on the future development of agriculture in the Republic of Crimea. This trend is especially noticeable in the steppe part of Crimea.

12. Cultivation of crops unsuitable for the climatic conditions of Crimea (industrial crops, oilseeds).

13. Incomplete use of the agricultural potential of the region (a large number of unused areas).

14. Lack of developed animal husbandry on the peninsula (there are no large farms for raising animals and poultry) [8].

The man-made risks that are present on the territory of the Republic of Crimea (Figure 2) pose a great threat to agriculture.

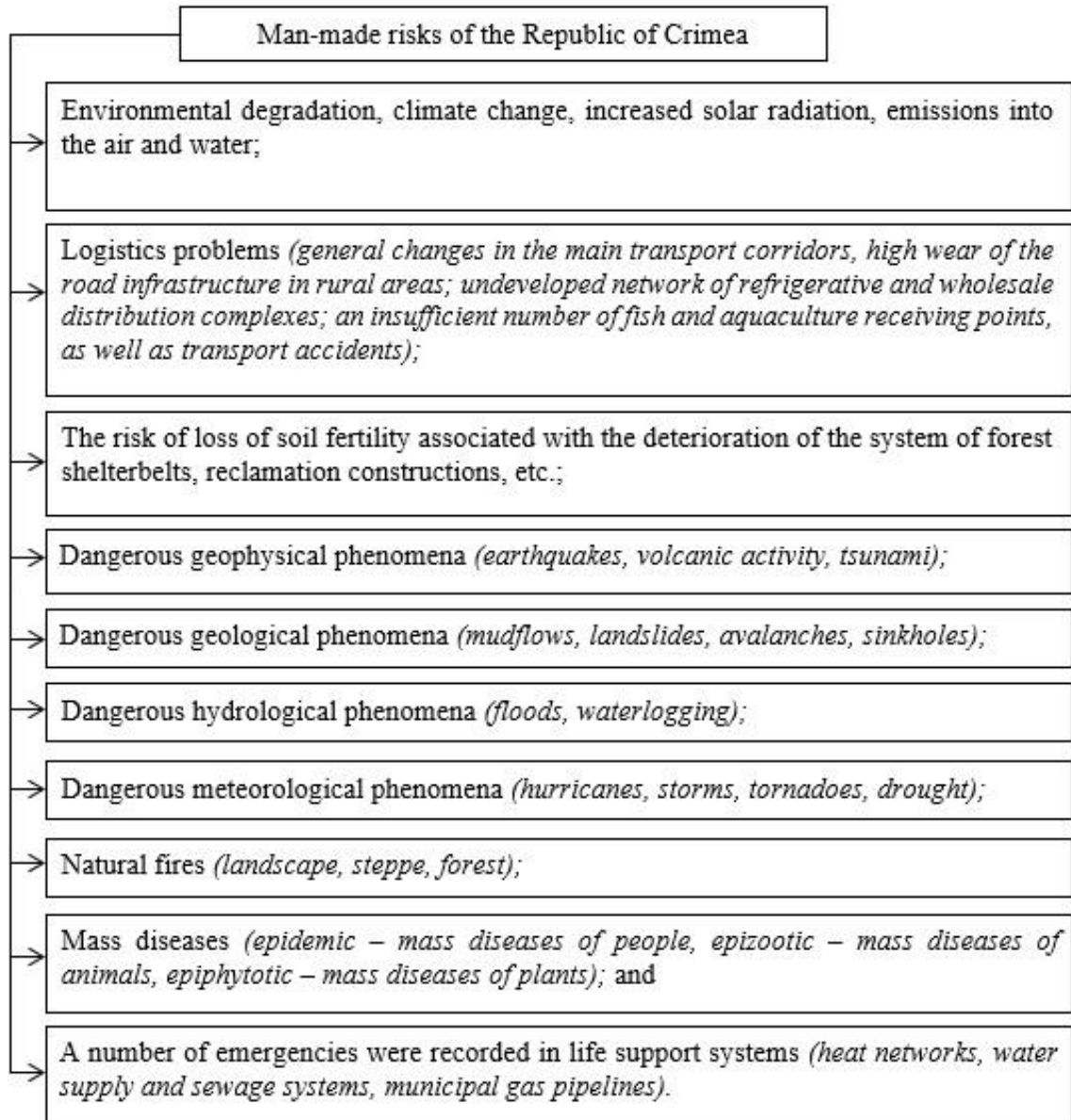


Fig. 2: Man-Made Risks Of The Republic Of Crimea [8, 10].

