Reproductive situation in agricultural organizations: Perspectives from the Orel region

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Abstract. Due to the solid motivation of business activity of farmers from the state during the implementation of the Programs on Development of Agriculture and Regulation of Markets of Agricultural Products, Raw Materials and Food for 2008-2012 and 2013-2020, agricultural organizations have taken a leading position among producers of commercial agricultural products. Over the past ten years, they have been able to radically change their economic behavior: modifying the nature of agribusiness management; increasing financial responsibility for its results, responding more adequately to market signals; taking into account demand; looking for profitable sales channels; focusing on the process of technical and technological re-armament; learning relevant professions; finding new approaches to people, developing a strategy and tactics to create conditions for expanded reproduction, intensification of production processes; and increasing the efficiency of commercial activities. In order to maintain the achieved positive results for the long term, agricultural organizations need the most constructive approach to effectively regulate the reproductive process, focusing on the continuous improvement and long-term transformations in economic relations.

1. Introduction

In a market economy, the activities of subjects of agrarian business are based on mutual interest and partnership. The financial instability of the modern agrarian sector due to increasing sanctions from the US and Western countries requires immediate adjustment and targeted use in the expanded reproduction of the two well-known finance functions: distribution and control. This is due to the fact that financial resources (a) are formed through the prism of the trust funds to meet the needs of social development and (b) recreate the current socio-economic processes, registering the positive and negative in the scheme of distribution processes [1].

Obeying the laws of dialectics, the image of the reproductive process in the agrarian sphere is in constant motion and transformation, recreating a higher level of development of productive forces and production relations at each particular stage of its evolution, and it is endless. It is important to ensure a sustainable rate of expanded reproduction through active turnover of material and financial resources within the framework of the developed long-term program for the development of agriculture in general and advanced production programs in the context of agricultural sectors, creating the necessary resources, stimulating high-performance labor, and establishing internal and external economic relations [2]. There are many unresolved issues in this area. How to organize agricultural
production and sales of products so that the final financial result provides expanded reproduction? There are many different points of view on this problem. Today, in our opinion, it remains the most relevant for the effective functioning of the agricultural sector of the economy.

2. Methods
We used the methods of statistical analysis, as well as monographic, abstract-logical, computational and constructive methods.

3. Results
The most important role in the regulation of production and economic relations in the agricultural sector belongs to the definition of the leading sphere in the entire food production chain. In the first fifteen years of reforming the domestic economy (1992–2007), the preference was given to the development of processing enterprises, which, being an intermediate link between a producer of raw materials and a consumer of finished products, coordinated the volumes and conditions of supply of raw materials for processing, leading to a deplorable state entrepreneurial activity in agriculture [3]. Therefore, during the implementation of the State development programs, the key organizations that determine the level of development of all its other industries (purchasing, processing, storing and selling products) became the agricultural organizations under conditions of close intertwining of the economic processes of reproduction with partners in the agro-industrial complex.

To solve the problems of our study, a comprehensive assessment of the effectiveness of the entrepreneurial activity of agricultural organizations of the Orel region during the implementation of the State programs of agricultural development for 2008-2017 was carried out. The dynamics of the main indicators of their financial condition are presented in Table 1.

| Index                               | Years         |
|-------------------------------------|---------------|
|                                      | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Change in balance currency for the year, % | +46.8 | +17.5 | +6.9 | +1.1 | +14.8 | +13.2 | +14.5 | +17.5 | +10.5 | +8.7  |
| Change in the cost of equity for the year, %  | +23.2 | +4.3  | +2.2 | +19.8 | +28.7 | +13.0 | +30.3 | +45.1 | +15.1 | +1.6  |
| Share of debt obligations in total balance sheet total, % | 76.9 | 77.0  | 77.5 | 74.8 | 72.2  | 70.4  | 65.2  | 56.5  | 51.3  | 56.6  |
| Debt liabilities in % of cash proceeds, %  | 266.4 | 247.2 | 220.0 | 216.1 | 165.0 | 187.4 | 144.1 | 118.5 | 112.1 | 133.3 |

Source: Calculated by the authors according to the annual reports of agricultural organizations of the Oryol region.

The increase in the currency of balance is evidence that the assets of agricultural organizations are increasing, and with them the liabilities are growing (the largest increase occurred at the beginning of the implementation of the State Program). Along with the fact that during the study period there is an increase in the cost of equity, this phenomenon can be viewed as a positive. An increase in the currency of the balance sheet while reducing the share of debt obligations (both long-term and short-term) is also a good sign. The analysis showed that the debt load on revenues is also reduced by 50%. This means that agricultural organizations can sufficiently provide financing for their activities at their own expense and be financially independent from external sources to a certain degree.
In order to consistently analyze the effectiveness of business activities of agricultural organizations of the Orel region, Table 2 presents an assessment of their effectiveness.

