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## Efficiency Analysis of Agricultural Cooperation in Russia

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### Abstract

This paper is devoted to a new approach in the research of the efficiency of cooperative forms of agricultural production organization in Russia. Based on the methodology of the cooperation efficiency evaluation developed by the author, the comparative efficiency analysis of the performance of agricultural enterprises in Russia was carried out. A comparison is made between two forms of agricultural production: cooperative (represented by agricultural production cooperatives) and non-cooperative (represented by peasant (farm) households). The calculation and the resulting analysis of efficiency indicators allowed characterizing the position of each form and drawing conclusions regarding the choice of strategy for the development of small-scale production in agriculture. The results of the analysis demonstrate a relatively higher efficiency of non-cooperative forms in agriculture in Russia now. This partly explains the unsuccessful attempts of the state to develop agricultural cooperation during the period from 2005 to 2016.

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### 1. Introduction

The branches of the agro-industrial complex are the most dynamically developing in Russia today. The analysis of the average growth rates by branches of agriculture showed that many of them have good positive dynamics, far ahead of the growth rates of industrial production sector. However, as some experts note (Nikulin, Trotsyk, Sobolev, Kurakin, 2016), such growth is largely due to the development of large agro-industrial holdings, actively supported by the state. Given the emergence of such holdings, certain industries (poultry farming, livestock farming) have achieved high production levels and, in fact, provide the country with the necessary foodstuffs, are able to solve the

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problem of dependence on Western suppliers.

Thus, partially one of the key problems - ensuring food security- was resolved. But another problem remained unsolved: the extremely weak development of small-scale agricultural production (primarily farming) and their associations, and at the same time total poverty in the countryside. The President of the Russian Federation V. V. Putin in the message to the Federal Assembly for 2017 emphasized these aspects. Understanding the importance of this issue exists (as indicated by a number of studies, including those commissioned by the Government of the Russian Federation), but its solution has not yet been found either in theory or in practice.

Today, the state within programs provides annual support to small- and medium-sized agricultural enterprises by providing, mainly, favorable credit terms. This, in fact, is the main tool for the development of farming in the countryside. However, despite the fact that such programs have existed for many years, the active growth of farms and the efficiency increase of the existing ones are not observed.

For the state, the development of small agricultural enterprises is seen in stimulation of creation and development of agricultural cooperation. In many Western countries (Italy, Denmark, the USA and others), cooperation in the sphere of agriculture is an integral part of the industry functioning. At the same time, favorable conditions for farming development have been created, and their stability in the market is facilitated by cooperation (horizontal and vertical) with other market players.

A lot of work has been devoted to the study of cooperation, both in agriculture and in general, but most of these studies have been conducted by foreign authors. And this is not surprising, since cooperation in Russia is poorly developed, and its modern advantages, which have been appreciated long ago by the Western enterprises, remain doubtful for Russian subjects of economy. According to the research (Nikulin, Trotsyk, Sobolev, Kurakin, 2016), in our country there are almost no new cooperatives, and the existing ones are not quite effective, as they are mostly successors of the Soviet collective farms.

Programs that do exist and are created for the development of agriculture in the country, are not enough to make cooperation in Russia a basis for development of agriculture in general and farming in particular as in the West.

In modern literature there are many works devoted to various models and methods for efficiency assessment of cooperative forms or individual subjects in agriculture. The analysis of these studies showed that, firstly, there is no consensus concerning what to consider as a criterion of efficiency (economic, technical, ecological, or other components). It is expressed in a variety of disparate attempts to evaluate the effectiveness. Each of the criterion is a unique approach. Secondly, even when assessing the same factors, researchers use various methods and indicators that, certainly, complicate comparison of the obtained data. In fact, the works existing today in this direction reveal the situation and regularities for some particular region or the country, and the applied methods have no universal character.

