Boosting the Efficiency of Agricultural Organizations Taking Into Account the State Support (A Case Study of the Novosibirsk Region)

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ABSTRACT

The research study suggested a clarified concept of the economic efficiency of the agricultural organization aimed at accounting not only assets and property of agricultural organizations used in the process of obtaining the economic effect (which corresponds to the use of the asset profitability index), but also labor resources (based on the output index). The system of indicators for assessing the efficiency of agricultural enterprises was analyzed and supplemented by the production asset profitability index, the integral efficiency index based on the use of conditional assessments by indicators such as margin on sales, productive asset turnover ratio and labor productivity (output), which will allow to obtain a more comprehensive evaluation of efficiency of the use of the production potential of the organization. The mechanism for determining the need for budget financing of agricultural production on the basis of the productive asset indicator is justified, which lays the foundation for saving budgetary funds and encourages agricultural organizations to develop not only at the expense of borrowed funds, but also through significant support of the owners' investment; measures to improve the methods of subsidizing the interest rate on loans to agricultural organizations are proposed. Areas of boosting the efficiency of agricultural organizations are introduced, in particular, the forecast values of the net margin on sales, the growth of which is primarily based on increasing the state support.

Keywords: Subsidizing effect, efficiency of agricultural organizations, state support, return on assets, mechanism for determining the need for budget financing.

1. INTRODUCTION

Activities in the agricultural sector in Russia are often economically unattractive and largely become profitable only with the state support. In the current environment and if the current trends are maintained, it is impossible for most agricultural organizations to achieve the efficient and profitable operation in the short and medium term. The practice of state support requires improvement; the development of different models and approaches to ensure the efficient operation of agricultural organizations is also required.

Activities of agricultural organizations should become increasingly efficient based on the use of internal resources, while the practice of state subsidies against the background of cutbacks to the total funding should become much more selective and targeted. As a result,it becomes relevant to develop new theoretical approaches and practical recommendations for improving the efficiency of agricultural organizations and its assessment based on both state support and the use of various internal reserves.

Such economists as A.M. Gataulin (2009), E.N. Krylatykh (2014), V.A. Kundius (2010), V.A. Nazarenko (2006) must be named among domestic academicians who made the greatest contribution to the study of the issues of ensuring the economic efficiency of agricultural production and its state support.

Separate aspects of ensuring the effective operation of agricultural organizations and their state support at the regional level are reviewed in the works of E.V. Bessonova (2012), N.F. Vernigor (2015), V.P. Zotov (2012*a*; 2012*b*), S.L. Kirillov (2010), I.V. Kurtsev (2011), M.G. Ozerova (2013), V.N. Papelo (2014), E.V. Rudoy (2012), V.F. Stukach (2010), A.I. Suchkov (2014), D.V. Khodos (2013), S.A. Shelkovnikov (2010; 2015), N.N. Shestakova, L.A. Yakimova (2012); D.M. Matveev, A.T. Stadnik and D.V. Menyaykin, 2014.

2. METHODS

The goal of the study is to develop theoretical provisions and practical recommendations for boosting the efficiency of agricultural organizations and their state support in the Novosibirsk region.

The object of the study is economic, organizational and management relations arising in the process of ensuring the effective operation of agricultural organizations.

The subject of the study is trends, conditions and factors that influence the boost in the economic efficiency of agricultural organizations and their state support.

The object under observation is agricultural organizations of the Novosibirsk region.

The theoretical and methodological basis of the study was the fundamental provisions of the economic theory, business economics, scientific works on the researched topic, laws and regulations of the Russian Federation, including those of the Novosibirsk region. The study used data provided by the Russian Federation Federal State Statistics Service and its local agency, materials from the Ministry of Agriculture of the Russian Federation, the Novosibirsk region, planning and reporting documents of agricultural organizations, and special reference literature.

The following research methods were used in the paper: monographic, analytical, modeling, abstract-logical, computational and constructive, economic and mathematical methods.

The developed proposals and practical recommendations can be used for boosting the efficiency of agricultural organizations and improving the state support.

3. RESULTS

1. It has been suggested to understand the economic efficiency of agricultural production as the comparison of the obtained economic effect and subsidies with available resources (plant and machinery, material and supplies, labor resources) involved in obtaining this effect, the value of which per ruble of the owners' investment ensures the investment attractiveness of the industry. Unlike the current definitions of the economic efficiency of agricultural organizations, the provided definition focuses on the interests of the owners of agricultural production, who should receive no less return per ruble of their investment than in other investment options for their funds. The provided definition of economic efficiency is aimed at accounting not only assets and property of agricultural organizations used in the process of obtaining the economic effect (which corresponds to the use of the asset profitability index), but also labor resources (based on the output index).

2. The system of indicators of efficiency of agricultural organizations has been supplemented by the productive asset profitability index, which,unlike the profitability of productive facilities, takes into account not only reserves in the area of production (raw materials, goods in process), but also reserves in the area of distribution (finished products, goods shipped, goods for resale) that also make up a significant part of the property of agricultural organizations, which will provide a more comprehensive evaluation of the efficient use of the production potential of the organization. When assessing the efficiency of agricultural organizations, it has also been recommended to apply an integrated indicator of efficiency based on the use of conventional estimates by indicators such as return on sales, productive asset turnover ratio and productivity of labor (output). The use of this indicator has been justified, because the process of production in any organization occurs provided the appropriate interaction of three determining factors: 1) personnel (workforce); 2) plant and machinery (fixed assets) and 3) material and supplies (reserves). The developed "subsidy effect" indicator shows the pace of growth in the return on equity thanks to subsidies from the budgets of all levels, attributable to financial result.