**Table 2.** Evaluation of business performance agricultural organizations of the Orel region, 2008-2017.

| Index                                      | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|--------------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Total AO, units                            | 232  | 225  | 214  | 201  | 197  | 171  | 173  | 191  | 194  | 187  |
| of them                                    |      |      |      |      |      |      |      |      |      |      |
| profitable                                 | 180  | 135  | 151  | 154  | 157  | 137  | 147  | 173  | 175  | 156  |
| unprofitable                               | 52   | 90   | 63   | 47   | 40   | 34   | 26   | 18   | 19   | 31   |
| Result, mln. rub.                          | 1097 | 1244 | 1649 | 1804 | 3952 | 2773 | 6619 | 9332 | 8059 | 4758 |
| *profit loss                               |      |      |      |      |      |      |      |      |      |      |
| Return on sales, %                         |      |      |      |      |      |      |      |      |      |      |
| without state support                      | -11.8| -16.0| -7.0 | -4.4 | 6.7  | -0.5 | 12.1 | 18.6 | 13.1 | 0.4  |
| with state support                         |      |      |      |      |      |      |      |      |      |      |
| Source: Calculated by the authors according to the annual reports of agricultural organizations of the Oryol region. * profit (loss) before taxes applied. |

As in many other subjects of the Russian Federation, the Oryol region experienced a tendency to reduce the number of agricultural organizations in the past ten years. Namely, their number decreased by 20% in 2017 in comparison to 2008. The reduction was due to a decrease in the number of profitable organizations by 13.3% and, importantly, by 40.4% among unprofitable ones. In 2008, out of 232 organizations, 76% were profitable. But at the same time, the amount of profit received from their activities was only 24 million rubles (or 2%). It was higher than the amount of loss for the same period. But 2015 was one of the most productive: out of 191 agricultural organizations, 173 were profitable (91% of the total). The maximum result was obtained in terms of profit (9332 million rubles). At the same time, there was the minimum amount of loss (236 million rubles) and the maximum level of sales profitability (28.8% with state support and 18.8% without it).

In 2017, there was a decrease in the number of profitable agricultural enterprises in relation to the level of 2016, and vice versa. An increase in the number of unprofitable ones led to a decrease in the amount of profit by 41% if compared to the previous year. In addition, an increase in the magnitude of the loss was by 4.9 times.

The results of our study confirm that, following the reduction in the number of agricultural organizations, there have been significant changes in the individual positions of their resource potential [4, 5].

According to the results of the implementation of the last State Program for the Development of Agriculture (2008-2012), the agricultural organizations of Oryol region in circulation increased the arable land area by 112 thousand hectares. This level remained in the next five years of the current State Program. Significant changes are also observed in the number of average annual workers. Over the past decade, there has been a reduction in the number of workers employed in agricultural production by 22%, including 8.6% 2008-2012 and 14.9% in 2013-2017. On the negative side, this fact can be explained by a significant decrease in livestock in cattle breeding and, as a result, by a decrease in the number of jobs. The positive side could be explained by the rapid development of technical and technological modernization, both in crop production and in animal husbandry.
There has been a positive trend in the security of agricultural production with fixed production assets. Comparing with 2008, the value of fixed assets increased 3.4 times and amounted to 40.6 billion rubles in 2017. Although their growth is associated with a rise in the cost of resources, the volume of private investment in the production sector has also increased significantly.

The livestock of agricultural animals and poultry during the years of the State Program implementation has undergone even more significant changes. At the end of 2012, there were 255.2 thousand pigs, i.e. 2.5 times more than in 2008. Moreover, it reached 292.4 thousand heads in 2017, which was higher than the 2013 level by 14%. A significant increase in the number of pigs is associated with the commissioning of large industrial-type complexes. The number of poultry in the first five-year period increased by 19%, but the reverse trend was observed in the next five years. In 2017, it decreased by 16% in comparison to 2013. A serious decline was observed in cattle breeding in 2012. The livestock of cattle was 88.3 thousand heads, which decreased by 16% if compared to 2008, including by 15% in the number of cows. In addition, the livestock of cattle consisted of 63.1 thousand heads in 2017 and decreased to the level of 2013 by 28% and by 40% to the level of 2008. Also, the number of cows in 2017 decreased to the level of 2013 by 40% and by 49% to the level of 2008.

