Formation of investment resources of the grain subcomplex
Volgograd region and its sustainability

A S Gorbacheva, V V Ivanov, N N Balashova, T A Chekrygina, N V Chernovanova, E V Yagupova and V A Melikhov

Volgograd State Agrarian University, 26 University Avenue, Volgograd, 400002, Russia

E-mail: annasemenovna26@mail.ru

Abstract. The article discusses the positive experience of the operation of the agricultural holding of the Volgograd region, engaged in the production, processing and sale of grain and grain products. The authors identified and analyzed the factors that both hinder the formation of integration ties in the grain sub-complex of the regional agro-industrial complex, and contribute to their dynamic development. The article describes methodological approaches to the organization of integration mechanisms that take into account the economic interests of all their participants: from producers of grain products, enterprises for the processing and storage of grain, subjects of the processing industry of the agro-industrial complex, transport companies, trade organizations. A competent pricing policy for products, works and services of all economic entities of the agricultural holding has been determined as a guarantee of the ability to compete and maintain its market niche. Prospects for integrating the activities of an agricultural holding with a research organization are considered in order to increase its investment activity in terms of introducing new technological, breeding, marketing and other innovations that contribute to ensuring a high level of development of all subjects of the agro-industrial business and their financial stability.

1. Introduction

The grain industry is one of the most important leading sub-complexes of the agro-industrial complex of Russia, including the Volgograd region. The share of grain and products of its processing is very significant in the structure of the gross product of the Volgograd region [1]. Their share in the food market is not just high, it prevails and thereby ensures regional food security and food independence [2]. Consequently, the search for promising directions for the development of the grain product sub-complex of the Volgograd region, including through the formation of integrated companies, is an urgent problem of the regional economy [3]. The interpretation of integrative growth as a general strategy for the development of the modern agro-industrial complex is based on the fact that, based on the achievements of scientific and technological progress, it reflects a promising global strategy for changing the food market as a whole, necessary to overcome the existing problems of its participants [4, 5, 6].

Based on the foregoing, the aim of the study was to analyze the experience of the effective functioning of integrated formations in the sphere of the agro-industrial complex, as a way to achieve their expanded reproduction, by increasing their investment competitiveness and innovative activity.
2. Materials and methods
The methodological basis for writing the article was the dialectical method of cognition and the systematic approach, which led to an integrated approach to the study of the state of integration and the formation of investment resources of the grain sub-complex of the Volgograd region. In the process of writing the article, monographs and articles of modern economists were studied, devoted to the problems of cooperation and integration of agricultural business entities, as well as statistical materials and accounting and reporting data of the Open Joint Stock Company “Novoanninsky Combine of Bread Products”. When writing the article, the methods of expert assessments and the economic and statistical method of scientific knowledge were used.

3. Results and discussion
The article presents objective evidence of the effectiveness of the formation of integration ties between the subjects of agribusiness of the grain sub-complex of the Volgograd region as a way to increase their investment competitiveness and innovative activity.

Despite the dynamic growth in the production of grain and products of its industrial processing, the noted stabilization of the financial condition of individual agribusiness entities in the Volgograd region, its general situation remains rather difficult [7]. Table 1 presents data on the size of the sown area, productivity and gross harvest of grain and leguminous crops.

