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Tools for state regulation of the region's agriculture

The article analyzes the issues of providing state support to agricultural enterprises in the Vologda Oblast. It classifies its municipal districts according to the production potential of agriculture. On this basis, the article proposes the ways of reducing the differentiation of the districts according to the level of their capacity development by using the tools of budget support, lending, leasing, and insurance. Furthermore, the article provides calculations of their efficiency.

Vologda Oblast, branch of agriculture, typological classification of municipal entities, territorial differentiation, tools of financial support.

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The research [1, 2, 3, 4, 5, 6] shows that the four central districts of the Vologda Oblast: Vologodsky, Gryazovetsky, Sheksninsky and Cherepovetsky have the most developed agricultural production in the oblast. Their agricultural enterprises, possessing 32% of the total agricultural land in the oblast, produce about 73% of the total volume of agricultural production. All these enterprises are provided with advanced equipment and machinery, highly qualified personnel and, as a consequence, they enjoy high crop yield, animal productivity and relatively high financial performance. Accounting for the remaining 27% of the volume of agricultural production, the rest twenty-two districts are characterized by a high share of unprofitable enterprises, in which the number of employees, number of livestock, agricultural areas, volume of agricultural production have been decreasing significantly.

These problem economic entities incur great losses resulting from the increase in prices for the tariffs, services and products of the sector. If their deferred debt were included in the performance evaluation system, such enterprises would fall within the bankruptcy law. This is mainly the result of unsatisfactory state regulation in the development of agricultural production. Due to the limited amount of available financial resources, investments are made primarily in the agricultural enterprises of the four leading districts. The data in *table 1* indicates that over the 5 years of the analyzed period (2006 – 2010), the oblast's leading districts has accounted for more than 65% of the amount of state financial support.

They account for over 80% of the amount of all the taxes paid. In this case, the return in the form of paid taxes in these districts more than 1.5 – 2.5-fold exceeds the government investment in them.

Thus, the state financial support for agricultural producers is an essential prerequisite and primary measure of state regulation, along with other conditions of the sector's development.

We consider that the typological classification of the oblast's municipal entities according to the level of support provided for the development of their production potential can contribute to the elimination of territorial differentiation in the development of agricultural production.

Municipal entities can be classified according to the condition and utilization of their agricultural potential [8].

This requires grouping the municipal formations by two criteria: *the level of available resources* and *the performance results*, and then comparing them.

The list of criteria for grouping the region's municipal entities by *the level of available resources* should include indicators characterizing the level of all factors used in the production, including the number of workers employed in agricultural production, the volume of production assets, energy facilities, and financial resources. We worked out the classification based on the following indicators:

- number of workers employed in agriculture per 100 ha of agricultural land, pers./ha;
- provision of agricultural enterprises with fixed assets, thousand rubles/ha;
- capital/labour ratio, thousand rubles/pers.;
- number of cattle per 100 ha of agricultural land, head/ha;

Table 1. Share of the leading districts of the Vologda Oblast in the general indicators of the oblast in 2006 – 2010, % [7]

Indicators	Year					Deviation of 2010 from 2006, p.p.
	2006	2007	2008	2009	2010	
Share in general indicators						
In the total area of agricultural land	32	33	32	35	36	4
In the average annual number of employees engaged in agricultural production	54	55	57	57	59	5
In the total value of fixed assets by the end of the year	69	68	64	67	65	-4
In the total amount of production facilities	51	53	51	52	55	4
In the total number of cattle	53	53	53	55	56	3
In the total number of agricultural enterprises	28	30	29	30	32	4
Share of investments in the leading districts						
In the total volume of state financial support	62	65	67	69	64	2
In the total sum of subsidizing of interest rates on investment and attracted loans	90*	78	79	76	75	-15 **
In the total sum of crop insurance subsidies	53*	68	74	86	100	47 **
In the total number of machinery leased by the agricultural enterprises	n.a.	56	39	69	63	7 ***
Share of return from the leading districts						
In the total amount of taxes paid (taking into account individual income tax)	78	78	77	78	79	1
In the total amount of taxes paid (regardless of individual income tax)	79	80	79	80	80	1
In the total volume of gross output	75	73	73	74	76	1
In the total volume of commercial output	74	72	70	73	73	-1
In the total amount of revenues	59	66	61	76	71	12

* For 2005.
** Deviation of 2010 from 2005.
*** Deviation of 2010 from 2007.
Source: calculated on the basis of the data of the Vologda Oblast Department of Agriculture, Food Stocks and Trade.