The dependence of efficiency of cooperation is investigated using such factors as: economy of scale on activity (on the example of farmer cooperatives in China) (Liu, Von Bailey, 2013), the type of the applied strategy (in the research of cooperative and non-cooperative forms in Greece) (Salavou, Sergaki, 2013), productive efficiency (the cooperative and non-cooperative wine-making enterprises in Italy) (Pestana Barros, Gomes Santos, 2007), technical efficiency (in works dealing with the analysis of the Italian and Ethiopian farm cooperatives) (Zaimova, 2011), (Abate, Francesconi, Getnet, 2013) and even the size of the board of directors (in the USA) (Keeling Bond, 2009). Often, the main criterion is institutional (minimizing transaction expenses), which is understandable taking into account popularity in scientific community of the neo-institutional theory (Pozzobon, Zylbersztajn, Bijman, 2012). Some studies point to the high importance of informal ties in the organization of agricultural cooperation (Biro, Hamza, Racz, 2016). It was also useful to study cooperation of small farms of the Republic of Kazakhstan where similar developmental features of Russia are traced (Yegizbayeva, 2016). Russian scientists suggest a comprehensive approach to the analysis of agricultural cooperation efficiency, considering such components of efficiency as economic, social, managerial, and national economic (Volodin, 2005).

### **Methodology and data**

Among economic indicators characterizing efficiency, it is proposed to determine labor productivity, production costs saving, financial stability, and profitability of production. Social and managerial efficiency is proposed to be measured through a number of qualitative characteristics of the cooperative, among them are participation in the labor activity of the cooperative members, the income distribution system, the solution of social issues, democratic governance, self-management, synchronicity in the work of cooperation partners. Scientists estimate national economic efficiency through the achievement of the following results: stabilization of the agro-industrial complex

(too much of a global goal for a certain subject, in our opinion), saturation of the market with food products, and an increase in budgetary allocations.

Perhaps, the greatest interest in the analysis of efficiency of integration of market subjects is shown by representatives of the institutional direction of economic thought. Evaluation of efficiency and expediency of cooperation (integration) from the position of institutional direction can be carried out through a comparison of the transaction expenses of integrated and non-integrated forms. At the same time, the decrease in transaction expenses is promoted to a greater extent, as a rule, by vertical integration ("up" or "down") with counterparties. Thus, the risks of uncertainty and opportunism for the firm are reduced. This approach gets guaranteed sales or access to the necessary resources. However, it is necessary to remember the so-called "lock-in effect" effect, in which a firm selling its product or service within the cooperative cannot sell outside. As a result, the company's production potential will not be realized, that will not allow it to cover fixed expenses and be profitable.

Further, we conducted a study of the selection of agricultural production cooperatives (APC) registered and operating in Russia, for which there were data on the accounting reports for the period from 2011 to 2015. Calculation and analysis of indicators was carried out on the basis of information provided by the information-analytical system FIRA.PRO (FIRA, 2017). In total, the analysis collected and processed data from 2916 cooperatives.

The research of efficiency indicators of cooperatives performance was conducted on the following algorithm:

1. The analysis of prime cost per ruble income for cooperative enterprises with subsequent comparison of the indicator with similar indicator of non-cooperative small agricultural enterprises. For this, the production cost of enterprises and its relation to the sales revenue of agricultural products was determined according to the financial statements.

2. The analysis of financial indicators in 2015:

- 2.1 the provision with working capital (characterizes the adequacy of the company's own funds for financing current activities and is calculated as the difference between own capital and non-current assets divided by the amount of current assets);

- 2.2 Equity Ratio (relative share of equity in total capital);

- 2.3 the return on costs (the ratio of gross profit to the cost of production);

- 2.4 the gross profit margin (the gross profit per ruble of sales revenue);

- 2.5 the growth rate of sales revenues.

3. The analysis of dynamics and efficiency of the use of fixed assets of enterprises:

- 3.1 the growth rate of fixed assets over the last 5 years;

- 3.2 the return on assets (the ratio of sales revenue to the average annual cost of fixed assets of enterprises).