3. Justification for improving the mechanism for subsidizing the interest rate on loans to agricultural organizations has been introduced through taking into consideration the interest coverage ratio. Implementation of the proposed measures will allow to preserve the current procedure for subsidizing, while also taking into account the debt overburden of agricultural organizations in the Novosibirsk region and the lack of funds at the federal and regional levels. The recommended measure lays the foundation for saving budgetary funds and encourages agricultural organizations to develop not only at the expense of borrowed funds, but also through significant support of the owners' investment.

4. It has been recommended to build the practice of state support of agricultural organizations on the basis of the size of the productive assets of the agricultural organization. The subsidy mechanism is based on the target and subsidized profitability indicators, which allows both to establish a certain minimum of guaranteed profitability for the agricultural producers (subsidized profitability) and to ensure leveling of the average profitability of agricultural organizations in the region (by the target profitability index), increase the number of profitable operating organizations, and lay the foundation for the growth of investment attractiveness of agrarian business.

5. Areas for ensuring the growth of the profitability of equity capital of agricultural organizations in the Novosibirsk region have been defined. The forecasted values of net margin on sales have been calculated, the growth of which is primarily based on boosting the state support. An algorithm for making decisions on intensification of the use of productive assets (in terms of reserves) aimed at the growth of the target productive asset profitability index has been introduced. The forecast of the change in the target productive asset profitability index has been made on the basis of the dynamics expected in the short-term period.

4. DISCUSSION

4.1. Clarified definition of the economic efficiency of agricultural organizations

Category of "efficiency" is one of the most frequently used in economic theory and practice at the macro and micro level. At the same time, despite such a close – if not exceptional – attention to this truly important economic category, academic science so far has not succeeded in formulating a definition of the economic efficiency that would reflect all aspects of the concept under study.

The prevailing opinion about the issue of the most appropriate indicator for assessing the efficiency of the organization involves the need to use profitability indicators (use of the labor productivity indicator is also recommended to assess the efficiency). At the same time, none of the indicators can be assumed "the best", since each of them shifts the emphasis in the assessment to one side or the other.

In our opinion, definition of the economic efficiency should take into consideration all the opportunities that exist for the assessment of efficiency by profitability indicators, as well as be supplemented with an assessment of the efficiency of the use of labor resources. In other words, the assessment of efficiency should be built taking into consideration the proper use of all its factors: personnel (workforce), plant and machinery (fixed assets), and material and supplies (reserves). Such a peculiarity of agricultural activities as significant state support should also be taken into account.

On that basis, we have proposed the following definition: economic efficiency is the comparison of the obtained economic effect and subsidies with available resources (plant and machinery, material and supplies, labor resources) involved in obtaining this effect, the value of which per ruble of the owners' investment ensures the investment attractiveness of the agricultural production.

Investment attractiveness of agricultural production is achieved when the return per ruble of the owners' investment is comparable or even higher than the yield of alternative investment (for example, the average yield on the market of bank deposits), which is a state's task.

4.2. Augmented system of indicators of assessment of the economic efficiency of agricultural organizations

Property of a large number of agricultural organizations is burdened with assets that are not core or operating, do not generate organization's income or profit. It is advisable to exclude non-earning assets (redundant fixed assets and reserves, intangible assets, etc.) from their total amount during the calculation of the asset profitability. This approach is useful when the profitability indicator is used as a tool for internal management and control. The described logic underlines the calculation of the productive asset profitability index, which is calculated as the percentage of balance or net profit to the average value of fixed productive facilities

and stock. It seems impossible to calculate this index according to the data of external reporting, since the balance sheet shows the total amount of reserves, while the finished products are not included in stock but are included in the inventory value. Therefore, the calculation of the productive asset profitability index is not always possible, as it is incompetent to include finished products in warehouses, goods in transit, future expenses, etc., into productive assets.

For this reason, it is recommended to use the category (concept) of productive assets, which refer to the aggregate of plant and machinery (fixed assets) and material and supplies (reserves, including finished products, goods for resale, etc., *i.e.* the entire amount of reserves). According to the Federal State Statistics Service, fixed assets and reserves are the largest asset groups of agricultural organizations. Accordingly, the productive asset profitability index calculated as a percentage of profit to the average annual value of productive assets will be essentially significant for agricultural organizations:

$$R_{pa} = \frac{P}{(FA + 3) \times 100} = \frac{P}{PA \times 100}$$

$$R_{pa\,(sub)} = \frac{(P + S_{sub}) \times n}{(FA + 3) \times 100} = \frac{P}{PA \times 100}$$

where R_{pa} is productive asset profitability;

$R_{pa\,(sub)}$ is productive asset profitability taking subsidies into account;

P is profit;

FA is fixed assets;

R is reserves;

PA is productive assets;

S_{ub} is subsidies from budgets of all levels attributable to the financial result.

Table 1
**Key indicators of business and operations of agricultural organizations of the
Novosibirsk region for 2010-2014**

Indicators	2010	2011	2012	2013	2014	2014 to 2010, %
Profit, *mln* rub.	3618	4195	3878	3502	5838	161.36
Fixed assets, *mln* rub.	18,450	21,724	25,431	28,769	32,887	178.24
Reserves, *mln* rub.	14,028	16,102	17,134	18,624	21,567	153.74
Productive assets, *mln* rub.	32,479	37,826	42,564	47,393	54,454	167.66
Subsidies from budgets of all levels, *mln* rub.	1298	1,515	1,883	2,792	2,448	188.49
Productive asset profitability, %						
Excluding subsidies	11.14	11.09	9.11	7.39	10.72	96.24
Including subsidies	15.14	15.10	13.53	13.28	15.22	100.52

Difference between the productive asset profitability of agricultural organizations of the Novosibirsk region excluding and including subsidies is significant (Table 1). Increase in the gap between the values of the presented figures indicates boost in the importance of the state support for the efficient operation of agricultural organizations.