### Table 1. Grain production in the Volgograd region in 2019.

| Types of cereals and legumes | Sowing area, thousand hectares | Gross harvest, thousand centner | Crop yield, centner / hectare |
|------------------------------|--------------------------------|---------------------------------|------------------------------|
| Whole grains and pulses      |                                |                                 |                              |
| Including:                  |                                |                                 |                              |
| - winter wheat              | 906.00                         | 22360.08                        | 24.68                        |
| - winter rye                | 24.30                          | 327.81                          | 13.49                        |
| - winter barley             | 1.09                           | 16.99                           | 15.59                        |
| - winter triticale          | 5.00                           | 85.95                           | 17.19                        |
| - spring wheat              | 65.39                          | 588.51                          | 9.00                         |
| - spring barley             | 130.39                         | 1131.79                         | 8.68                         |
| - spring triticale          | 0.98                           | 5.88                            | 6.00                         |
| - oats                      | 4.49                           | 449.00                          | 10.00                        |
| - corn                      | 51.19                          | 2548.75                         | 49.79                        |
| - millet                    | 21.79                          | 311.82                          | 14.31                        |
| - buckwheat                 | 1.68                           | 25.18                           | 14.99                        |
| - sorogo                    | 10.47                          | 156.74                          | 14.97                        |
| - pulses (total)            | 68.0                           | 774.52                          | 11.39                        |

The reasons that reduce economic sustainability and investment competitiveness include the following:
- the lack of a balanced mechanism for the formation of the existing infrastructure of the food market for grain products, seed and feed grain, agricultural machines and mechanisms, information and consulting services;
- the presence of numerous intermediaries in the promotion of grain commodity flows from agribusiness and processing industries to the end consumer;
- low solvency of wholesalers - buyers of grain, the use of surrogate forms of mutual settlements by subjects of the agro-food complex;
- deterioration of all components of the natural potential of grain growing (fertility of agricultural land, reduction of varietal crops, reduction of quality parameters of grain) caused by a shortage of material and production resources and a lack of investment opportunities for its representatives;
- the absence of a mutually beneficial basis in the formation of partnerships of all counterparties of the grain-product half-complex.

Insufficient development of integration ties between the production and processing of grain predetermines: a growing price disparity between agricultural and industrial products, as well as between the cost of grain products and the selling price; a widespread reduction in the capital and power supply of agribusiness entities; reduces their ability to use leasing of agricultural machinery [8].

All of the above reduces the investment competitiveness of economic entities of the regional agro-industrial complex, which results in a drop in their investment activity, deepening of the investment crisis, which interferes with their expanded reproduction.

One of the promising ways out of this situation is the formation of a more profitable production and marketing chain of the grain sub-complex through the cooperation of their activities, which will allow the fullest use of their production potential [1, 2, 9]. The elements of the structure of the grain sub-complex of the Volgograd region, with the proposed integration and the formation of on-farm mutually beneficial relations, are shown in Figure 1.

The above diagram shows that the grain market of the Volgograd region includes all stages of production and marketing chains. It includes four areas.

The first sphere is formed by representatives of the production of means of production, which should include the engineering industry, which produces machinery, equipment and vehicles for the subjects of the grain-food sub-complex of the agro-industrial complex, chemical industry enterprises that provide the above entities with fertilizers and plant protection products, as well as oil refineries that supply fuel and other fuels and lubricants.

Representatives of the second sphere are direct grain producers - these are agricultural enterprises, which have their own individual organizational-production and financial structure and specific intra-farm ties.

The third sphere is formed by processing and service enterprises, which should include grain elevators and warehouses, transport services, flour and cereal plants, feed producers, and bakery enterprises.
Figure 1. The structure of the grain product sub-complex and the movement of commodity flows.

An important function of promoting goods made from grain is performed by the fourth - the marketing sphere, which includes enterprises and the organization of wholesale and retail trade, their logistics and service (Figure 2).

The existing system of production and marketing of grain and its processed products should be rationalized through the creation and development of horizontal and vertical integrated formations, which makes it possible to stabilize all stages of the production and marketing chain of the grain subcomplex [3, 10]. Practical experience proves that in modern conditions the most stable form of cooperation are vertically integrated organizations. They make it possible to more effectively
coordinate the actions of all participants in the grain market, using a mutually beneficial pricing policy.

![Diagram] Figure 2. Factors shaping consumer demand for the products of the grain product sub-complex [1].