- provision with energy, HP per 100 ha of agricultural land, HP/ha;
- application of mineral fertilizers per 1 ha of crops, kg of application rate/ha;
- volume of subsidies and compensations from the budgets of all levels to the oblast's districts per 100 ha of agricultural land, thousand rubles/ha.

A multivariate comparative estimation (MCE) of each of the seven factors according to the results of 2010 was carried out in advance for each municipality. According to the methodology of G.V. Savitskaya [9], this assessment is carried out according to the following algorithm. First, the standard value (maximum or minimum depending on the nature of the indicator) is determined for each of these indicators. Then, the so-called standardized coefficients reflecting the ratio of the reference indicator to the indicator for each district of the region, raised to the second power, are calculated for each unit of the set. Further on, squared standardized coefficients for each unit are summed up and the square root is taken from the sum, the result is the value of the multivariate comparative estimation.

The results of these calculations are presented in *table 2* and *figure 1*.

The highest value of the multivariate comparative estimation corresponds to the best unit in the selected list of indicators, and the lowest value – to the worst unit, accordingly.

By *the level of resources available* for agricultural production, the oblast's districts, as the table shows, are divided into three groups: 1) below average; 2) average; 3) above average. About half of the municipalities (12 units) are included into the first group, with the availability of resources for agricultural production below average. At the same time, the availability of resources is above average in five districts.

We used indicators, characterizing agricultural production efficiency for *grouping according to the performance results of agricultural enterprises* in municipal entities. The list of these indicators is as follows:

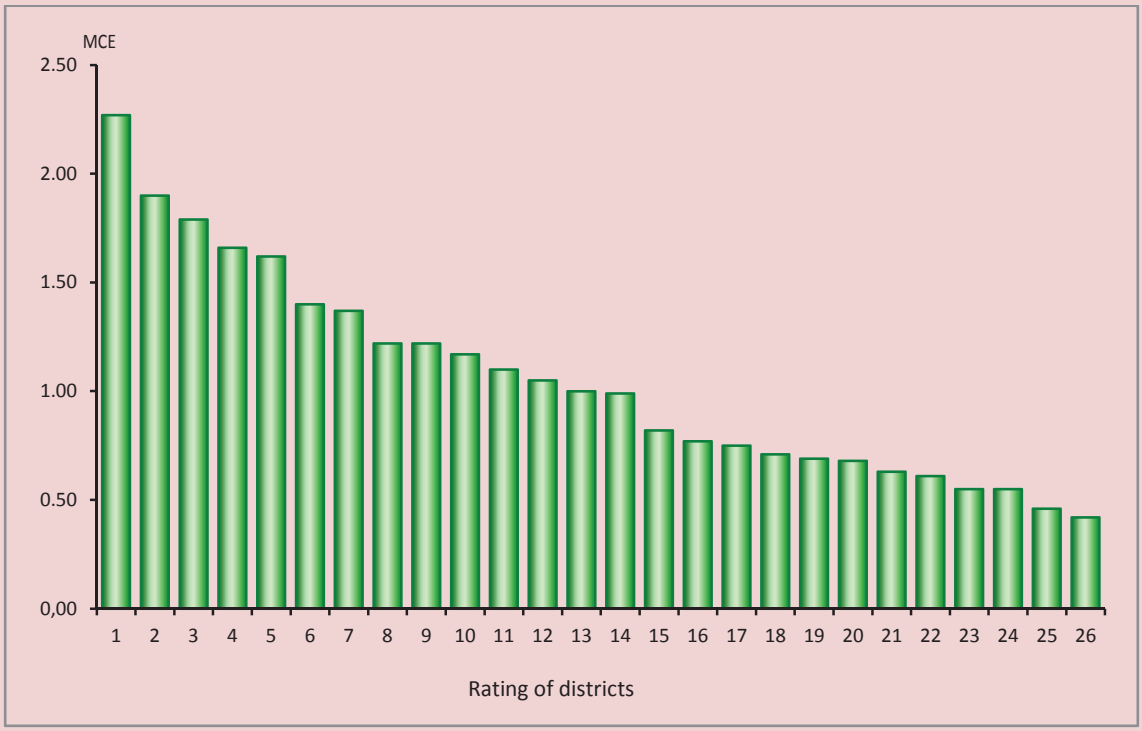
- yield of grain crops (harvested area), centners/ha;