All this has impact on the environment and, respectively, pollutes all possible resources required for the agro-industrial complex operation.

The constant impact of all these adverse factors has negative effect on the economic performance of producers in the agro-industrial complex and reduces the investment attractiveness of the industry. The yield of agricultural crops suffers, which affects production costs, sales volumes, profit

margins, and profitability.

C. Flow chart

Based on the analysis, the main strengths and weaknesses of agriculture in the Republic of Crimea are highlighted, as well as threats and opportunities, presented in the SWOT analysis (Table 1).

Table 1. SWOT Analysis Of The Agro-Industrial Complex Of Crimea

Strengths	Weaknesses	Opportunities	Threats
<ol style="list-style-type: none"> 1. Mild climate and terrain features allow using the industrial farming systems; 2. Updating the fixed assets using budget support; 3. Financing of the economically and socially important projects of the agriculture development programs; 4. Reduction of food imports as a response measure of the Russian Federation to international sanctions against the Crimean producers; and 5. Effects of preferences in the Free Economic Zone. 	<ol style="list-style-type: none"> 1. Erodibility and various forms of degradation of 50 % of arable land; 2. Lack of water resources and power grid equipment 3. Reduction of the rural population, reduction of labor motivation, unsatisfactory state of the rural social infrastructure; 4. High depreciation of fixed assets; 5. Lack of a legislative framework for organic farming; 6. Lack of marketing services in most agrarian enterprises; 7. Weakened competition can reduce the interest of business entities in optimizing their activities; and 8. Budget funding of the agro-industrial complex many times exceeds tax revenues from its activities. 	<ol style="list-style-type: none"> 1. Possibility of expanding the area of land in cultivation, vastness of the available soil resources; 2. Increasing the prestige of rural professions, overcoming the reluctance of university graduates to work in agriculture; 3. Better efficiency of agricultural production at better capital-labor ratio; 4. Active use of banking lending services: leasing, factoring. 5. Optimal combination of the market and state regulation will ensure the stable development of the agro-industrial complex; 6. Growth of food security in the region; 7. Reducing seasonal fluctuations in sales; and 8. Expanding the product range. Rational level of agrarian protectionism. 	<ol style="list-style-type: none"> 1. Insufficient soil moisture, risk of early spring frosts; 2. Weakening of the personnel potential at agricultural enterprises, drop in demand for skilled labor; 3. Budget deficit may not allow to fully finance programs of state support of the agro-industrial complex; and 4. Risk of reducing the nonprice competitiveness of agrifood products.

The data from the SWOT analysis indicate that the agro-industrial enterprises are currently operating in quite favorable environmental conditions. The importance of direct and indirect external factors influencing the environment is great: strengthening the state support policy and formation of strategic areas for the enterprise development.

A number of problems faced by agricultural producers can be seen at the present stage of development of the agro-industrial complex in the Republic of Crimea. The range of problems listed is not exhaustive. Failure to solve the arising problems adversely influences the development of the agricultural sector. Some problem situations are solved by producers independently, while some require state support, such as financial resources and the creation of certain administrative documents, both in terms of supporting agricultural producers and in creating a favorable climate for potential investors. The Ministry of Agriculture of Russia is given an important role in the implementation of anti-crisis measures, defining the ways to achieve key indicators on import substitution, and ensuring the country's food security.

The agriculture development requires the overcoming of the existing problems in this sector related to the extensive development of the agro-industrial complex, irrational use of water resources, outdated technologies and methods, poor transport logistics, and high production costs. The following is required to overcome the problems and ensure the successful operation of the agro-industrial complex in Crimea: attract investors; change the structure of agriculture in the Republic of Crimea, because the agricultural potential of each

individual region in Crimea varies significantly (development of agricultural subsectors that correspond to the climatic, economic, cultural, and historical conditions of Crimea); livestock development; construction of factories for processing agricultural products; and modern equipment for agricultural production. The methods of overcoming the main problems of the agricultural complex of Crimea are considered further in more detail.

III. RESULTS

A. Approaches to neutralize the identified threats to the agro-industrial complex of the Republic of Crimea

On a sectoral basis, the Republic of Crimea can boast the possibility of developing the agro-industrial complex. The agro-industrial complex in the Republic of Crimea has one of the leading positions in the region, which is caused not only by climatic conditions, but also by sufficient soil fertility. The agro-industrial complex needs to create new jobs and bring real income to the region, thereby ensuring import substitution, finding means and ways to preserve nature for further positive development. The crisis in the agricultural sector is currently one of the reasons for the modern development of the agro-industrial cluster.

