Priorities and strategies for the development of the agro-industrial complex of the Rostov region

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Abstract. The article presents the results of research on priorities and strategies for the development of the regional agro-industrial complex. The research is based on actual materials on planning and management of the agro-industrial complex of the Rostov region of the Russian Federation. The analytical analysis has been carried out on the basis of regional development patterns, organization laws and the theory of planning and forecasting. In contrast to the dominant methods of spontaneous market regulation of agricultural production, it is proposed to use strategic management methods based on the identified priorities and the methods of economic stimulation of agro-industrial clusters development. Application of these methods will increase the efficiency of the region’s agro-industrial complex.

1. Introduction

The role of strategy in the scientific and technological development of Russia is confirmed by the relevant Decree of the President of the Russian Federation [1] and the Federal Law on strategic planning [2]. Academician of the Russian Academy of Sciences A.G. Aganbegyan notes: "At times, our state purposelessly spends vast sums of money on certain industries that do not produce positive results. The reason for this is the lack of planning."

There are several viewpoints on the definition of strategy, which can be reduced to two groups: 1) strategy as a general comprehensive plan for the development of an organizational socio-economic system; 2) strategy as a methodology for achieving an organization's strategic goals [4, p. 17-19]. Regional authorities of the Rostov region consider the strategy as the implementation of certain conceptions and comprehensive plans, a "road map". As it is known, a strategic plan is based on a conception. The conception of development of the agro-industrial complex of the Rostov region was approved by the Decree of the Government of the Rostov region in 2012 [3]. The content of this conception's strategic management is disclosed in [4, p. 473-474]. Subsequently, the Program and the Strategy for the development of the agro-industrial complex of the Rostov region were adopted [5-7].

The purpose of the present research is to describe the priorities and development strategy of the agro-industrial complex based on the materials of the Rostov region.
2. Materials and methods

The research methodology includes monographic analysis of conceptions, strategies and programs for the development of the regional agro-industrial complex (AIC), as well as strategic analysis. The analysis is based on the principles of development of the regional agro-industrial complex, the laws of organization, the theory of planning and forecasting. The research methodology provides for the identification of threats and risks in the development of the agro-industrial complex. It is based on academic works and regulatory documents on priorities and strategies of the agro-industrial complex development.

Experimental base is represented with available web resources, the data of Russian State Statistics Service (Rosstat), documents of the regional government of the Rostov region [1-3; 5; 13-16].

According to Russian scientists A.G. Aganbegyan, S. Glazyev, O. Vikhansky, R. Vesnin et al., strategic planning is an integral part of the activities of both commercial organizations and states with market economies where development indicators are set, i.e. it is possible to manage the economy through development and implementation of road maps, state programs, conceptions, strategies, and projects. This point of view is confirmed in the works of foreign researchers R. Akoff, I. Asides, P. Drucker, R. Ganta, C. Bowman, T. Peters et al. [8]

Among the latest developments by Russian scientists, we can note the research by A.A. Ter-Grigoryants, according to whom the Stavropol region bordering with the Rostov region has serious problems of agricultural development: cancellation of land reclamation, reduced export of organic matter to the fields, non-observance of crop rotations due to the skewed cropping patterns in favour of economically profitable crops [9, p. 171]. The Rostov region experiences the same problems. Therefore, there is need to work out a strategic plan for improving crop rotations and preventing a decrease in soil quality [9, p. 178].

Studies on basic strategies for agricultural development in the region carried out by A.V. Getov and O.V. Kolesnikova (Rostov State University of Economics) confirmed the relevance of strategic management and planning.

An economic analysis of the Conception [3] has been conducted. The following results have been obtained. The agro-industrial complex of the Rostov region is sufficiently competitive due to the large volume of grain production (12.0 million tons) and exports of wheat, oilseeds, food products: the region's share in the volume of the whole country's export makes over 20%, with the proportion of land resources being 8.5%. The efficiency of management and return on farmlands in the Rostov region is three times higher than the average indicator in Russia.