Table 2. Grouping of the Vologda Oblast's municipal districts by the level of resources availability for agricultural production, 2010

Level of resources availability	Value of MCE, units	Number of districts, units	District and its rating according to MCE*
1. Below average	Under 0.99	12	15) Ust-Kubinsky, 16) Vashkinsky, 17) Tarnogsky, 18) Belozersky, 19) Babayevsky, 20) Kichmengsko-Gorodetsky, 21) Nikolsky, 22) Vytegorsky, 23) Babushkinsky, 24) Vozhegodsky, 25) Syamzhensky, 26) Nyuksensky
2. Average	From 0.99 to 1.40	9	6) Sheksninsky, 7) Mezhdurechensky, 8) Velikoustyugsky, 9) Totemsky, 10) Chagodoshchensky, 11)Kirillovsky, 12) Verkhovazhsky, 13)Kharovsky, 14) Sokolsky
3. Above average	Over 1.40	5	1) Vologodsky, 2)Cherepovetsky, 3) Kaduysky, 4) Ustyuzhensky, 5) Gryazovetsky
Total		26	

* MCE – multivariate comparative estimation; see fig. 1.

Figure 1. Rating of the oblast's municipal districts according to MCE, characterizing their provision with resources for agricultural production, 2010



- average milk yield per 1 cow, kg;
- fat content of milk, %;
- production of milk per 100 ha of agricultural land, centners/ha;
- volume of cattle and poultry sales per 100 ha of agricultural land, centners/ha;
- yield on capital investments, rubles/100 rubles;
- average monthly salary of employees, rubles.;
- labour productivity (gross agricultural output in comparable prices of 1994 per one worker, thousand rubles/pers.;
- profitability of products with subsidies, %;
- share of profitable (cost-effective) farms in the total number of farms in the district, %.

The distribution according to the performance results was different from the distribution according to the availability of resources. However, the same districts, Vologodsky, Cherepovetsky and Gryazovetsky, headed the list.

Judging by *table 3*, which consolidates the classification results, the districts are divided into 9 groups. However, due to similarity in the characteristics of some districts, they can be divided into five types *(fig. 2)*.

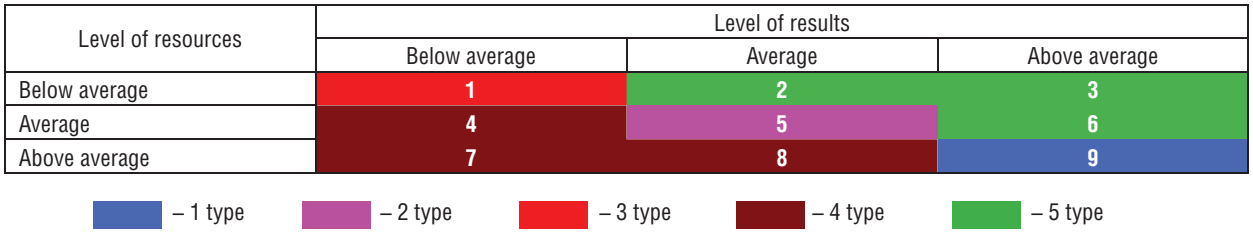
Final distribution of the Vologda Oblast's municipal districts by the type of production potential is represented in *table 4*.

Table 5 describes activities aimed at improving state regulation of agricultural production in municipal districts depending on their type. These activities cover the issue of state regulation, including the formation of prices for agricultural products, budgetary investments, compensations and subsidies, loans. Special attention, in our viewpoint, should be paid to the creation of agricultural insurance system. For financing the activities stated above, we propose to create *an Oblast Fund for support to agricultural producers*. The procedure for the fund's formation can be entrusted to the Vologda Oblast Department of Agriculture, Food Stocks and Trade.