Obviously, an increase in the cultivated area of arable land should have led to an increase in the technical equipment of agricultural organizations. However, as we noted in earlier studies of this problem, the number of tractors in 2012 decreased by 535 units (or 13%) to the level of 2008 and in 2017 by 320 units. (or 9%) to the level of 2013. The number of combines over the years of the last state program decreased by 10%, and over the period 2013-2017 it grew by 7%. At the same time, the power capacity increased by 7.7% and 28.6%, respectively. That testifies to the acquisition by agricultural organizations of tractors and combines with higher power.

An important circumstance for the success of agricultural organizations in modern conditions is dependence on state support and a reduction in the tax burden (Table 3).

Table 3. Estimation of the growth rate of state support and tax burden of agricultural organizations of the Orel region for 2008-2017.

| Index                     | 2008  | 2009  | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | 2017  |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Rates of growth, %        |       |       |       |       |       |       |       |       |       |       |
| State support             | 100.0 | 138.0 | 156.8 | 168.9 | 144.0 | 188.8 | 196.7 | 196.4 | 181.9 | 144.3 |
| The tax burden            | 100.0 | 116.2 | 123.0 | 115.1 | 137.8 | 94.0  | 95.8  | 113.7 | 125.4 | 138.4 |
| Accounted for 100 rubles. revenue, rub. |
| State support             | 12    | 12    | 12    | 12    | 7     | 10    | 7     | 6     | 5     | 5     |
| The tax burden            | 20    | 17    | 15    | 13    | 11    | 8     | 6     | 6     | 6     | 6     |
| It comes on 100 hectares of arable land, rub. |
| State support             | 117   | 146   | 184   | 181   | 152   | 215   | 216   | 204   | 190   | 145   |
| The tax burden            | 194   | 203   | 239   | 204   | 240   | 177   | 174   | 195   | 216   | 230   |

Source: Calculated by the authors according to the annual reports of agricultural organizations of the Oryol region.

During the study period, agricultural organizations received from the state budget subsidies in the amount of 18.8 billion rubles, including 8.3 billion rubles in the five years of the last state program (2008-2012) and 10.5 billion rubles for five years of the current state program (2013-2017). For their part, they sent to the budget and extrabudgetary tax funds in the amount of 22.4 billion rubles, including 11.4 billion rubles for 2008-2012 and 10.9 billion rubles for 2013-2017. Thus, over ten years, the total amount of taxes paid by agricultural organizations of the region to the budget and extrabudgetary funds exceeds the amount of budget subsidies by 19%. At the same time, the difference in the first five years out of ten was 37%, and it was 4% in subsequent years.
Throughout the period, there has been a decrease in state support and tax burden per 100 rubles of revenue. At the same time, the amount of state support (with the exception of the last two years) and the tax burden on 100 hectares of arable land are growing.

Over the past ten years, the growth rates of the production of the main types of commodity products are quite different, as evidenced by the data in Table 4.

The total volume of grain production for the five years (2013-2017) of the current State Program for the Development of Agriculture has increased by almost 40% over the corresponding period of the last State Program. Significant growth in production in 2008-2012 (if compared with 2013-2017) is observed for such types of products: corn for grain (4.2 times), soybeans (4 times), sunflower (3.4 times), sugar beets (67.5%), cattle and poultry in live weight (26%). The last one is due to an increase in the production of pig meat by 55% and poultry meat by 15%. The production of milk and meat of cattle decreased by almost 17% and 13%, respectively.

**Table 4.** Comparative assessment of the volume and growth rate of production of commodity products of agricultural organizations of the Orel region, 2008-2012 and 2013-2017.

| Product type                  | Production volumes, thousand c. | Rates of growth |
|------------------------------|---------------------------------|-----------------|
|                              | 2008-2012                       | 2013-2017       | +/-       | %      |
| Grain without corn           | 72525                           | 101143          | 28618     | 139,5  |
| Corn for grain               | 3411                            | 14267           | 10856     | 418,3  |
| Sugar beet                   | 54732                           | 91668           | 36936     | 167,5  |
| Rape                         | 1926                            | 1943            | 17        | 100,9  |
| Sunflower                    | 1243                            | 4284            | 3041      | 344,7  |
| Soy                          | 678                             | 2726            | 2048      | 402,1  |
| Milk                         | 6836                            | 5686            | -1150     | 83,2   |
| Livestock and poultry in total weight | 2902                          | 3658            | 786       | 126,1  |
| including cattle             | 766                             | 668             | -98       | 87,2   |
| pigs                         | 1402                            | 2174            | 772       | 155,1  |
| bird                         | 449                             | 514             | 65        | 114,5  |

Source: Calculated by the authors according to the annual reports of the agricultural organizations of the Oryol region.