4. The comparative analysis of transaction costs in cooperative and non-cooperative forms of enterprises.

The transaction costs are estimated according to the accounting data through the level of commercial and management costs, as well as through the speed of turnover of the enterprise assets.

This algorithm of analysis was developed on the basis of the studied and described above methods of cooperation efficiency analysis, and also taking into account data that were in the accounting reports of the enterprises and were available to the author.

According to the Russian Federal State Statistics Service, the quantitative dynamics of cooperatives in the last 4 years has been negative (Rosstat, 2017). The number of agricultural production cooperatives (APC) decreased from 11,850 to 9,972 units (a loss of approximately 15%). And there is a clear tendency of annual decrease in the number of agricultural cooperatives in the country (Fig. 1). It coincides with the observation that in the given period there was a significant reduction in the number of peasant (farm) households (small forms of organization of agricultural production), which is especially noticeable in 2016. The number of peasant farms reduced from 47316 in 2013 to 29810 enterprises in 2016 (that is approximately 37%).

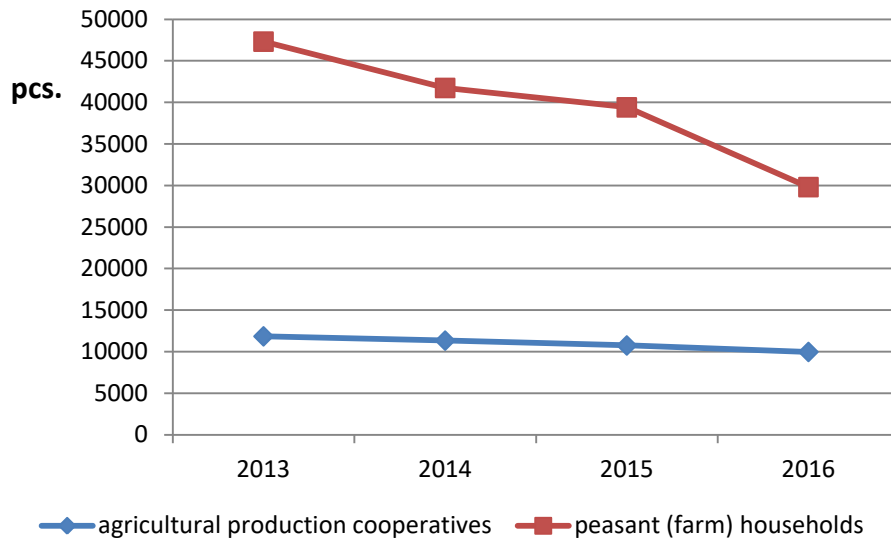


Fig. 1. The number of agricultural production cooperatives and peasant (farm) households in Russia for the period 2013-2016.

The described changes reflect a negative tendency among small agricultural manufacturing enterprises, both in the cooperative and non-cooperative sectors.

### Results

On the basis of the proposed algorithm the analysis of the allocated indicators in two forms of managing (agricultural production cooperatives and peasant (farm) households) was made. At this stage, the author set the following goal: to obtain a comparative description of various financial and economic parameters in two forms and to identify the most effective of them.

During the analysis it was revealed that about 30% of cooperatives in the selection were unprofitable by the end of 2015. At these enterprises the production cost in exceeded the sales income by a factor of 1, 4. In other cooperatives, the share of production cost in proceeds on average for the selection was 82%. Considering that this indicator is calculated without taking into account unprofitable cooperatives, and then it is necessary to conclude about rather low profit and cost effectiveness of agricultural production cooperatives in general.

On average, the return on costs of the entire selection was 9, 8%, while only among the profitable enterprises the indicator was significantly higher - at the level of 24%. Also, about 30% of cooperatives had a negative gross margin. Throughout the selection, this indicator was on average 6.1%.