Assessment of efficiency of business and operations by the productive asset profitability index will ensure more adequate conclusions about the efficiency of using the productive potential of the organization than by the profitability of productive facilities or the profitability of assets in general.

4.3. Advantages of the integral efficiency indicator

The productive asset profitability index, also calculated as the product of the profitability of sales by the productive asset turnover ratio, underlies the integrated efficiency indicator (IEI) recommended in the dissertation study, the purpose of which is to formalize the efficiency of the use of plant and machinery, material and supplies, and personnel in one generalizing indicator.

Generalization can be made only on the basis of an integral indicator. IEI is calculated using conditional assessments defined as follows: 1) if the actual value of the indicator for a particular organization is higher than the average across the group and there is a positive trend, then the organization receives score 4; 2) if the actual value exceeds the average, but the trend is negative, the organization receives score 3; 3) if the actual value does not reach the average level, but the trend is positive, it's score 2; 4) if the actual value is less than average and the trend is negative, it's score 1.

It is recommended to conduct a comprehensive assessment of the efficiency of agricultural organizations using a geometric mean method:

$$\text{IEI} = \sqrt[3]{S_{Psa} \times S_{cpat}} \times S_{PL}$$

where S_{Psa}, S_{cpat}, S_{pl} are scores of the profitability of sales, coefficient of the productive asset turnover, productivity of labor (output) of agricultural organizations.

Conclusions following the results of the efficiency analysis are formulated using Table 2.

Table 2
Classification of efficiency groups

Efficiency score	Score range	Description
I class – grade "excellent"	3.63 to 4.00	The organization uses its resources efficiently, its operations are profitable
II class – grade "good"	2.88 to 3.63	The organization uses its resources at the level of industry-average values, but they can be reduced in certain periods
III class – grade "satisfactory"	2.00 to 2.88	The organization uses only part of its resources efficiently
IV class – grade "unsatisfactory"	1.00 to 2.00	Operations of the organization are inefficient

The lower limit of enterprises of class I is based on the fact that the organization remains efficiently functioning even if it allowed for score 3 for one of the indicators. The lower limit of the II class of enterprises is based on the fact that all the indicators included in the calculation must have at least score 3 (which gives an average result of 3) or one score is 2 but compensated by score 4 for another indicator. The establishment of a lower limit for class III organizations at the level of 2.00 is based on the fact that all indicators (in this group) must have score of not less than "satisfactory".

The proposed method of assessing the efficiency of business and operations based on the integrated efficiency indicator has the following advantages in comparison with the traditional indicators of profitability and productivity of labor:

1. Versatility – an integrated approach to assessment of efficiency of the agricultural organization is provided. Along with such an important indicator as profitability of sales, assessment of the efficiency (intensity) of the use of productive assets and labor resources is also used;

2. Non-redundancy of indicators. According to the proposed methodological approach to assessing the efficiency of the agricultural organization, indicators with similar meaning are not provided;

3. Practicality. The proposed indicators can be calculated on the basis of data contained in the annual reports and forms of accounting (financial) statements of organizations and notes to them;

4. Ability to automate a comprehensive assessment of efficiency. The author has created an auxiliary calculation in Microsoft Excel, which allows to cut labor costs of analysts to calculate the required indicators and automatically assign scores, as well as to conduct a comparative analysis based on the input data.

Similarly to the degree of financial leverage, the impact of the degree of state support on the efficiency of the agricultural organization (return on equity) is quantitatively expressed:

$$\mathrm{DS} \; = \; \mathrm{P}_{as(np)} \; \times (\mathrm{MC} - 1 + \mathrm{S}_{sub/\mathrm{P}tax}) = \frac{\mathrm{P}_{as}(np) \times (\mathrm{MC} - 1) + \left(\dfrac{\mathrm{S}_{up}}{\mathrm{A}} \right)}{\mathrm{TF}}$$

where DS is degree of subsidizing;

$\mathrm{P}_{as(np)}$ is net margin return on assets;

MC is multiplier of capital;

$\mathrm{S}_{sub/\mathrm{P}tax}$ is share of subsidies in profits before taxation;

S_{sub} is subsidies from budgets of all levels;

A is assets (average annual value);

TE is tax equalizer.

As such, state support should lay the foundation for boosting the efficiency of agricultural organizations. The significant influence of state support on revenue and cost of sales (correlation coefficient amounted to 94%) was revealed, as well on profit from sales and before taxation (85% and 89%, respectively) and productive assets (93%). The relationship of state support has been defined as weak with return of sales of 15% and as moderate with return on total and productive assets of 36 and 37%, respectively.

4.4. Improved mechanism for provision of state support to agricultural producers in the form of subsidizing the interest rate on loans

State support to agricultural organizations is being provided in severe conditions. On the one hand, the agricultural organizations of the Novosibirsk region cannot operate without external financing, as the latter provides them with a significant part of return on equity, as evidenced by a large share of the degree of financial leverage in the values of this indicator (36.13% at year-end 2014). On the other hand, operation of the agricultural organizations in the Novosibirsk region is carried out in conditions of heavy debt overburden (at 2014 year-end, the share of loans in the structure of aggregate sources amounted to 37.64%), loss of financial independence by the organizations (at year-end 2011-2014, share of the owners' capital is less than 50%), as well as lack of funds from the federal and regional budgets.