Table 3. Results of typological classification of the Vologda Oblast's districts according to the level and degree of utilization of agricultural production potential

Level of available resources	Level of obtained results		
	Below average	Average	Above average
Below average	1. Ust-Kubinsky 2. Vashkinsky 3. Tarnogsky 4. Belozersky 5. Babayevsky 6. Kichmengsko-Gorodetsky 7. Vytegorsky 8. Babushkinsky 9. Vozhegodsky 10. Syamzhensky 11. Nyuksensky	Nikolsky	
Average	1. Totemsky 2. Chagodoshchensky 3. Kirillovsky 4. Verkhovazhsky 5. Kharovsky	1. Sheksninsky 2. Mezhdurechensky 3. Velikoustyugsky 4. Sokolsky	
Above average	Kaduysky	Ustyuzhensky	1. Vologodsky 2. Cherepovetsky 3. Gryazovetsky

Figure 2. Representation of groups and types of municipal districts according to the level and degree of utilization of agricultural production potential



Let us consider in more detail the above mentioned tools of state regulation.

Insurance. It is necessary to introduce a system of compulsory crop insurance at the federal level. Consequently, insurance tariffs will be lower and enterprises will be able to carry out wide-scale agricultural insurance. At the oblast level it is proposed to carry out livestock insurance with the use of the oblast budget funds. At present, the voluntary insurance of farm animals is not carried out due to the fact that agricultural enterprises lack financial resources for the implementation of production activity (crop insurance is effected to a very limited extent for the same reason).

There are exceptions in cases related to receiving loans when the insurance of animals, presented in the form of security, is carried out upon the request of the bank. We suggest that animals should be insured in OJSC Rosgosstrakh, as it has low insurance rates. In addition, the sum of unconditional franchise (the policyholder's losses that are not subject to compensation by the insurer under the insurance terms, [10]) is minimal (not more than 1%). Insurance terms and conditions are as follows. Insurance should cover the full package of risks. The tariff rate in this case is 0.97% of the sum insured. According to Rosgosstrakh, enterprises insure livestock animals mainly in the range of 40% up to 60% of the insurance value.

Table 4. Types of the Vologda Oblast's municipal districts according to the level and degree of utilization of production potential

Type of municipal district	Districts
1 type High level of resources – high performance results	1. Vologodsky 2. Cherepovetsky 3. Gryazovetsky
2 type Average level of resources – average performance results	1. Sheksninsky 2. Mezhdurechensky 3.Velikoustyugsky 4. Sokolsky
3 type Low level of resources – low performance results	1. Babushkinsky 2. Babayevsky 3. Belozersky 4. Vashkinsky 5. Vozhegodsky 6. Vytegorsky 7. Kichmengsko-Gorodetsky 8. Nyuksensky 9. Tarnogsky 10. Syamzhensky 11. Ust-Kubinsky
4 type Do not use the available resources to the fullest extent	1. Totemsky 2. Chagodoshchensky 3. Kirillovsky 4. Verkhovazhsky 5. Kharovsky 6. Kaduysky 7. Ustyuzhensky
5 type Good performance results at the low level of resources	Nikolsky

At that, we propose to carry out insurance in the amount of 40% only in regard to the enterprises of the first type (Vologodsky, Gryazovetsky and Cherepovetsky districts). In other districts of the oblast it is required to carry out insurance in the amount of 60% of the insurance value. It is suggested that only cattle should be insured, and not all the herd, but only the young and fattening stock. The second option of the rate, 7.09%, concerns livestock insurance for a policyholder – an individual person.

Lending. At present, only financially sustainable organizations, can afford to take loans; three-quarters of agricultural enterprises due to their unsatisfactory financial situation are not yet able to take long-term bank loans. It was long ago proposed to create the oblast collateral fund at the oblast level. Such funds are already functioning in a number of Russia's regions. However, economically weak enterprises do not receive the guarantees of this fund. In such case it is necessary to provide financial support to such enterprises at the oblast level e.g. through futures contracts for the delivery of production. It can be proposed as an alternative to develop the system of price regulation using the resources of the Fund for support to agricultural producers of the oblast. It is necessary to compensate for the costs of agricultural producers in these districts (minimal prices, guaranteed prices, etc.). Crediting secured on land is not considered as the way out, because today this system is not working, the land is not transferred to the ownership. Besides, the registration of land into property, which is an expensive procedure, is a problem for agricultural producers.