It is necessary to consider in more detail the factors influencing the development of agro-industrial cooperation and integration. They can be classified in two directions: factors of integration assistance and factors restraining integration processes. The characteristics of these factors, whose synergistic effect affects the formation of cooperative formations in the Volgograd region, is presented in Table 2.

**Table 2.** Contributing and constraining factors for the development of integration and cooperation in the grain-food sub-complex of the Volgograd region.

| Facilitating factors of cooperation | Restraining factors of cooperation |
|------------------------------------|-----------------------------------|
| 1. Equality and equivalence of participants united by integration ties | 1. Decrease in the volume of grain production and its quality parameters |
| 2. Improving the mechanism for regulating the grain market on a mutually beneficial basis | 2. The financial crisis of the subjects of individual agricultural producers |
| 3. The interest of grain producers in the development of integration and cooperation in order to balance the price positions for grain and its processed products | 3. Counteraction to the development of integration of trade and intermediary commercial structures - owners of elevators and processing enterprises |
| 4. The interest of all subjects of integration ties in increasing their investment competitiveness and investment security | 4. Lack of targeted government support - unfinished regulation of integrated business schemes and financial and credit measures |
| 5. The importance of grain products for ensuring regional food independence | 5. Insufficient level of qualifications of administrative personnel and owners of enterprises |
Despite the influence of constraining factors, an example of the successful formation and development of integration processes in the production and processing of grain in the Volgograd region is the practical experience of the operation of the agricultural holding “Novoanninsky”, which unites a number of modern, high-tech, diversified enterprises. It should be noted that over the past few years, thanks to the implementation of a competent investment strategy, this enterprise has been actively working on launching new industries and creating conditions for the creation of new enterprises. In addition, the enterprises that are part of the agricultural holding are constantly updating and expanding their material and technical base - the methodological approaches underlying the formation of this agricultural holding are shown in Figure 3.

![Figure 3. Methodological approaches to the development of integration processes in the grain product sub-complex.](image)

The head enterprise of the agricultural holding in question is “Novoanninsky Combine of Bread Products”, whose sphere of activity includes control and management of the production and financial activities of all participants in the integrated formation, namely:
- determination of the target mission of the agricultural holding’s functioning;
- formation of a strategy for investment and innovative development of the subjects of the agricultural holding;
- formation of coordination on-farm ties between the participants of the holding system;
- strategic and tactical financial business management;
- optimization of the formation and use of the material and technical base;
- formation of a pricing policy for products, works and services of the subjects of the agricultural holding;
- choosing a marketing strategy for an agricultural holding and solving problems of promoting products to sales markets;
- solving problematic issues and possible conflicts between agribusiness subjects;
- targeted support of a specific participant in case of crisis situations.

The organizational structure of the agricultural holding in question is represented by enterprises of various fields of activity: direct grain producers (Limited Liability Company “Solnechnaya Strana”, Limited Liability Company – Agrofirm “Belorechinskaya”), enterprises providing services for the processing and storage of grain (Open Joint Stock Company “Novoanninsky Combine of Bread Products”), representatives of the bakery industry (Limited Liability Company Novoanninsky Baker; Limited Liability Company “Novoanninsky Bread”), as well as service organizations (Open Joint Stock Company Trading House “Novoanninsky Combine of Bread Products”, Open Joint Stock Company “Volgograd Regional Machine-Building Technological Station”).

Each of the enterprises included in the agricultural holding is the owner of its property complex, land and independently pays its taxes [8].

A well-thought-out pricing policy is an effective tool for integrated production associations that allows them to maintain competitive advantages, firmly gain a foothold in the market and maintain a market niche. It is based on the principle: “an agricultural holding should be able to sell products, works and services at lower prices than those of competitors. All participants in the agricultural holding’s trade and food chain focus their work not on maximizing profit at any cost, but on optimizing it with the rational use of all types of resources: from material and technical to labor. At the same time, the bulk of the profit should be obtained from the expansion of production capacity and the increase in sales, and not due to the irrepressible growth of the selling price.