As such, the existing subsidy system should be preserved but supplemented with tools that would allow to limit the growth of financial dependence of agricultural organizations. Limitation on the interest coverage ratio can be one of such tools. This will allow to preserve the practice of this subsidy, while at the same time encouraging agricultural producers to adopt the projects the investment solutions of which are more adequate to the current situation, structure of financing, and risks. Accordingly, not the entire amount of interest rates will be subsidized, but only the amount "falling" under its size, calculated on the basis of the standard for the interest coverage ratio.

Table 3
Calculation of the amount of funds allocated for subsidizing the interest rate for agricultural organizations of the Novosibirsk region in 2009-2014, thous. rubles

Year	Earnings before interest and taxes	Interest due	Actual subsidies	Interest coverage ratio	Subsidized interest expense	Non-subsidized interest expense	Coverage of actual expense on interest payouts,%
2009	3,921,894	1,403,048	1,391,148	2.80	980,474	422,575	69.88
2010	4,908,774	1,767,228	1,298,453	2.78	1,227,194	540,035	69.44
2011	5,569,317	1,651,723	1,515,249	3.37	1,392,329	259,394	84.30
2012	4,605,378	1,808,823	1,882,809	2.55	1,151,345	657,479	63.65
2013	5,437,790	1,809,347	2,791,886	3.01	1,359,448	449,900	75.13
2014	7,070,623	1,796,736	2,447,517	3.94	1,767,656	29,080	98.38

The standard for the interest coverage ratio is set equal to 4. This value meets the requirements of reasonable safety, since only 25% (100 / 4) of earnings (before interest and taxes) will be allocated to repay interest on the loan. Subsidized interest expenses are calculated by dividing the earnings before interest and taxes by the standard of the interest coverage ratio. Non-subsidized interest expense comprises the remaining part of total interest expense (Table 3).

The proposed changes in the mechanism for subsidizing interest rates may result in reduction of the investment program for a range of agricultural organizations, but since the "saved" funds will be allocated to other projects (organizations), it can be said that subsidies, state support for agricultural production will not shrink but rather become more balanced, less risky in nature, allow to meet the financial needs of the greater number of stakeholders – agricultural organizations.

4.5. Method of determining the size of the state support, taking into consideration the value of productive assets of the agriculture organization

The state support system should guarantee a certain degree of profitability to the agrarian business and encourage its investment attractiveness. Leveling the average level of profitability is also in the interests of the state, as the excess profitability of some organizations in the current conditions is accompanied by loss-making or extremely low profitability of the larger number of other organizations. The state support system should take into consideration the composition and structure of the organization's assets, encouraging the latter to boost its production potential.

The designated targets underlie the proposed method of subsidizing, which takes into account the size of productive assets of the agricultural organization. Aside from the productive asset index, this method is also based on the indicators of the target and subsidized profitability (productive assets). In the first case, it is referred to the level of profitability that should be characteristic of the typical agricultural organization; in the second case, it is referred to the level of profitability, which is subsidized by the state in order to ensure the investment attractiveness of the agricultural business and leveling the average actual profitability.

The instrument of subsidy should "cut off" the organizations whose profitability (of productive assets) is higher than the target level, adopted in three versions: 10, 15 and 20% (which corresponds to the lowest profitability; the average level of profitability in the economy in general and the lowest margin of profitability creating the investment attractiveness of the agrarian business). Each level of target profitability corresponds to its level of subsidized profitability (R_{sub}) – 5, 10 and 15 percentage points, respectively.

Each ratio of the target and subsidized profitability corresponds to 3 possible options:

1. If the actual value of the productive asset profitability excluding subsidies (R_{pa}) is above the target level R_{tar}, subsidies are not allocated;

2. If the actual value of the productive asset profitability is below the target level but greater than the difference between the values of the target and subsidized profitability (the lowest profitability, R_{min}), the subsidy is calculated as the product of productive assets by the difference between the target and actual profitability R_{act} :

$$S_{sub} \quad = \quad \frac{PA \times (R_{tar} - R_{act})}{100}$$

3. If the actual value of the productive asset profitability is less than the lowest profitability, the size of subsidies is defined by multiplying the productive assets by subsidized profitability:

$$S_{sub} \quad = \quad \frac{PA \times R_{sub}}{100}$$

4.6. Implementation of the method of determining the size of the state support, taking into consideration the value of productive assets of the agriculture organization

The introduced estimates of the target and subsidized profitability require different levels of state support (Table 4).

Option 1, aimed at achieving the productive asset profitability of 10% and suggesting subsidies in the amount of 5%, actually leads to a reduction in the amount of state support. Options 2 and 3, on the contrary, require an increase in the state support by 21.52 and 98.60%, respectively.