Leasing. According to estimations of Rosagroleasing, leasing for the utilization of agricultural machinery in recent years has become cheaper and more profitable than credits.

Table 5. Proposals for enhancing state regulation of the activities of agricultural enterprises according to the types of the Vologda Oblast municipalities

Type of municipal entity	Brief description of district types	Proposed activities
1 type	Agricultural enterprises in these districts are better adapted to market conditions and they use the available production potential rationally. But their performance can be higher, if they are provided with additional resources.	These enterprises are suitable for investments, as the funds that are already at their disposal, produce economically successful results. In addition to the existing system of state support, it is proposed to carry out livestock insurance in the amount of 40% of the insurance value at the expense of oblast budget funds, to promote innovations implementation and to carry out lending with the participation of the oblast government.
2 type	The enterprises of this group are characterized by the average level of provision with resources, which hinders the achievement of better results.	In order to get better performance results, the agricultural enterprises of this group should receive financial investments, which will contribute to the renewal of fixed assets. In addition to the already applied tools of state regulation, it is also proposed to insure livestock in the amount of 60% of the insured value at the expense of the oblast budget.
3 type	The enterprises of this group have a very low production potential. Agricultural production in such conditions is unprofitable. Additional funding of such enterprises can turn out useless.	These enterprises can be recommended to develop other directions of activities. It is necessary to take into account social importance of the enterprises included in this group. Gaining profit, as well as preserving agricultural production should become strategic goals. That is why it is only small enterprises that can be shut down or oriented toward other activities; and large enterprises require the development of specific action programmes. In addition to the already utilized tools of state support, it is proposed to insure livestock in the amount of 60% of the insured value at the expense of the oblast budget.
4 type	The two most likely reasons for the current situation in such enterprises include flaws in their industrial and organizational structures and poor performance of the department distributing the manufactured products.	The enterprises of this type should improve the structure of production and organization of management, and implement the achievements of advanced farms. Such enterprises should be given an opportunity to insure livestock at the expense of the oblast budget in the amount of 60% of the insured value.
5 type	Such enterprises should strengthen their production facilities. But in this case, not only material and financial support, but also active innovation activity is necessary.	In addition to strengthening their material base by the infusion of investments and innovations, this group of farms requires state support in the form of higher purchase prices for agricultural products or special compensations. Besides state support, it is proposed to carry out insurance of livestock in the amount of 60% of the insured value at the expense of the oblast budget.
For farms of all types we propose to implement, besides the existing system of subsidies, the compensation of losses at the expense of the Oblast Fund for support to agricultural producers. It is proposed to compensate the losses on the sales of milk and cattle meat through the establishment of guaranteed prices.		

However, only financially sustainable enterprises have an opportunity to conclude agreements on the delivery of machinery and equipment for lease. Banks do not cooperate with economically weak farms. It is suggested that the Oblast Fund for support to agricultural producers should allocate funds to the enterprises of the 3 and 5 types so that they could purchase the necessary equipment (to create machine and tractor fleets (MTF) in some districts) and use it. In the course of the study, conditional calculations were made concerning the volume of the expenses necessary for the formation of MTF. In particular, according to the all-Russian agricultural census data of 2006, the performance of agricultural activities in the Vologda Oblast required the employment of machinery and equipment of third-party organizations. The number of attracted equipment for one organization was 3 tractors and 2 combine harvesters (in the period from 1 July till 30 June of the following year) [11].

According to the information of the Vologda Oblast Department of Agriculture, 85 such organizations functioned in the 11 districts of the 3rd type in 2010. In addition, it is suggested that the MTF Fund should include the machinery and equipment for Nikolsky district, falling into the 5th type in 2010. This is explained by the fact that this district has a very low level of resources. The total number of enterprises including Nikolsky district was 93 units in 2010. Therefore, the total amount of equipment required for the establishment of MTF, is 279 tractors and 186 combine harvesters. The ratio of forage harvesters to grain harvesters (46% and 54%, respectively) was calculated on the basis of the 2010 data provided by the oblast Department of Agriculture; i.e. 87 forage harvesters and 99 grain harvesters will be required. According to Rosstat, the average cost of a tractor is 2 million rubles, a grain harvester costs 5 million rubles, a forage harvester – from 2 up to 4 million rubles. The maximum price of 4 million rubles was chosen for the calculations. Therefore, the total amount of funding required for the formation of MTF, according to our calculations, is 1401 million rubles. Tractors for MTF were chosen with the drawbar category 1.4, which corresponds to the capacity of 80 – 130 HP, since, according to the census, the share of such tractors in the oblast accounts for about 70% of the total tractor fleet.