Let’s consider the situation in the market of flour and bakery products and their average retail price in 2019 - 2020 using the example of the Volgograd region.

During 2019, the level of average regional prices for flour was more than 20% higher than the prices of the agricultural holding, which only by the beginning of 2020 increased the price by 4%, while the profit from core activities for 2019 from core activities amounted to more than two million rubles (Table 3).

| Time intervals       | Average price for the region | Agricultural holding “Novoanninsky” |
|----------------------|------------------------------|-----------------------------------|
| As at January 01, 2019 | 23.50                        | 19.51                             |
| As at May 01, 2019    | 24.91                        | 19.51                             |
| As at September 01, 2019 | 24.91                      | 19.51                             |
| As at December 01, 2019 | 24.91                       | 19.51                             |
| As at January 01, 2020 | 26.48                        | 20.30                             |
| As at March 01, 2020  | 27.30                        | 20.30                             |

A similar situation was observed at the market of bread and bakery products of the Volgograd region at the same time. As an example, consider the dynamics of price fluctuations for a bakery product – “Wheat bread (yeast)” (weight 500 grams). This product enjoys stable consumer demand, its competitive advantages are based on good taste and affordable price.

Among the analogs produced in the municipal districts of the Volgograd region, “Wheat bread (yeast)” of the “Novoanninsky Combine of Bread Products” is sold at the lowest price, the excess of the price of competitors for a similar product range from 11 to 38% (Table 4). A competent policy for managing the cost of production of the structures of the agricultural holding, reducing transfer and sales costs made it possible to achieve such results.
Table 4. Price range for the product “Wheat bread (yeast)” including value added tax.

| Municipal areas              | Average regional price of a product, ruble | Percentage % to the price of the agricultural holding |
|------------------------------|--------------------------------------------|------------------------------------------------------|
| Volgograd                    | 30.00                                      | 112                                                 |
| Gorodischensky district      | 30.00                                      | 112                                                 |
| Zhirnovsky district          | 27.90                                      | 106                                                 |
| Kikvidzensky district        | 29.60                                      | 106                                                 |
| Elansky district             | 29.45                                      | 107                                                 |
| Olkhovsky district           | 28.30                                      | 107                                                 |
| Novoanninsky district        | 26.90                                      | 102                                                 |
| Frolovsky district           | 29.80                                      | 111                                                 |
| Bykovskiy district           | 29.80                                      | 113                                                 |
| Olkhovsky district           | 28.30                                      | 107                                                 |
| Rudnyansky district          | 28.30                                      | 107                                                 |
| Kikvidzensky district        | 29.60                                      | 106                                                 |
| Elansky district             | 29.45                                      | 107                                                 |
| Regional average             | 29.00                                      | 110                                                 |
| Open Joint Stock Company     | 26.40                                      | 100                                                 |

Due to the established on-farm relations, the enterprises of the agricultural holding have the opportunity to pay for services related to the promotion of the finished product along the technological chain, using more favorable tariffs compared to commodity producers that are not part of its structure.

From the data presented in Table 5, it follows that the economic entities of the agricultural holding cost acceptance services by 9%, and storage services - 24% cheaper than third-party enterprises. The exception is varietal wheat for the production of premium flour, which is purchased by members of the agricultural holding at a single market price of 9600 rubles for one ton.

Table 5. The cost of services for the acceptance and storage of grain of the agricultural holding.