Table 4
Size of the state support according to the method of subsidizing on the basis of productive assets

District	Option 1		Option 2		Option 3	
	Amount, thous. rub.	% of actual amount	Amount, thous. rub.	% of actual amount	Amount, thous. rub.	% of actual amount
Bagansky	46,795	44.18	112,915	106.61	200,355	189.17
Bolotninsky	53,179	99.97	118,290	222.37	183,400	344.78
Vengerovsky	52,757	69.13	118,011	154.63	190,049	249.02
Dovolensky	18,699	70.80	37,397	141.60	56,096	212.40
Zdvinsky	23,049	30.99	49,060	65.97	84,155	113.16
Iskitimsky	120,762	41.16	277,725	94.67	438,489	149.47
Karasuksky	51,240	45.10	129,085	113.61	208,107	183.15
Kargatsky	46,413	131.36	102,413	289.85	158,885	449.68
Kolyvansky	39,172	94.06	81,334	195.30	126,421	303.56
Kochenevsky	57,782	52.67	116,228	105.94	174,675	159.21
Kochkovsky	82,059	135.44	209,890	346.42	327,199	540.04
Krasnozersky	110,268	87.95	237,385	189.33	365,905	291.83
Kuybyshevsky	17,847	41.52	38,598	89.80	59,702	138.90
Kupinsky	38,312	40.67	99,343	105.46	167,575	177.89
Kyshtovsky	4,182	27.66	8,415	55.66	12,647	83.65
Maslyaninsky	128,152	99.25	256,971	199.01	386,488	299.32
Moshkovsky	16,588	151.01	35,162	320.09	52,534	478.23
Novosibirsky	119,291	19.18	375,147	60.31	720,369	115.82
Ordynsky	39,529	74.16	80,824	151.63	168,383	315.89
Severny	5,208	47.39	10,416	94.79	15,624	142.18
Suzunsky	54,002	45.18	132,237	110.62	222,736	186.33
Tatarsky	29,835	39.57	69,970	92.81	114,955	152.47
Toguchinsky	27,905	77.10	65,905	182.09	111,550	308.21
Ubinsky	17,839	59.91	36,308	121.93	54,777	183.96
Ust-Tarksky	34,206	74.98	79,694	174.69	132,601	290.66
Chanovsky	18,013	48.78	44,781	121.26	72,475	196.26
Cherepanovsky	71,167	85.10	150,381	179.82	230,965	276.18
Chistoozerny	22,606	42.50	51,049	95.97	79,651	149.73
Barabinsky	39,049	71.25	79,579	145.21	120,110	219.16
Chulymsky	10,392	132.16	22,289	283.46	34,185	434.76
Total	1,396,299	52.94	3,205,095	121.52	5,238,166	198.60

The size of state support should be compared with the results achieved through the implementation of the proposed method, which are expressed in the growth of the number of profitable organizations and the average productive asset profitability of agricultural organizations in the Novosibirsk region (Table 5).

Option 1, which allows for a reduction in the amount of state support (compared to actual values for 2014), as shown above, is inefficient, as there are a reduction in the number of profitable organizations (from 365 to 356) and a drop in the average productive asset profitability (from 14.34% to 11.65%). Option 2 requires an increase in subsidies of 21.52% for its implementation and at the same time leads to an increase in the number of profitable organizations (up to 394) and an increase in the average profitability (up to 15.57%). Option 3 shows even better results, registering increase in the number of profitable organizations up to 404 (out of 443 included in the calculation) and increase in the average productive asset profitability up to 19.97%.

Table 5
Number of profitable organizations and productive asset profitability of agricultural organizations of the Novosibirsk region according to the method of subsidizing the productive assets

District	Option 1		Option 2		Option 3	
	Number of profit. org.	P_{pa}	*Number of profit. org.*	P_{pa}	*Number of profit. org.*	P_{pa}
Bagansky	11	9.47	11	13.25	11	18.25
Bolotninsky	10	-0.86	14	4.13	14	9.12
Vengerovsky	12	7.11	15	11.64	16	16.64
Dovolensky	2	-5.68	2	-0.68	2	4.32
Zdvinsky	12	9.93	14	13.10	14	7.12
Iskitimsky	17	18.37	18	21.57	18	15.90
Karasuksky	16	8.50	17	13.41	17	18.39
Kargatsky	7	8.23	7	13.11	8	18.04
Kolyvansky	12	6.49	12	11.14	12	16.12
Kochenevsky	12	23.47	14	26.23	14	29.00
Kochkovsky	8	6.41	13	12.43	13	17.96
Krasnozersky	18	6.25	21	11.20	21	16.20
Kuybyshevsky	15	7.76	16	12.44	16	17.18
Kupinsky	14	5.13	17	9.51	18	14.40
Kyshtovsky	3	-0.64	5	4.36	7	9.36
Maslyaninsky	6	7.19	6	12.16	6	17.16
Moshkovsky	13	18.62	16	22.90	15	26.91
Novosibirsky	30	18.62	31	21.72	32	25.90
Ordynsky	17	14.41	17	16.18	18	19.95
Severny	5	-3.41	9	1.59	10	6.59
Suzunsky	14	8.76	16	13.07	16	18.07
Tatarsky	13	12.61	13	15.95	13	19.70
Toguchinsky	8	9.71	10	13.52	10	18.09
Ubinsky	3	0.31	5	5.31	7	10.31

District	Option 1		Option 2		Option 3	
	Number of profit. org.	P_{pa}	*Number of profit. org.*	P_{pa}	*Number of profit. org.*	P_{pa}
Ust-Tarksky	12	9.86	12	14.07	12	18.98
Chanovsky	19	12.57	19	16.96	19	21.49
Cherepanovsky	16	8.76	16	13.28	16	17.88
Chistoozerny	14	4.71	15	9.46	16	14.24
Barabinsky	10	5.54	11	10.39	11	15.24
Chulymsky	7	9.01	7	13.41	7	17.80
Total	356	11.65	394	15.57	404	19.97

Based on the provided data, a conclusion can be made that the proposed method of subsidizing the agricultural organizations based on the value of productive assets is efficient. Its implementation requires an increase in subsidizing, but it will result in the growing number of profitable agricultural organizations and the growth of the average profitability.