The economic benefit from the implementation of the proposed activities will be expressed in the observance of scheduled timeframes of all agricultural works by the enterprises, in reducing downtime due to breakdown of the equipment, in the growth of total energy supply and energy potential by more than 9%.

Subsidies for livestock production. A system of guaranteed prices for the sold milk and meat of cattle in live weight was proposed and developed in view of the foreign experience of prices introduction [13, 14, 15]. These prices take into account the required minimum profitability level (in the amount of 15%) for the further development of agricultural production. The amount of additional payments (the amount of subsidies) was determined on the basis of conducted calculations. The calculations were made according to two options. The difference between them lies in the fact that in the second option no additional payments were effected when selling cattle meat to the enterprises of the 1st type. This is explained by their greater financial stability and a greater amount of subsidies in the total distributed volume. If the amount of financial resources is limited, the additional payments by this indicator are unnecessary.

The total economic impact from the activities on the insurance of farm animals and the establishment of guaranteed prices for the sold milk and meat of cattle will be as follows: in case of the first option, the total amount of additional payments will be 1 053 285.7 thousand rubles, in the second case – 527 373.8 thousand rubles. At that the profitability of primary activity of agricultural enterprises in the oblast in general will increase by 8.7 and 4.4 percentage points, respectively. If we determine the economic impact only from the introduction of guaranteed prices for milk and livestock insurance, then the profitability in the oblast in general will increase by 1.2 percentage points.

As the economic impact is not reduced to the indicators of profitability alone, we considered it possible to estimate changes according to other indicators. In particular, we calculated the increase in revenue per each ruble of additional investments. At that, we didn't take into account the amount of funding allocated for the creation of machine and tractor fleet, since it remains the property of the oblast, and considering livestock insurance, we took into account the amount of received insurance benefits.

Table 6. Calculation of economic benefit from the implementation of proposed activities for the oblast in general, in the prices of 2010

Indicators	Actual value, 2010	Project (1 option)
1. Amount of the state financial support (subsidies and compensations) without taking into account the creation of MTF, thousand rubles	1474222	2527507.7
2. Increase of the amount of state financial support, thousand rubles, including:	x	1053285.7
in the sector of milk production and distribution	x	88490
in the sector of production and distribution of cattle meat in live weight	x	905474.6
in the sector of livestock insurance (compensation)	x	59321.1
3. Increase of the amount of state financial support, including:		
absolute increase, thousand rubles	x	1053285.7
increase rate, %	x	71.45
4. Sales revenue, thousand rubles	12758247	13694928
5. Revenue increase, including:		
absolute increase, thousand rubles	x	936681
increase rate, %	x	7.34
6. Labour productivity as calculated per one employee engaged in agricultural production, rubles per person	641859.8	688983.6
7. Labour productivity increase:		
absolute increase, rubles/person	x	47123.8
increase rate, %	x	7.34
8. Profitability of the main activities, %	6.5	15.2

The pair correlation was worked out between state financial support (x) and sales revenue (y) based on the data of the oblast Department of Agriculture. The analyzed period was 12 years (from 1999 to 2010). Regression equation was as follows: $Y = 6.228x + 2502.2$. The coefficient of determination was $R^2 = 0.8407$, which indicates that the equation is statistically significant. Therefore, each ruble of the investments leads to an increase in revenues by 6.23 rubles. This indicator has been calculated for the oblast as a whole. Further, using the method of forecasting from the general to the particular, we estimated the growth in revenues for each municipality and the oblast as a whole, the growth of labour productivity, as well as the aggregated PSE.

The economic benefit from the implementation of the proposed activities for the oblast in general will be as follows *(tab. 6)*:

- increase in revenue growth rates and labour productivity up to 7.34 percentage points per year;
- improvement in the profitability of the main activities up to 8.7 p.p. per year.

The implementation of the above recommendations will facilitate the equalization of business environment, the elimination of disparities in socio-economic development of the districts by enhancing the performance of agricultural organizations.

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