The analysis of prime cost per ruble income and profitability was carried out separately for large-, medium- and small-sized enterprises (agricultural production cooperatives) in the selection. In total, there were 2 large cooperatives in the selection (according to the size of the annual turnover), 10 medium-sized cooperatives, and the rest were small. The share of production cost in proceeds at large cooperatives was on average 75% in 2015, at the same time, we also observed significantly higher profitability indicators - the average return on costs was 34.1% and gross profit margin was 24.9%. Almost identical indicators were shown by medium-sized cooperatives: the share of production cost in proceeds 76%, return on costs 30%, and gross profit margin 23.9%. The situation was much worse for small cooperatives as we observed the relative share of production cost in proceeds was 100, 32%.

Further, the indicators of the enterprise's financial stability, as the most significant in the process of financial and economic activity, were investigated. The average for the sample of the ratio has become 67.2. This indicates the dominance of the owner's equity over debt one and that it is quite "comfortable" for financial stability. However, 4,5% of cooperatives had a negative rate of autonomy, which indicates the presence of the uncovered damages of past periods. An essential part of cooperatives (12,4%) had sufficiently high negative security of their own circulating asserts. Therefore the index of the average for the sample of ratio has become negative one. Being a

negative occurrence, this sample of the entire selection has also become a negative one.

The average growth of capital assets among studied cooperatives also had an economic slowdown in the period from 2011 -2015. The average economic growth of agricultural production cooperatives is shown in Fig. 2.

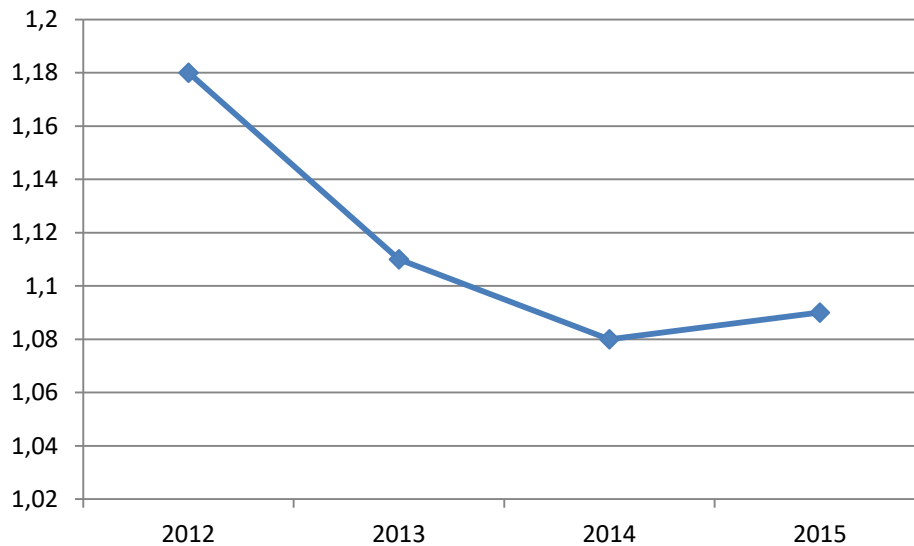


Fig. 2. The average economic growth of agricultural production cooperatives in 2012-2015.

The dynamics of the indicator shows a significant slowdown in the growth of fixed assets of cooperatives from 18 to 9 percent in 2015. However, it should be noted that the dynamics are non-negative and it is considered as a positive moment. Since the majority of enterprises that compose RAS accounts (Russian Accounting Standards) do not conduct an annual revaluation of fixed assets, their positive growth, most likely, reflects a real increase in assets on the balance sheet with enterprises. Further analysis of the growth rate of revenues from the sale of cooperatives is given below in Fig. 3.