A prerequisite for the high efficiency of entrepreneurial activities of agricultural organizations is to ensure the material interest of their employees in their work through constant wage growth. And an important indicator in evaluating labor resources is the labor productivity and the ratio of its growth rates to wage growth rates. Because the labor productivity is higher, the prerequisites for increasing the workers’ wages are more real. Conversely, motivation and productivity increase with increasing wages. Figure 1 shows the growth rate of the average monthly wage of workers and labor productivity of agricultural organizations in the Oryol region for 2008-2017.

Labor productivity for the studied period of time has a tendency to grow, agricultural organizations achieved the greatest value on this indicator in 2016 (2,714 thousand rubles). The average monthly wage of workers is also steadily growing over the period of 2008-2017. Moreover, the growth rates of labor productivity are much higher than the wage growth rates – 4.7 times and 3.3 times in 2017 if compared to 2008, respectively.

It is well known that indicators of economic growth in individual sectors are (a) the gross production (output) per employee and per unit of fixed assets, (b) the added gross value per employee and per unit of fixed assets. In agriculture, in addition to these indicators, economic growth should
also be determined by the output of gross output and the added gross value per unit of agricultural land [6].

Table 5 presents data on the efficiency of using labor resources, agricultural land and fixed assets, which speak about the positive dynamics in the development of entrepreneurial activities of agricultural organizations in the Oryol region over the past decade [7, 8].

Figure 1. The rate of growth of productivity and wages in agricultural organizations in the Orel region in 2008-2017.

Over the ten years of the implementation of the State Program for the Development of Agriculture, there has been an increase in the efficiency of using the resource potential in such indicators as:

- Per employee: the value of added gross value is 4.3 times, sales revenue is 4.7 times, gross profit is 7.5 times;
- Per 100 hectares of agricultural land: the value of added gross value is 3.2 times, sales revenue is 3.5 times, gross profit is 5.6 times;
- Per 100 rubles fixed assets: the added gross value is by 21%, sales revenue – by 30%, gross profit – in 2.1 times.

Table 5. The main indicators of resource use efficiency potential agricultural organizations of the Orel region in 2008-2017 (rub.).

| Index                          | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2017 by 2008, times |
|-------------------------------|------|------|------|------|------|------|------|------|------|------|-------------------|
| Gross value added             |      |      |      |      |      |      |      |      |      |      |                   |
| On 1 worker                   | 190  | 203  | 303  | 384  | 575  | 535  | 866  | 1136 | 1013 | 820  | 4.3               |
| On 100 hectares of agricultural land | 351  | 344  | 577  | 630  | 888  | 843  | 1292 | 1634 | 1470 | 1130 | 3.2               |
| On 100 rub. fixed funds       | 28   | 21   | 26   | 38   | 48   | 40   | 49   | 59   | 46   | 34   | 1.2               |
| Sales revenue                 |      |      |      |      |      |      |      |      |      |      |                   |
| On 1 worker                   | 462  | 630  | 820  | 896  | 1340 | 1299 | 1809 | 2257 | 2317 | 2171 | 4.7               |
One of the factors of the intensification of agriculture is the increase in yield. In 2009, the yield of rapeseed increased despite the decline in feed crops. The area under grain crops has increased by 159 thousand hectares. This happened due to the growth of the sown area of industrial crops (28%), industrial crops (by 3.4 times), potatoes and vegetables (by 4.3 times), as well as despite the decline in feed crops by 40%.

One of the factors of the intensification of agriculture is the increase in yield. In comparison to 2008, the yield of rapeseed increased in 2017 by 3 times, as well as yields of grain (30%), sunflower (23%), sugar beet (20%), corn (2%). In contrast, the soybean yields decreased by 23%.

In 2009-2010, due to adverse weather conditions, the yield for all types of crops fell in relation to the level of 2008. Over the ten years of implementation of the State Program for the Development of Agriculture (2008-2017), the area under crops has increased by 159 thousand hectares. This happened due to the growth of the sown area of grain crops (by 21%), industrial crops (by 3.4 times), potatoes and vegetables (by 4.3 times), as well as despite the decline in feed crops by 40%.