The Conception [3] reflects the competitive advantages, potential and forecast of economic development of the Rostov region until 2020, and identifies threats and risks. It takes advantage in the program-target method used in its development.

In general, the conception's development corresponds to the methodology of strategic planning and anticipates some provisions of the conception of scientific and technological development of Russia and legislation on strategic planning [1, 2]. What priorities have been set in this conception? They proceed from the need to solve systemic problems of crop production, animal husbandry, and processing industries. Crop production is characterized by the extensive path of development. The increase in production of wheat, barley and grain crops in general was achieved due to the introduction of accelerated crop rotation with a predominance of oilseeds and cereals, while reducing the production of forage crops, perennial and annual grasses, pastures, that is, to the detriment of the feed base of the livestock industry. The problem consists in the tendency to increased dehumification [11], agricultural depletion, secondary salinization, flooding, and desertification [12]. According to the conception, water and wind erosion provoke withdrawal of arable lands from circulation and an increase in areas with saline soils characterized by limited agricultural production [3]. Moreover, the area of irrigated lands is decreasing, which leads to a reduced production of a number of irrigated crops [3]. The real threats include the wear of machine and tractor fleet, imperfection of engineering services and control system of agricultural and processing equipment, including elevators and grain reception centers, lack of qualified staff due to low attractiveness of jobs in villages and hamlets [5, p. 34-35]. Development of ani-
mal husbandry is constrained by its decentralization. The decentralization of the livestock sector is evident due to a significant share of the small-scale sector. For example, agricultural enterprises cover only 18.4% of the total number of cows that produce about 11.5% of milk, while private farms hold 70% of cows that produce almost 80% of milk. The problems in pig farming are associated with the threat of African swine fever. Methods of treatment of this disease in pigs have not yet been developed, and the usual measures consist in transferring pig farms to the closed type mode. The number of pigs in agricultural enterprises decreased by 36.5%, in homesteads – by 67.3%, and in private subsidiary farms – by 49.6% due to animal diseases. The problems in cattle breeding include the lack of an economically justified gradation of prices for cattle meat, as well as a long payback period for investments (payback period for projects for cattle fattening is over 10 years). The poultry farming suffers from the lack of hatching eggs produced in the Rostov region at increasing production volumes of poultry products, which leads to increased dependence on external suppliers and epizootic conditions. Sheep farming in its turn experiences the lack of meat processing enterprises specialized in primary processing of sheep meat.

3. Results and discussion

− The Strategy 2030 [5] is based on "essential challenges that have a significant impact on the development of the Rostov region", namely:
  − retention and extension of sanctions between developed Western countries, conflict at the border with the Rostov region;
  − prerequisites for the fourth technological revolution (digitalization, artificial intelligence, "smart materials", additive technologies, genetic engineering, autonomization and greening of production processes. This conclusion is drawn from the system of priorities of the USA, EU countries, Japan and China, which are developing the following technological areas: IC technologies, bio- and nanotechnologies (NBIC technologies) and new materials technologies;
  − climate aridity and increased anthropogenic impact on the environment;
  − increased instability and changes in the structure of international trade in agricultural raw materials and food, in which the Rostov region participates;
  − growth of interregional competition for qualified staff in the conditions of "knowledge economy", i.e. increased physical mobility of employees who move to Moscow, St. Petersburg and Krasnodar for self-fulfilment opportunities;
  − intensification of inter-regional competition for investment resources.

It is logical to assume that the priorities for the agro-industrial complex development are determined by the listed challenges, as well as threats specific to agricultural sector. The long production cycle of the agro-industrial complex complicates lending at commercial rates and creates a lack of availability of credit products for three reasons: 1) relatively high cost of borrowed funds; 2) insufficient liquidity of the collateral base of farmers; 3) reduced financial stability due to the creditworthiness of agricultural enterprises.