However, there is still a trend to underestimate the role of the agrarian sector at

the regional level. This strengthens the crisis trends in the development of rural areas and activates the migration of the working-age rural population to the cities. The introduction of measures for the development of a competitive agricultural sector and the organization of the economically efficient agro-industrial production, as well as the maximum saturation of the domestic market with own-produced agricultural products [11] should prevent the decline of rural areas.

At the present stage of transformations, the efficiency of the measures for encouraging the development of the agro-industrial complex in the Republic of Crimea is directly related to solving systemic problems in rural areas, improving the state policies to encourage the development of entrepreneurship, and revitalizing the economic initiative in villages.

It is strategically important to clearly define the ways to solve the main problems described in paragraph 3.1 at the state and regional levels under such conditions. Based on this, some specific problem areas can be identified. First of all, ensuring food security in the region is hampered by the lack of the efficient monitoring of supply and demand for agricultural products. Measures for pricing and integrated supply of domestic agricultural products remain inefficient. For example, consumer prices for agricultural products are rising in the regional markets, on the one hand, while a resident of

the village remains unprotected as an agricultural producer since the intermediary price of bulk purchases is understated, on the other hand.

Besides, structural imbalances in the functioning of the agro-industrial complex in the Republic of Crimea are observed, reinforced by the preservation of the extensive nature of production. The obsolescence of the material and technical base of the agrarian sector in the region should be recognized as the systemic problem in this area.

Socio-demographic indicators of the development of rural areas in the Republic of Crimea indicate the persistence of sustainable trends of aging among the rural population, as well as increased labor migration ("brain drain") among young people and economically active population from the village to the cities, which inevitably raises the labor problem in the agricultural production [12].

The man-made risks in the Republic of Crimea are also underresearched and monitored.

The main tools to encourage the development of the agro-industrial complex in the Republic of Crimea can be derived on the basis of the above-mentioned problem areas (Table 2).

Table 2. Tools To Encourage The Development Of The Agro-Industrial Complex In The Republic Of Crimea

Tools to encourage the development of the agro-industrial complex in the Republic of Crimea			
Measures to improve the state management mechanisms in the industry	Measures for the modernization of technical and technological support of the industry	Employment promotion measures	Measures to minimize man-made risks
<ul style="list-style-type: none"> • modernization of integrated regional development programs for rural areas; • consolidation of the status of rural areas, with the definition of territorial features and available resource opportunities for the production of certain types of agricultural products; • preparation of the investment project base for attracting new production technologies in order to increase productivity – first of all, at the farms in the region; • encouraging an increase in sales of agricultural products through the development of regional systems for providing preferences for various types of agricultural products; and • introduction of advertising information tools to promote local agricultural products on domestic and foreign markets. 	<ul style="list-style-type: none"> • introduction of incentives for farms that introduce environmentally friendly technologies for the production of agricultural products and upgrade the existing irrigation systems; and • initiating cooperation of agricultural producers, representatives of research institutions, and machine-building complex at the regional level in order to identify the existing opportunities for improving land reclamation systems using water and energy-saving technologies. 	<ul style="list-style-type: none"> • updating educational programs on the basis of higher educational and scientific institutions using a modern system of personnel training and retraining; • introduction of compulsory internship in agricultural enterprises, where modern production technologies of agricultural products are introduced, in the educational process with the aim of increasing the level of professional training of specialists in the agrarian sector; and • increasing youth employment in rural areas through the cooperation of employment centers and employers with state administrations and village councils to promote the creation of new jobs, including temporary jobs (paid public works). 	<ul style="list-style-type: none"> • reservation – creating the reserves of resources, which allows either to exclude the possibility of a risk situation or to partially reduce the incurred losses and damages; • re-equipment based on the introduction of new scientific achievements, energy and resource saving technologies, waste-free and environmentally safe technological processes, use of renewable energy sources, solution of problems of recycling and processing of all types of waste; • updating the system to monitor the state of the mining and chemical industry, pollution of groundwater and surface water, and the development of technological options for the disposal of opencast mines; • use of insurance and self-insurance, their compensatory risk management capabilities. They determine possible consequences of incidents, give binding recommendations to reduce risks, and exercise third-party control in the handling of incidents; and • measures to help farmers minimize risks through a system of research and consulting institutions.