4.7. Areas of development and forecast of changes in economic efficiency of agricultural organizations

In broad strokes, the following areas of ensuring the growth of the productive asset profitability can be note das the target (resulting) indicator of the efficiency of agricultural organizations:

1. Increase in return on sales expressed as the growth of return in the form of profit per ruble of revenue;

2. Intensification of the use of productive assets, which implies a higher turnover of productive assets, reduction in the duration of their turnover, a smaller amount per ruble of sales (revenue).

Intensification of the use of productive assets, which is primarily achieved in terms of the reserves of the organization, may require a reduction in prices for its implementation. In this case, the management is faced with the question: "Will the losses from selling finished products at a lower price (or resulting from providing discounts to certain categories of customers) be compensated by the additional benefits and profit that the organization can earn on the saved funds?"

The algorithm for decision making and finding the answer to the question posed is presented according to the data from CJSC Priobskoye of the Novosibirsk district of the Novosibirsk region. It has been established that the losses arising in the form of a direct reduction in the organization's profit (reserves of finished products multiplied by the share of sales at a lower price and the "new" value of return on production) are compensated in full by the additional profit that the organization receives on the saved funds (at the rate of the alternative yield of 12%), while the increase in profitability of production assets achieved through the implementation of this measure can be traced throughout the analyzed period (Table 6). The table below provides calculations for the situation in which 50% of the finished products of the organization are sold with a product profitability (mark-up) of 25% less than actual. However, the economic feasibility of this measure can be traced in many other options of the ratio of price reduction and share of products sold at a lower price.

Table 6
Justification of the sale of finished products of CJSC Priobskoye at a lower price

| Indicators	2009	2010	2011	2012	2013
Stocks of finished products (average per year), thous. rub.	10,863	13,596	18,942	15,603	17,366
Revenue, thous. rub.	50,365	79,929	62,234	76,408	57,483
Prime cost, thous. rub.	46,129	63,910	51,595	71,211	52,131
Gross profit, thous. rub.	4,236	16,019	10,639	5,197	5,352
Period of finished products turnover, days	85	77	132	79	120
Product profitability, %	9.18	25.06	20.62	7.30	10.27
Conditional value of the product profitability, %	6.89	18.80	15.47	5.47	7.70
Loss of profit, thous. rub.	125	426	488	142	223
New period of finished products turnover, days	42	38	66	39	60
Conditional average annual amount of stocks of finished products, thous. rub.	5,357	6,705	9,341	7,694	8,564
Release of stocks of finished products, thous. rub.	5,506	6,891	9,601	7,908	8,802
Additional profit (alternative income), thous. rub.	661	827	1152	949	1,056
Profit (loss) resulting from the sale of products at a lower price, thous. rub.	536	401	664	807	833
Actual values of productive asset profitability, %	3.78	14.24	9.05	4.26	4.08
Potential values of productive asset profitability, %	4.48	15.55	10.47	5.26	5.05
Growth in productive asset profitability, percentage points	0.70	1.31	1.42	1.00	0.97
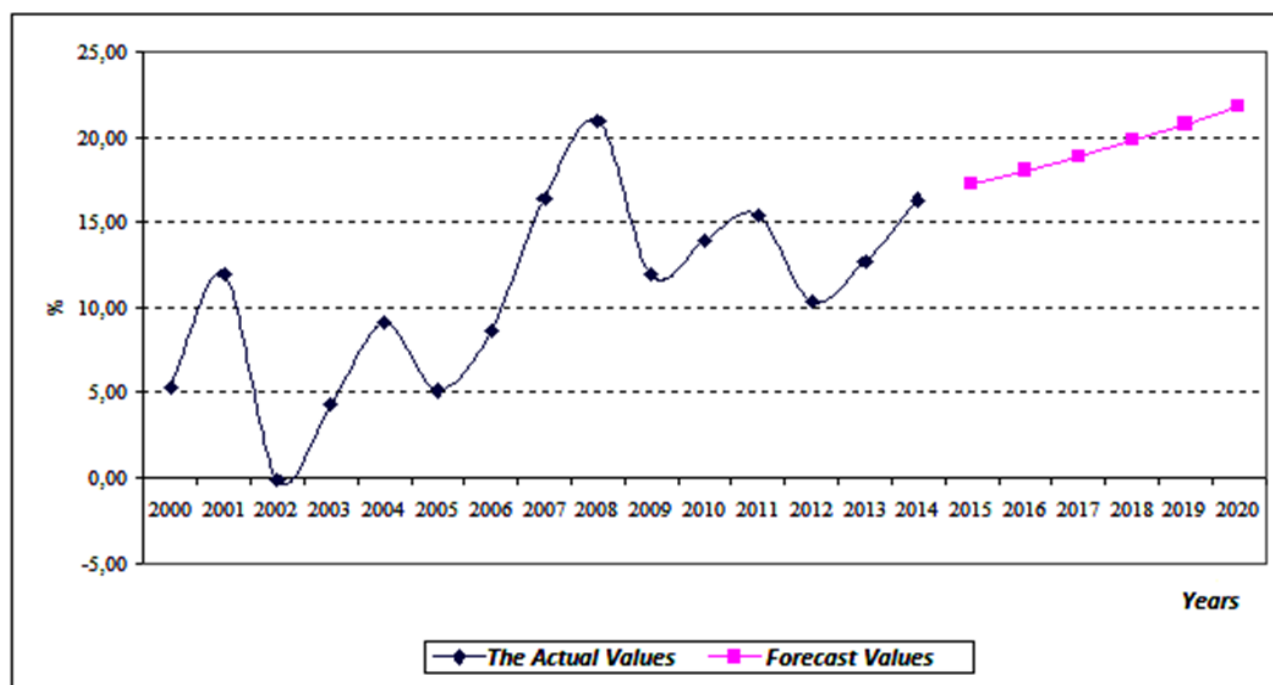
Figure 1: Actual and forecast values of productive asset profitability of agricultural organizations of the Novosibirsk region