The development priority is to increase financial stability of agricultural enterprises using financial management methods and reduce the cost of borrowed funds to the values accepted in the world farming practice (up to 2-3% per annum), subsidizing and protectionism of production and export of agricultural products based on the experience of competitors – the United States, EU countries, Japan, Israel.

Increasing the availability of credit funds and financial stability of agricultural enterprises in the Rostov region, including concessional lending, subsidies and export protectionism will allow developing the material and technical base of agricultural producers and processors of plant and livestock raw materials, including purchasing equipment, tractors, harvester that have integrated ICT and AI technologies, and introducing additive and NBIC technologies. This will solve the problem of excessive wear of machine and tractor fleet of the Rostov region, which makes 66% for tractors and 55% – for combine harvesters.
The priority measures include minimization of the risks of natural and climatic anomalies and adverse epizootic situations. According to the Strategy, as a result of various anomalous natural phenomena, agricultural producers receive from 10 to 15% less than due crop [5, p. 34]. Due to the African plague and avian flu, the number of pigs and poultry has significantly decreased. Damages from droughts and epizootics are so significant that insurance companies offer high premiums, which makes risk insurance in the agricultural sector unpopular. It is necessary to compensate the costs of agricultural producers for risk insurance through subsidies based on the experience of the Scandinavian countries.

Development of clusters of agricultural production and processing is one of the priority directions provided for in the conception [7].

Greening of agricultural production is also a matter of priority. It implies compliance with the norms and standards for the use of soil cover of state and private agricultural land; restoring the humus content in the soils of the Rostov region to the level of 1965–1968 years, i.e. up to 3.5%; increasing the content of mobile phosphorus to an acceptable level of 30.0–40.0 mg/kg (currently it is two times below the norm). To prevent deterioration of the environmental and economic situation in the agricultural sector, it is necessary to prevent soil degradation and preserve the potential of irrigated agriculture. These measures can increase yield by an average of 10 dt/ha [5, p. 35]. It is also necessary to develop livestock industries and introduce biotechnologies for processing manure into organic fertilizers with their subsequent introduction into the soil fertile layer [11, p. 5-11]. Forest plantations being an obstacle to soil degradation should be restored, and the activities of forestry enterprises should be relaunched.

Increasing the profitability and volumes of agricultural production in the Rostov region directly depends on the possibility of its sale in retail chains at wholesale prices, i.e. on the proportionality of profit distribution between trade and agricultural producers. Priority measures include the regulation of price margins of trading networks to ensure the profits of at least 35% for agricultural enterprises and farmers (the case of technologically developed countries), while ensuring protectionism for domestic products in retail chains and improving access to the wholesale market for domestic food and agricultural raw materials.

At the same time, data of [13] and [14] provide for insurance of only 2.2% of crops by 2030 (indicator E. 9), the growth of livestock and poultry production in live weight from 362.5 to 460.0 thousand tons (indicator E. 10), milk – from 183.0 to 208 thousand tons (indicator E. 11). Equipment upgrades are projected at an extremely low level: 50 tractors and 200 harvesters per year (indicators E. 30, p.p. 2.30.1 and 2.30.2) [13, p. 19-21].

Table 1. Data on indicators of the State program of the Rostov region (extract) [14]

| Показатели | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|-----------|------|------|------|------|------|------|------|------|------|------|------|
| 1) %      | 101.2| 101.3| 101.5| 102.0| 101.8| 101.8| 101.7| 101.8| 101.8| 101.7| 101.9 |
| 2) %      | 28.8 | 28.9 | 28.9 | 28.9 | 28.9 | 29.0 | 31.0 | 31.5 | 32.0 | 32.5 | 33.0 |
| 3) Т.т.   | 265.5| 300  | 380  | 452  | 452.5| 453  | 453.5| 454  | 454.5| 455  | 460  |
| 4) Т.т.   | 212  | 220  | 220.5| 208  | 208  | 208  | 208  | 208  | 208  | 208  | 208  |