It is impossible to single out the value of any of the subsystems for agriculture, since the absence of one of them has negative consequences for the agro-industrial complex. However, the decisive role belongs to the economic

component, which is dominant in the system of this relationship, since the goal of the activities of any

commercial organization is to make a profit. The social field relates to existential social goals, inseparable from the humans and the economic structure they create. The environmental component ensures the rational use and preservation of the existing natural resources, and maintenance of the existing ecosystem [13]. When all subsystems are developed in their interconnection, not only improvement of indicators of each of the components is expected, but also an impact is made on the change of indicators that are the results of the interaction of these systems: socioeconomic development of the agricultural sector, economic environmental, and social environmental (Figure 3) [13].

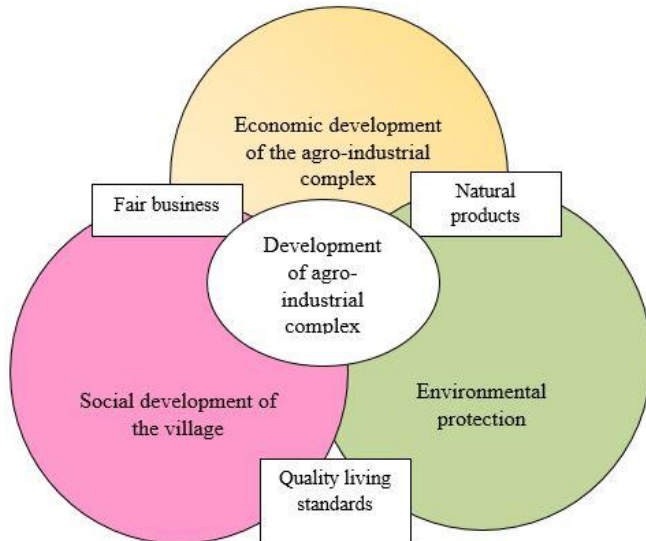


Fig. 3: Components Of The Development Of The Agro-Industrial Complex In The Republic Of Crimea

It is indicated in Figure 3 that only a clear interaction of all parties defining the activities of the agro-industrial complex allows achieving uniform stable development of the industry, since the slightest negative change in one of them leads to the respective consequences in the others.

Besides, the regulatory documents governing the

development of the agro-industrial sector include the State Program for the development of agriculture and regulation of agricultural products, raw materials, and food markets of the Republic of Crimea for 2015 – 2020 (Figure 4) [14].

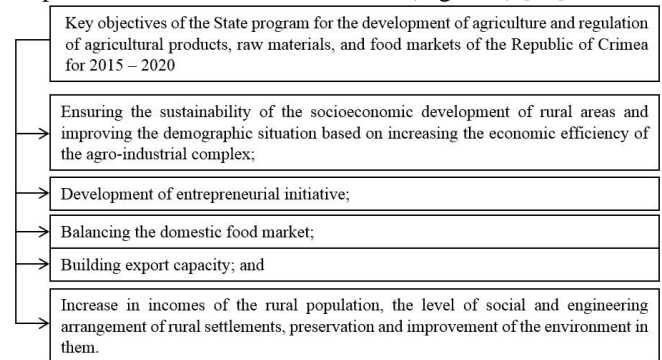


Fig. 4: The Key Objectives Of The State Program For The Development Of Agriculture And Regulation Of Agricultural Products, Raw Materials, And Food Markets Of The Republic Of Crimea For 2015 – 2020 [15].

The key measures of the program are two units:

1) measures to improve the efficiency of the agro-industrial complex;

2) measures for the social development of rural areas. Upon analyzing the objectives of the program, it can be noted that this strategy does not cover the development of the environmental subsystem, which can affect both the sustainability of the agro-industrial complex as the unified system, and the sustainability of the region, as well as the health of the population. Therefore, for the comprehensive implementation of the strategy for the development of the agro-industrial complex, the system presented in Figure 4 should be formed with due consideration for the factors presented in Table 3.

Table 3. The Factors Ensuring A Comprehensive Implementation Of The Strategy For The Development Of The Agro-Industrial Complex Of The Republic Of Crimea [14]

The factors ensuring a comprehensive implementation of the strategy for the development of the agro-industrial complex of the Republic of Crimea	
State level	Industry level
Economic development of the agro-industrial complex	
<ul style="list-style-type: none"> • stringent finance and credit policy, which allows creating conditions for a rapid economic recovery; and • active investment and innovation policies focused on searching for and using one's own opportunities, choosing priority development areas with high rates of economic circulation and growth of internal accumulation and consumption funds. 	<ul style="list-style-type: none"> • organization of the program-targeted management, which should include modeling of monitoring market events, including the flows of capital, investment, labor, and other factors.
Social development of the village	