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In 2009-2010, due to adverse weather conditions, the yield for all types of crops fell in relation to the level of 2008. In the next two years, the main crops were able to increase indicators and exceed the performance of the base year. It happened except for grain crops, which yield remained at a rather low level. The year 2015 is also characterized by a drop in yield for individual crops to the level of 2008, including soybeans (28%), grains (6%), sugar beets (6%), and corn (1%). In the past two years, an increase in yield was observed. One of the most stable crops in terms of yield is rapeseed. After a decline in its yield in 2009-2010, there is a growth rate in all subsequent years.

The positive dynamics of productivity growth for all ten years to the level of 2008 is observed only for the yield per cow and the weight gain of pigs. The average daily weight gain of cattle to the level of the base year was higher only in 2011 and in 2016–2017. In all other years, it is lower than the 2008

| On 100 hectares of agricultural land | 859 | 1068 | 1563 | 1468 | 2064 | 2044 | 2704 | 3250 | 3363 | 2986 | 3.5 |
| On 100 rub. fixed funds | 69 | 65 | 71 | 88 | 113 | 97 | 103 | 118 | 105 | 90 | 1.3 |
| Gross profit | 55 | 47 | 117 | 157 | 337 | 247 | 519 | 750 | 750 | 413 | 7.5 |
| On 1 worker | 102 | 80 | 222 | 257 | 520 | 388 | 776 | 1081 | 929 | 569 | 5.6 |
| On 100 hectares of agricultural land | 8 | 6 | 10 | 16 | 28 | 18 | 30 | 39 | 29 | 17 | 2.1 |

Source: Calculated by the authors according to the annual reports of the agricultural organizations of the Oryol region.

It should be noted that the beginning of the implementation of the current state program (2013) is characterized by a decrease in all indicators of the efficiency of using the resource potential by 2012. And in 2017, there is also a decline after their growth in previous years (2014-2016).

4. Discussion

Measures of the state programs for the development of agriculture and regulation of the markets for agricultural products, raw materials and food for 2008–2012 and for 2013–2020 were aimed at changing the structure of production, developing the resource-saving technologies, improving the seed production, using highly effective fertilizers, maintaining the ecological level at a proper level, reducing losses of agricultural products, etc. [4].

The Orel region is one of the active representatives carrying out the modernization of agricultural production with the attraction of considerable private investments in its development, which has already been expressed in the consolidation of the entrepreneurial activity of agricultural organizations. The Orel Region is one of the first in Russia under the auspices of the federal corporate structures (and in close cooperation with local authorities), which carried out a large-scale integration of economic entities of the agro-industrial complex and large individual entrepreneurs. As a result, the total number of agricultural organizations has decreased dramatically, but at the same time they, as part of integrated formations, are developing significant amounts of investment resources and increasing their production potential [5, 9].

During the study period, an increase in the production of marketable products in crop production was due, firstly, to an increase in acreage, and, secondly, to an increase in yield. Over the ten years of implementation of the State Program for the Development of Agriculture (2008-2017), the area under crops has increased by 159 thousand hectares. This happened due to the growth of the sown area of grain crops (by 21%), industrial crops (by 3.4 times), potatoes and vegetables (by 4.3 times), as well as despite the decline in feed crops by 40%.

The positive dynamics of productivity growth for all ten years to the level of 2008 is observed only for the yield per cow and the weight gain of pigs. The average daily weight gain of cattle to the level of the base year was higher only in 2011 and in 2016–2017. In all other years, it is lower than the 2008
level. In the growth rates of bird productivity, periodic sharp changes are observed: for example, in 2009 it was a fall in the average daily weight gain by 64%. Already in 2010, it grew by 22% compared to 2008 and 3 times compared to the previous year. The same fall was in 2016 [11].

A positive increase in the cost of equity capital, the balance sheet, with a significant reduction in the share of debt obligations indicates a strengthening of the financial condition of agricultural organization.

5. Conclusion
Evaluation of the reproductive situation in the agricultural organizations of the Orel region showed that their economic situation improved during the study period (2008-2017). Despite the reduction in the number of workers and the production of certain types of livestock products, there has been a significant increase in the cost of fixed assets, an increase in the availability and efficiency of their use, the efficiency of use of farmland, labor productivity, and wages have significantly increased. Moreover, the reduction in the number of agricultural organizations in the Orel region in 2008-2017 primarily occurred due to a 40.4% decrease in the number of unprofitable. An increase in profitability is observed, which ensures obtaining sufficient profit for maintaining not only simple, but also expanded reproduction. Consequently, agricultural organizations have sufficiently strengthened the position of production and economic potential and reduced financial dependence on external sources and increased the segment of activities at their own expense.

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