Notes: 1) Index of agricultural production in farms of all categories (in comparable prices).
2) The share of animal husbandry in the structure of agricultural production, %.
3) Production of livestock and poultry for slaughter in farms of all categories (in live weight), thousand tons
4) Production of milk in agricultural organizations, peasant (farm) farms, including individual entrepreneurs, thousand tons

The State program [15] provides for a slight increase in the share of livestock and agricultural products in general (Table 1). The index of agricultural production in farms of all categories (in comparable prices) is projected in the range of 101.2 - 102.0%. The largest growth is expected in 2023. The share of animal husbandry in the structure of agricultural production, which affects not only the production of meat, but organic fertilizers as well, provides for a slight increase from 28.8 to 33.0%.
which does not significantly change the current situation. With an increase in the share of animal husbandry by 4.2%, it is planned to increase the volume of meat production in live weight from 265.5 in 2020 to 460.0 thousand tons in 2030, by a total of 194.5 thousand tons, i.e. by 73.28%.

The State program does not provide for an increase in milk production volumes and significant growth in the production of agricultural raw materials in the Rostov region.

Analysis of the main types of crop production shows that the forecast for the development of the agro-industrial complex in the Rostov region outlined in the Conception [3] was verified (Fig.1). Production of oilseeds, cereals and legumes was increased by 35% during the period under review (Fig.1).

Determining the export potential of the Rostov region required carrying out recalculation of production per capita and finding out that food security of the region is ensured and there is a significant export reserve for agricultural raw materials and products of its processing.

![Figure 1. Production of cereals, legumes and oilseeds: forecast and fact, thousand tons [16]](image)

The results of the analysis substantiate application of strategic management methods based on the identified priorities and economic incentives for the development of agro-industrial clusters, as opposed to the dominant methods of spontaneous market regulation of agricultural production. This will increase the efficiency of the region's agricultural sector.

4. Conclusion

The priorities for the development of the regional agro-industrial complex, according to the research based on the materials of the Rostov region, are as follows:

− improving financial stability of agricultural enterprises and reducing the cost of borrowed funds to the values accepted in the world farming practice (up to 2-3% per annum), subsidizing and protectionism of production and export of agricultural products based on the experience of competitors – the United States, EU countries, Japan, Israel;
− minimizing the risks of natural and climatic anomalies and adverse epizootic situations;
− greening of agricultural production: compliance with the norms and standards for the use of soil cover of state and private agricultural lands; restoring the humus content in the soils of the Rostov region to the level of 1965–1968 years, i.e. up to 3.5%; increasing the content of mobile phosphorus to an acceptable level of 30.0–40.0 mg/kg;
− regulating price margins of trading networks to ensure the profits of at least 35% for agricultural enterprises and farmers, while ensuring protectionism for domestic products in retail chains and improving access to the wholesale market for domestic food and agricultural raw materials;
− establishing agricultural clusters [13, p. 163-165], realizing export potential.

The existing program documents [3; 5; 13; 14-16] do not fully correspond to the region's development strategy. The strategic direction for the Rostov region's AIC development consists in concession-
lending and subsidies, export protectionism, which will provide financial resources for the purchase of equipment, tractors, harvesters integrated with ICT and AI technologies, and funds for the introduction of additive and NBIC technologies. It is impossible to solve the problem of excessive wear of machine and tractor fleet of the Rostov region within the framework of the adopted program. The program does not meet the requirement of increase in insured risks of crop and animal yield losses, droughts and epizootics by compensation of agricultural producers' expenses on risk insurance. To prevent deterioration of the environmental and economic situation in the agricultural sector, it is necessary to prevent soil degradation and preserve the potential of irrigated agriculture. Providing opportunities for agricultural producers to sell their products in retail chains, achieving an optimal proportion in the distribution of profits between trade dealers, farmers and agricultural enterprises.

In contrast to the dominant methods of spontaneous market regulation of agricultural production, it is proposed to use strategic management methods based on the identified priorities and the methods of economic stimulation of agro-industrial clusters development. Application of these methods will increase the efficiency of the region's agro-industrial complex.

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