It has been established through modeling in spreadsheets that even in the conditions of significant reduction in the product profitability, the organization achieves growth of profit and profitability thanks to the relative savings of productive assets (stocks).

The highest values of the increase in the target productive asset profitability index (more than 2-3 percentage points) can be traced for situations (options) in which the lowest value of the reduction in product profitability corresponds to the highest share of sales of finished products of CJSC Priobskoyeat a lower price.

An indispensable condition for ensuring the growth of profitability of sales of agricultural organizations is preservation and increase of state support for agriculture.

The inertial scenario of the change in the productive asset profitability index of agricultural organizations in the Novosibirsk region, with other things being equal, suggests negative forecasters of the indicator (Figure 1) at a target level of productive asset profitability index of 20% on average for agricultural organizations in the Novosibirsk region.

5. CONCLUSION

1. Proceeding from the fact that the production process in the organization is established only in case of the skillful use of all its factors: personnel (workforce), plant and machinery, and material and supplies, we suggest to understand the economic efficiency of agricultural production as the comparison of the obtained economic effect and subsidies with available resources (plant and machinery, material and supplies, labor resources) involved in obtaining this effect, the value of which per ruble of the owners' investment ensures the investment attractiveness of the industry.

2. From the position of an adequate assessment of the efficiency of the use of assets, it is expedient to correlate profits with assets (in the average annual estimate) that are most involved in generating the economic effect (profit). On this basis, it is expedient to use the profitability of production assets calculated as the ratio of profit to the average annual value of productive assets. This indicator is calculated both excluding and including subsidies from budgets of all levels.

3. Based on the definition of economic efficiency, which takes into consideration the use of all the factors of production: personnel, plant and machinery, and material and supplies, it is logical to use an integral efficiency index that takes into account conditional assessments (according to the formula of the geometric mean) of profitability of business and operation, intensity of use of productive assets and return from labor resources.

4. In fact, the current system of state support encourages only the increase in quantitative indicators - revenues and cost of sales (where the correlation coefficient is set to 94%), earnings from sales and before taxation (85 and 89%), productive assets (93%). The relationship between the size of state support and profitability indicators is weak (return on sales is 15%) or moderate (profitability of total and productive assets is 36 and 37%, respectively).

5. Trend of the productive asset profitability index of agricultural organizations of the Novosibirsk region, calculated excluding and including subsidies, is described with high variability of values and lack of unidirectional trend. The highest value of the indicator was recorded at year-end 2008 – 21.10% including subsidies, 14.29% excluding subsidies. At year-end 2014, the values

were the following: 15.22% and 10.72%. Increase in the gap of values excluding and including subsidies evidences the strengthening role of state support in ensuring the efficient operation of agricultural organizations in the Novosibirsk region.

6. Improvement of the practice of subsidizing the interest rate on loans to agricultural organizations is aimed at preserving its basic parameters and target focus, but it is proposed to supplement it with accounting for the requirement for the interest coverage ratio in the conditions of a shortage of federal and regional budgets. This will limit the desire of agricultural producers to maximize borrowed funds and encourage them to finance their operations primarily from their own sources. The finds saved (29,080 thous. rubles at year-end 2014) will be redistributed, which will allow to increase profitability. Use of this measure is determined by the fact that the share of the degree of the financial leverage in terms of the return on equity is significant (36.13% at year-end 2014) but accompanied by a high share of loans in aggregate sources (over 37%) and general financial dependence of agricultural organizations of the Novosibirsk region from external funding (share of the owners' capital is less than 50%).

7. It has been proposed to build the system of state support for agriculture on the basis of the indicator of productive assets. The indicators of target and subsidized profitability are defined, according to this method. Adaptation of this method to the agricultural organizations of the Novosibirsk region revealed that the implementation of the option with a target profitability of 20% and a subsidized profitability of 15% necessitates the 1.99 times increase in subsidies (up to 5,238 mln rub.) and allows to increase the number of profitable organizations up to 404 and the average productive asset profitability up to 19.97%.

8. Boost in the return on sales and intensification of the use of productive assets should be emphasized among the areas to increase the efficiency of agricultural organizations in the Novosibirsk region in terms of productive asset profitability. Increase in return on sales is only possible in conditions of increasing state support, since the inertial scenario suggests a reduction in the productive asset profitability down to 14.65% by 2020. The decision to intensify the use of productive assets is based on the comparison of losses resulting from price reductions (aimed at accelerating sales) with the benefits that the organization can receive on saved funds. It has been established in the situation of CJSC Priobskoye that a reduction in the average product profitability (mark-up) from the actual 10.27% in 2012 to 7.7% would mean a reduction in revenue and gross profit for the organization (223 thous. rub.). However, the efficient use of the released funds in the form of additional profit (1,056 thous. rub.) allows to make a conclusion on feasibility of this measure. The growth in the profitability of productive assets can be traced through all the years of the analyzed period.