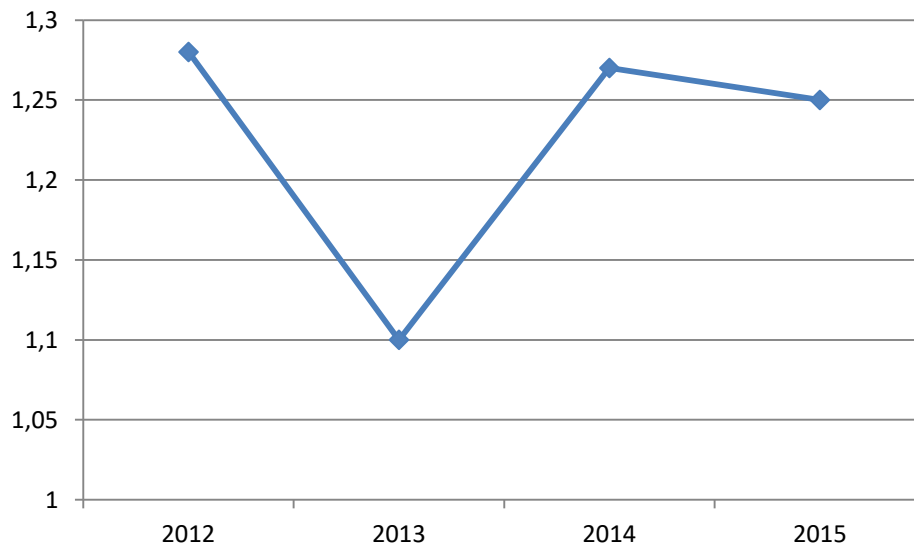


Fig. 3. The average economic growth rate of revenues from the sale of cooperatives in 2012-2015.

With the exception of 2013, the average revenue of agricultural production cooperatives has steadily increased

by 25-28%. These rates of growth seem optimistic, because they outstrip the average values in many sectors of the Russian economy. However, compared with the dynamically developing field of agriculture in general, these indicators are slightly lower than the average in most of the industries.

To sum up the comprehensive analysis of the activities of the agricultural production cooperatives, it can be concluded that, on average, these enterprises for the last 5 years have worked with low efficiency (this is confirmed by an annual reduction in the number of cooperatives). Among the negative characteristics, we particularly note the low level of profitability, a significant share of loss-making cooperatives. Taking into consideration that the research was conducted on those cooperatives that provided full accounting records in the last 5 years (these are usually the largest and most stable of them), then, most likely, the real situation of such forms of management is much worse.

In order to assess the situation of the cooperative production sector more thoroughly, it is necessary to make a comparative analysis of their performance indicators with similar indicators of another group of enterprises that have opted for alternative cooperative strategy - individual entrepreneurship, for instance, peasant (farm) households (PFH).

We have already cited the dynamics of the number of peasant farms in Russia and, as in the case of cooperatives, it used to be negative. The reduction in the number of peasant (farm) households came in 4 years by 37%, and only from 2015 to 2016 by 24%. That is, the reduction of non-cooperative small forms of agricultural production was much more significant than cooperative ones (on average, their number decreased by about 15%), which indicates their weak market stability.

Further, on the basis of information from the same information and analytical system FIRA.PRO, a number of indicators were studied that describe the efficiency of the activities of peasant (farmer) households (the same indicators were used for analyzing agricultural production cooperatives). The sample was formed among the farm households, which provided accounting reports for the 5-year period (from 2011 to 2015) and had non-zero income in this period. There were 492 farms which participated in the study. It should be noted that not all peasant (farm) households form and provide full accounting reporting. According to the Russian economic law, farm households have the right not to maintain accounting records, but only tax accounting, in which accounting is conducted only in the context of income and expenses (Tarasov, Brik, 2013). Unfortunately, this does not provide an opportunity to assess most of the indicators of financial and economic activities of enterprises.

Our task was to conduct a comparative analysis of the activities of cooperative and small non-cooperative forms, therefore, only a small proportion of peasant (farm) households had viable data to study. At the same time, the objectiveness of the research is reinforced and confirmed by the fact that peasant (farm) households of various sizes, operating in different sectors and regions, participated in it.

According to our algorithm, at the first stage, the production costs of enterprises were analyzed, namely their share in the operating income of the enterprise. On average, the share of production costs in the revenues of peasant (farm) households, according to 2015, was 77%, which is lower than that of agricultural production cooperatives (with an average share of 82%). On average, the share of production costs in the revenues of peasant (farm) households, according to 2015, was 77%, which is lower than that of agricultural production cooperatives (APC) (with an average share of 82%). At the same time, only about 40 out of 492 farms were unprofitable in the studied period.