<ul style="list-style-type: none"> • active social policy with clear innovative guidelines, goals, and objectives using mobilization modernization; • creation of efficient institutional conditions, mechanisms for updating the entire social complex, technologies, and knowledge, using tax, credit, and investment tools; and • clear definition of the responsibility areas of the state and business. 	<ul style="list-style-type: none"> • creating conditions for attracting young professionals; and • invoking interest in employees of the organization in advanced training and obtaining vocational education.
Environmental protection	
<ul style="list-style-type: none"> • active environmental policy in terms of the quality of the environment. 	<ul style="list-style-type: none"> • implementation of the optimal way of operation; • optimization of irrigated farming; • creation of a rational system for the use of fertilizers and pesticides; and • application of biotechnology methods for waste disposal.

State support is required for high-quality and efficient implementation of the strategy for the development and effective functioning of the agro-industrial complex in the Republic of Crimea, which consists in developing mechanisms for the indirect regulation of the activities of independent business entities, organizations, institutions, and people associated with agricultural activities. The key management tools for development and socioeconomic systems of different levels include strategic indicative

planning, which is the formation of a system of indicators reflecting the socioeconomic development of the industry, and government regulation of development to achieve the target values of indicators [14]. Based on the analysis of the agro-industrial complex in the Republic of Crimea from Chapter 2 and the detected problematic and promising aspects, the main indicators will be derived that could be used to assess the level of development of the agro-industrial complex of the Republic of Crimea (Figure 5).

Economic subsystem	<p>Indicators:</p> <ul style="list-style-type: none"> • dynamics of changes in agricultural production; • consumption of materials and energy intensity of agricultural products; • changes in the structure of commodity products, with due consideration for the priority productions; • labor productivity; • waste utilization and recycling; • volume of investments in fixed assets; • share of profitable agricultural organizations • capital productivity; and • growth rate of GRP.
Social subsystem	<p>Indicators:</p> <ul style="list-style-type: none"> • life expectancy (expected at birth and actual); • provision of medical care; • level of injuries at work and at home; • availability of jobs and their compliance with the structure of labor resources; • access to education and training; • provision of housing and places of recreation; • satisfaction of cognitive and cultural needs; and • population.
Environmental protection subsystem	<p>Indicators:</p> <ul style="list-style-type: none"> • level of environmental pollution: air, water, soil, flora and fauna; • trends in emissions and accumulation of pollutants in the media: gaseous, liquid, solid; • rates of change in biodiversity; • increase in the area of specially protected areas; and • level of costs for environmental activities.

Fig. 5: The List Of Indicators To Assess The Development Of The Agro-Industrial Complex Of The Republic Of Crimea

The above list of indicators is not exhaustive, some of them relate to an agricultural enterprise, while others describe the

development of the region in general. The improvement of

these indicators can be achieved both through the results of the enterprise operation, and with the help of state support in the form of various programs [16].

The appropriate information systems that are focused both on researchers and specialists of implementation services, and on agricultural producers should be created to influence the indicators at the state level in order to ensure their highly efficient operation [16].

Creating an information system at the level of the Republic of Crimea and organizing interconnections between different levels of information systems will allow collecting and generating information about individual components of both agriculture and the region in general for further strategic planning of the agro-industrial sector, which will generally contribute to solving complex program, technical, legal, organizational, financial, and other issues [16].

The development of the agrarian production in the Republic of Crimea is impossible without a harmonious interconnection between the roles of the market and the state, where the development of state plans and strategies is very important. The development strategy for the agrarian sector of the Republic of Crimea should contribute to creating conditions for its sustainable development, increasing the productivity and competitiveness of agricultural products while preserving the environment. Ensuring the sustainable development of the agro-industrial complex of the Republic of Crimea as an integrated system is possible only under the condition of the development of its three subsystems, such as economic, social, and environmental protection in their interconnection [16].

IV. CONCLUSION

It is not correct to single out the importance of a single subsystem (economic, social, environmental protection) in agriculture. If one subsystem is lacking, it will entail extremely negative consequences for the entire agro-industrial complex. Therefore, a strategy for its development should be formed in three directions: economic, social, and environmental protection. However, the implementation of this strategy should be accompanied by supporting information on the size of the main indicators that reflect both the situation in the industry and in the region in general, as well as the dynamics demonstrating the results of the strategy and its institutional support.

Further research should be focused on the development of institutional support in the context of implementing national projects in Russia.

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