References

Bessonova, E.V. (2012). Organizatsionno-ekonomicheskiye osnovy effektivnogo razvitiya molochnogo podkompleksa *v* Sibiri [Business foundations for the efficient development of a dairy subcomplex in Siberia]. Siberian herald of agricultural science, 3, 101-109.

Gataulin, A. (2009). Matematicheskoye modelirovaniye ekonomicheskikh protsessov v selskom khozyaystve [Mathematical modeling of economic processes in agriculture]. Moscow: ITK Granit, pp. 432.

Khodos D.V. (2013). Ekonomicheskiy mekhanizm razvitiya APK regiona [Economic mechanism of development of agribusiness in the region]. Herald of the KrasSAU, 13, 24-28.

Kirillov, S.L. (2010). Ekonomicheskaya effektivnost selkhozproizvodstva: vybor produkta, rentabelnost, summy pokrytiya [Economic efficiency of agricultural production: product selection, profitability, profit margins]. Herald of NSAU, 10(1), 57-62.

Krylatykh, E.N. (2014). Prognoznyye otsenki agrarnykh rynkov ES i Rossii na period do 2022 goda [Predictive estimates of the agrarian markets of the EU and Russia for the period through to 2022]. Economics of agricultural and processing enterprises, 7, 29-36.

Kundius, V.A. (2010). Ekonomika agropromyshlennogo kompleksa [Economics of agribusiness]. Moscow: KnoRus, pp. 544 (Study guide).

Kurtsev, I.V. (2011). Znacheniye selskogo khozyaystva dlya effektivnogo uchastiya Sibiri v globalnoy ekonomike [Importance of agriculture for efficient participation of Siberia in the global economy]. Nikonovsky readings, 16, 45-46.

Matveev D.M., Stadnik A.T. and Menyaykin D.V. (2014). Boosting The Investment Attractiveness Of Agricultural Production. World Applied Sciences Journal, 31(8), 1535-1539.

Nazarenko, V.I. (2006). Gosudarstvo i selskoye khozyaystvo na Zapade [State and agriculture in the West]. Moscow: Ogni TD, pp. 324.

Ozerova, M.G. (2013). Kontseptualnyye osnovy ekonomicheskogo mekhanizma agroprodovolstvennogo sektora [Conceptual foundations of the economic mechanism of the agrifood sector]. Herald of the Krasnoyarsk State Agrarian University, 5, 25-30.

Papelo, V.N. (2014). Sibirskaya model ustoychivogo razvitiya selskikh territoriy [Siberian model of sustainable development of rural territories]. Agribusiness: Economics, management, 2, 71-75.

Rudoy, E.V. (2012). Otsenka sovremennogo sostoyaniya selskokhozyaystvennogo proizvodstva i prodovolstvennogo rynka v Sibirskom i Dalnevostochnom federalnykh okrugakh [Assessment of the current state of agricultural production and food market in the Siberian and Far Eastern Federal Districts]. Herald of NSAU, 1(22-2), 192-196.

Shelkovnikov, S.A. (2010). Sistema pokazateley rezultatov ekonomicheskoy deyatelnosti i byudzhetnoy podderzhki selskokhozyaystvennykh organizatsiy [System of indicators of economic performances and budget support of agricultural organizations]. Agribusiness: economics, management, 7, 21-24.

Shelkovnikov, S.A. (2015). Sovershenstvovaniye mekhanizma subsidirovaniya protsentnoy stavki po kreditam selkhozorganizatsiyam [Improvement of the mechanism of subsidizing the interest rate on loans to agricultural organizations]. Herald of NSAU, 2 (35), 172-177.

Stukach, V.F. (2010). Mekhanizm gosudarstvennoy podderzhki selskokhozyaystvennogo proizvodstva na regionalnom urovne v usloviyakh vkhozhdeniya Rossii v VTO [Mechanism of state support for agricultural production at the regional level amid Russia's accession to the WTO]. Izvestiya of the Orenburg State Agrarian University, 2(26-1), 110-113.

Suchkov, A.I. (2014). Sostoyaniye zakreditovannosti selskokhozyaystvennykh organizatsiy Novosibirskoy oblasti i Vengerovskogo rayona [State of debt overburden of agricultural organizations of the Novosibirsk region and the Vengerovsky district]. Herald of NSAU, 1 (30), 140-143.

Vernigor, N.F. (2015). Gosudarstvennaya podderzhka selskogo khozyaystva – neotyemlemaya chast gosudarstvennogo regulirovaniya [State support of agriculture as an integral part of state regulation]. Herald of the Altai State Agricultural University, 2 (124), 143-147.

Yakimova L.A. (2012). Mekhanizm strategicheskogo upravleniya innovatsionnymi proyektami na molokopererabatyvayushchikh predpriyatiyakh [Mechanism of strategic management of innovative projects at milk processing plants]. Herald of the Krasnoyarsk State Agrarian University, 8, 19-22.

Zotov, V.P. (2012a). Sovershenstvovaniye upravleniya tekushchimi zatratami s tselyu effektivnogo upravleniya pribylyu v APK [Improvement of managing current costs for the purpose of efficient profit management in agribusiness]. Herald of NSAU, 1(22-2), 165-170.

Zotov, V.P. (2012b). Byudzhetirovaniye kak metod upravleniya zatratami i effektivnost rezultatov yego vnedreniya [Budgeting as a method to manage costs and the efficiency of results of its implementation]. Herald of NSAU, 1(22-2), 170-175.