Peasant (farmer) households also showed higher profitability rates compared to cooperative enterprises. The average cost-return ratio for the sample for 2015 was 47.4% (in agricultural production cooperatives, on average, this figure was 9.8%). The average gross profitability in peasant (farm) households was at the level of 23.1% (in agricultural production cooperatives it was only 6.1%) (Fig.4).

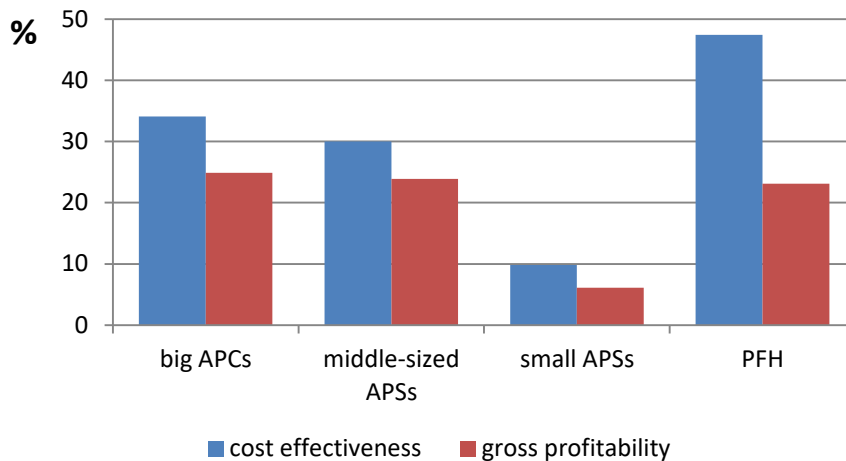


Fig. 4. Cost-effectiveness and gross profitability according to the type of business in 2015

Thus, only big and medium-sized agricultural production cooperatives had a level of profitability comparable to those of peasant (farm) households in 2015. However, the sample of such enterprises is only 12, which is an insignificant fraction of the total sample size. In general, it is clear, that the majority of the cooperatives are small agricultural production cooperatives are significantly inferior to individual forms of production in terms of profitability of their activities.

Thus, it can be concluded that peasant (farm) households have higher profitability rates than cooperatives. On the one hand, this is due to the fact that cooperatives in general, as a form of farming, are not very effective in Russia. Most of them were founded in the Soviet period and today are not able to meet the new market requirements. On the other hand, peasant (farm) households are also not highly efficient as evidenced by a significant reduction in their numbers from 2013 to 2016 (Figure 1). Rather high indicators of their effective can be explained by the fact that the most stable and large farms have been selected in the sample (since the majority of small peasant (farm) households in Russia are allowed not to conduct and provide accounting statements). In general, a large number of such farms are created and closed annually in the country; however, their growth is negative.

Further, among the indicators which characterize the financial condition of the farms, the average supply with their own circulating assets and the specific weight of equity in total capital (the coefficient of autonomy) were estimated. The availability of their own circulating assets on average for the sample of peasant (farm) households in 2015 was positive. However, there were 45 peasant (farming) households (9%) in the sample, which had negative provision with their own circulating assets. Probably these are the enterprises that suffered losses according to the results of the year. In absolute terms in this indicator, peasant (farm) households also showed better results than agricultural production cooperatives

The average rate of autonomy in the sample was quite high – at the rate of 75%. Taking into account that it was at an acceptable level among cooperatives (67.2%), it is possible to make a general conclusion that small agricultural enterprises and their cooperatives are reluctant to attract borrowed capital, preserving their financial independence. Probably this is what could prevent many of them from complete ruin and bankruptcy, as the level of profitability of enterprises is not high enough to service a significant amount of raised capital.