| Name of product, service | Open Joint Stock Company “Novoanninsky Combine of Bread Products” | Limited Liability Company “Solnechnaya Strana” | Limited Liability Company “Agricultural enterprise Belorechinska ya” | Limited Liability Company “Novoanninsky baker” | Limited Liability Company “Novoanninsky bread” | Subjects not included in the agricultural holding |
|--------------------------|---------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Services:                |                                                              |                                               |                                                               |                                               |                                               |                                               |
| - storage, rubles/t      | *                                                             | *                                             | 177.65                                                        | 177.65                                        | 177.65                                        | 123.30                                        |
| - acceptance, rubles/t   | *                                                             | *                                             | 164.83                                                        | 164.83                                        | 164.83                                        | 171.32                                        |
| Recycling:               |                                                               |                                               |                                                               |                                               |                                               |                                               |
| - grain, rubles/t        | *                                                             | *                                             | 118.94                                                        | 118.94                                        | 118.94                                        | 150.83                                        |
| - sunflower, rubles/t    | *                                                             | *                                             | 120.15                                                        | 120.15                                        | 120.15                                        | 122.16                                        |
| Drying:                  |                                                               |                                               |                                                               |                                               |                                               |                                               |
| - grain, rubles/t        | *                                                             | *                                             | 221.21                                                        | 221.21                                        | 221.21                                        | 223.33                                        |
| - sunflower, rubles/t    | *                                                             | *                                             | 224.24                                                        | 224.24                                        | 224.24                                        | 226.67                                        |
| Grain processing services, rubles/t | *                                                             | *                                             | 530.3                                                         | 530.3                                         | 530.3                                         | 583.33                                        |
| Sales:                   |                                                               |                                               |                                                               |                                               |                                               |                                               |
Members of the agricultural holding

| Name of product, service | Open Joint Stock Company “Novoanninsky Combine of Bread Products” | Limited Liability Company “Solnechnaya Strana” | Limited Liability Company “Agricultural enterprise Belorechinska ya” | Limited Liability Company “Novoanninsky baker” | Limited Liability Company “Novoanninsky bread” | Subjects not included in the agricultural holding |
|--------------------------|---------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------|--------------------------------------------------|
| - high-quality wheat grain for flour, rubles/t | 9600 * 9600 | * 27300 | * 27300 | * 20300 |
| - flour, rubles/t | * | * | * | * |
| - finished products, rubles/kg (rubles 26.40 × 2) | * | * | * | * | * | 52.80 |

The relatively low level of tariffs for each link of the production and marketing chain ensures profitability of production and marketing activities for the subjects of the agricultural holding “Novoanninsky”, allowing them to carry out their expanded reproduction. Let us consider the mechanism of financing real investments of enterprises of the agricultural holding “Novoanninsky” (Table 6).

Table 6. Distribution of financial resources between the subjects of the agricultural holding for 2019 million rubles.

| Financial resources | Open Joint Stock Company “Novoanninsky Combine of Bread Products” | Limited Liability Company “Solnechnaya Strana” | Limited Liability Company “Agricultural enterprise Belorechinska ya” | Limited Liability Company “Novoanninsky baker” | Limited Liability Company “Novoanninsky bread” | Total |
|---------------------|---------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------|-------|
| Sources of everything | 678.3 36.3 21.4 17.6 20.0 | 773.6 | 100.0 |
| Profit | 55.7 36.3 8.3 6.3 1.1 | 107.7 | 13.9 |
| Loans | 222.6 * 13.1 11.3 18.9 | 265.9 | 34.4 |
| Investments | 400.0 * * * * | 400.0 | 51.7 |

The data in Table 6 indicate that the largest percentage in the structure of funding sources belongs to borrowed funds: loans and attracted private investment (more than 85%). Only about 14% of investment projects were implemented at the expense of our own sources. Thus, the largest share in financing belongs to private capital in the amount of 400 million rubles, which indicates investment competition and investment security of the enterprise in question. The private investment mechanism is implemented through the head enterprise - Open Joint Stock Company “Novoanninsky Combine of Bread Products”, which, in accordance with the investment policy of the enterprise, distributes funds between the structures of the agricultural holding.