The study of small- and medium-sized successful enterprises, carried out by V.I. Barkhatov, I.A. Belova, E.V. Nikolaeva, D.A. Pletnev (Barkhatov, Belova, 2016), (Pletnev, Nikolaeva, 2015, 2016), has demonstrated the high importance of the "financial stability" factor for the sphere of agriculture. The authors denote that all the most successful small- and medium-sized agricultural enterprises (leaders) have a high level of financial stability, characterized primarily by the predominance of equity in the structure of aggregate capital.

As a result of the analysis of the growth rates of income and fixed assets, it was revealed that from 2011 to 2015 both indicators showed a positive and very significant increase. Figure 5 shows the growth rates of fixed assets in



agricultural production cooperatives and peasant (farming) households.

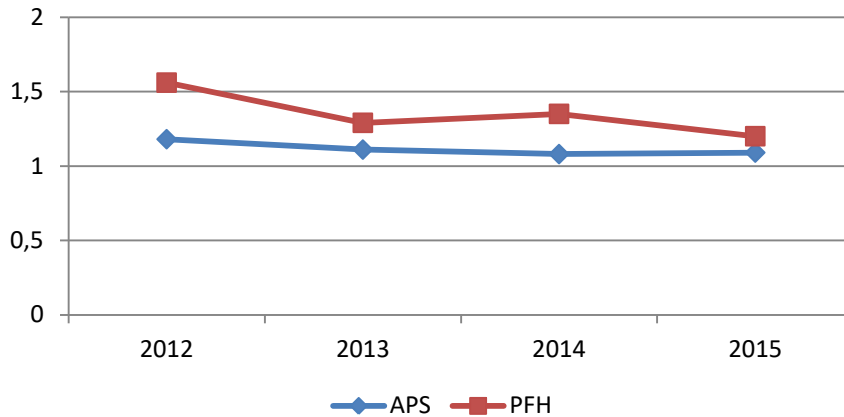


Fig. 5. The average growth rates of fixed assets in agricultural production cooperatives and peasant (farming) households in 2012-2015.

In both cases, the growth rates are positive, but tend to slow down. In all analyzed periods peasant (farm) households outstripped agricultural production cooperatives in this indicator. Could these rates be considered sufficient? Probably, for industries that do not tend to accelerate outstripping development. These growth rates are quite acceptable, especially due to the protracted recession in the economy.

Due to the rate of return on assets, peasant farms also outstrip cooperatives. In 2015, on average for a sample of peasant (farm) households, this indicator was 3.45, while for a sample of agricultural production cooperatives, there were only 2.42. That means that the efficiency of using fixed assets in cooperative forms of management is lower than in individual farm households.

Peasant (farm) households have demonstrated high growth in revenue from sales over the past 4 years, with some decline in 2013 (Fig. 6).

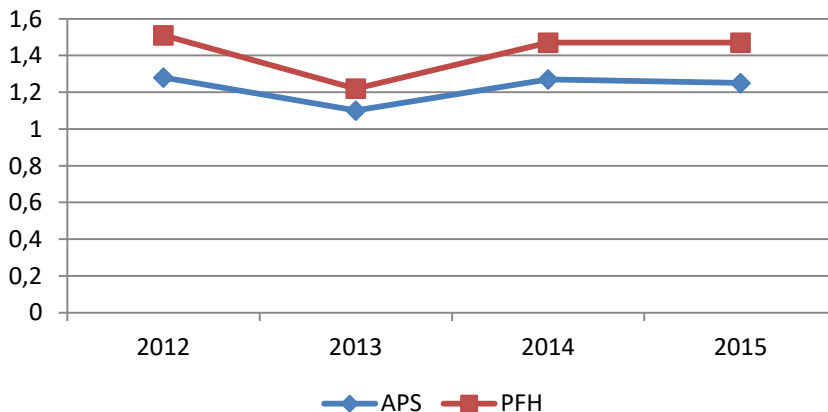


Fig. 6. The average growth rates of revenues from sales in agricultural production cooperatives and peasant (farm) households in 2012-2015.