Thus, the successfully functioning agricultural holding of the grain sub-complex of the Volgograd region testifies to the viability and competitive and investment advantages of its structures. Financial
and production stability of all structures of the agricultural holding “Novoanninsky” is planned to be achieved through their innovative development, the formation of a unified pricing policy, planning and budgeting of income and expenses, an increase in the functionality of the marketing service, and the formation of strong inter-farm ties. As proposals for the future, it is necessary to recommend the introduction of a research structure into its production and marketing chain, which allows for expanded reproduction and ensure a stable raw material base through the use of new varieties of grain crops, to carry out seed production and breeding services [3, 4, 6, 11, 12].

4. Conclusion
All of the above allows us to draw the following main conclusions:
- the considered model of integration ensures the operational independence of all structures of the agricultural holding in production and financial activities;
- all business entities of the agricultural holding, with the help of thoughtful actions and competent investment policy, coordinate their economic interests on a relatively mutually beneficial basis;
- by combining their finances, the subjects of the agricultural holding not only get the opportunity to implement priority and strategic projects, but also provide, if necessary, targeted assistance to its members who are in a difficult economic situation;
- as a production and financial integrated structure, the agricultural holding has investment competitiveness and the ability to carry out innovative development;
- the integration of the agricultural holding’s activities with a research organization is a promising direction for increasing its investment activity in terms of introducing new technological, breeding, marketing and other innovations that contribute to ensuring a high level of investment potential development in the interests of social and economic stabilization of its subjects.

References
[1] Donskova O A and Nemkina E A 2019 New approaches to monitoring food security in the digital economy Int. Scientific and Practical Conf. held within the framework of the Int. Scientific and Practical Forum dedicated to the 75th Anniversary of the Formation of the Volgograd State Agrarian University vol 4 pp 57-63
[2] Ovchinnikov A S, Balashova N N, Ivanova N V and Koshkarev I A 2018 Development Strategy for the Regional Market of Leguminous Crops: Implementation Opportunities and Cluster-Network Organization (Volgograd: Volgograd State Agrarian University) p 200
[3] Shemet E S, Tikhonovich E A, Ruskova E G and Samedova E N 2018 Analysis of trade globalization of integration groups (for example, the Eurasian Economic Union) European Social Science J. 12(1) 14-20
[4] Balashova N N and Ivanova N V 2019 Research of the innovative potential of small-scale farming in the digital economy Development of the Agro-Industrial Complex Based on the Principles of Rational Nature Management and the Use of Convergent Technologies pp 147-153
[5] Melikhov V A 2016 Organizational and technical regulations for the formation of integrated reports of agro-industrial holdings Strategic Guidelines for the Innovative Development of the Agro-Industrial Complex in Modern Economic Conditions pp 340-344
[6] Yagupova E V and Belousov A S 2019 Strategies for innovative development of the agro-industrial complex Innovative Technologies and Technical Means for the Agro-Industrial Complex pp 82-85
[7] Smotrova E E 2019 Efficiency of state regulation of the agro-industrial complex and key problems of its development Russian Economic Bulletin 2(5) 172-177
[8] Vardanyan S A and Terekhina N V 2018 Assessment of financial risks in the formation of the credit policy of the organization Science and Youth: New Ideas and Solutions pp 277-280
[9] Popova S A, Rudkova T A and Kolpakova E A 2013 Sustainable development of rural areas of the Volgograd region: problems and solutions Proc. of the Nizhnevolzhsky Agrouniversity Complex: Science and Higher Professional Education 3(31) 235-239

[10] Chernovanova N V and Gorbachev A S 2017 Automated procurement system in agricultural consumer cooperatives Scientific Review: Theory and Practice 12 73-77

[11] Egorova E M 2019 Innovative processes in the agro-industrial complex: problems and prospects for implementation; development of methodological support Priority Research and Innovative Technologies in the Agro-Industrial Complex: Science-Production pp 103-110

[12] Gorbacheva A S, Balashova N N, Chekrygina T A, Chernovanova N V, Yagupova E V and Vorontsova E S 2020 Organization of registration ensuring innovative development of branch of sheep breeding IOP Conf. Series: Earth and Environmental Science 422(1) 012073