In 2014-2015, peasant (farm) households had a stable high increase in revenues - at the level of 47%. It is necessary to point out that cooperative forms of agricultural production annually lagged by about 20% in this indicator. This confirms the lower effectiveness of cooperative forms in comparison to individual small forms of organization of agricultural production in Russia.



As to the assessment of the level of transaction costs, the analysis was intended to use the integrated level methodology developed by Pletnev D., Nikolaeva E., Lushnikov S. (Pletnev, Nikolaeva, Lushnikov 2014). This level consists of several indicators. The values of commercial and administrative costs of enterprises are the main indicators. However, the analysis of these costs in agricultural production cooperatives and peasant (farm) households has shown that the overwhelming majority of them have no expenses. This is due to the specifics of accounting on the one hand, and on the other hand to the weak market activity of such enterprises and their often simple organizational structure and management structure. Thus, without even making calculations, we can say that analyzing only the accounting data, the level of transaction costs in small forms of organization of agricultural production (cooperative and non-cooperative) turned to be low. In the future, to determine the effect of various factors, it is advisable to carry out a regression analysis of the influence of factors on the effectiveness of small forms of agricultural enterprises in Russia.

## Conclusion

During the analyzed period of 4 years, the number of both cooperative and non-cooperative agricultural producers has significantly decreased. This negative tendency was especially strong among peasant (farm) households, where the reduction was more than 37%. However, such small forms of management in Russia have never been known for high stability in the market and quite a lot of them are closed annually. As for cooperative production forms, the described tendency does not demonstrate the development of agricultural integration in the country. In addition, it should be noted that there is an annual decrease in the number of functioning entities in the consumer cooperation sector.

Analysis of production costs showed that a large proportion of cooperatives in 2015 did not cover their expenses, and remained unprofitable. These are mostly small-scale agricultural production cooperatives, which, on average, had an operating cost that exceeded sales revenue by 0.2%. Only large- and medium-sized cooperatives had an acceptable level of profitability of expenses and gross profitability. The best results for these indicators were demonstrated by peasant (farm) households, where, on average, the profitability in 2015 was 47.4%.

Among the indicators of financial activity, the most significant for the agricultural sector were analyzed: indicators of financial stability (provision of own working capital and the share of equity in total capital). Both of these indicators were at a high level. Although, as in the previous analysis, peasant (farm) households demonstrated greater financial independence than cooperatives. It should be noted that a sufficiently high level of own funds were used by agricultural enterprises of both types (64-75% of total capital).

Furthermore, among the positive tendencies there could be noted the high growth rates of income of analyzed agricultural enterprises. The proceeds of agricultural production cooperatives grew by 10-28% annually during the period under consideration. A similar indicator for non-cooperative peasant (farm) households was 22-51%. However, in this case, non-cooperative enterprises outstripped the cooperative in terms of development level. In general, during the observed period of three years, the high growth rates of income are explained by the general rise in the agricultural sector of Russia.

Analysis of the dynamics and efficiency of the use of fixed assets of cooperative enterprises made it possible to reveal a slowdown in the growth rates of fixed assets throughout the analyzed period, which is certainly a negative tendency. By 2015, the increase in fixed assets is reduced by 10% compared to 2012 and is only 9%. In peasant (farm) economies, the slowdown is even more significant, however, despite this fact, by 2015, the growth rate of fixed assets remains at a quite acceptable level of 20%.

As a result of the analysis, it can be concluded that currently there is no development of cooperation in agriculture in Russia, which has been revealed both in terms of quantitative indicators and in qualitative characteristics of production cooperatives. Unfortunately, the cooperative, which has to increase the effectiveness of small business in the field of agriculture, remains one of the least attractive forms of organization agricultural enterprise. It is obvious that the state government attempts to stimulate the development of cooperation in rural areas do not produce visible results, which calls for a revision of the support policy and its instruments, and at the same time creating a favorable institutional environment for its development.

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