

# Large and Small Agricultural Business in Russia: Market Adaptability and Efficiency

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## 1. Basic Concepts

In Russia, the major part of agricultural output is created in large and largest agricultural organizations, on the one hand, and small and smallest family farms, on the other hand. In this article, the development and adaptation of agricultural organizations of these two types to market conditions is considered.

In this article, the term “small agricultural business” describes both individual and family farms and small agricultural enterprises (according to the Russian legislation, the enterprises with the total number of permanent workers not exceeding 60 persons). All the other agricultural enterprises are named “large agricultural business”.

In market economy countries, agricultural output is created mainly in small business. The issue of small business development is broadly discussed in economic studies. Economic theories explain the sustainability and efficiency of family farms by proprietor’s labor motivation that is stronger than one of hired worker, the proprietor’s orientation not to profit but to the needs of his family, higher aesthetic and moral value of labor in the owned farm, the integration of labor process and family life, and stronger environmental sustainability of family farms.

The development of large business is supported by economy of scale. However, it is constrained by the higher transportation costs, managerial complexity, and environmental threats. The modern institutional economic theory adds one more argument — hired workers’ behavioral opportunism. O. Williamson defines the opportunism as “the standing for one’s interests even by the use of the obvious forms of deceit such as lie and fraud, but not only them. More often, opportunism means finer passive or active forms of deceit being reflected *ex ante* and *ex post*.”<sup>1</sup>

To cope with opportunism, the appropriate items can be inscribed into labor contracts, and monitoring can be strengthened. However, it is impossible to control everything, so the negative consequences of opportunistic behavior are unavoidable. This problem is the particular issue of agricultural organizations (AgO) because of their dispersed allocation across the territory causing the complexity of the control over contractors and the protection of agricultural machinery, equipment, and cattle from theft. This problem is of the particular importance for Russia, where the population has rich experience of opportunistic behavior gained during the years of socialism.

In contrast to industrial sector (for example, conveyor industries), in agricultural sector it is possible to define the precise scope of workers’ responsibility, and labor content and efficiency. The “specter” of works depends on plants species and animal breeds, soils, relief, etc., so it is practically impossible to struggle against behavioral opportunism using the standards and control measures. Therefore, a family farm the proprietor of which at the same time plays the role of manager, worker, security guard, controller and so on, is more appropriate. The number of permanent hired workers is small, and they work together with and under the control of the members of the proprietor’s family.

In the period of socialist economy, the dominating role of large business was caused by the following factors:

— the “enslaving” of peasants;

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<sup>1</sup> Williamson O. Поведенческие Предпосылки Современного Экономического Анализа. //TESIS T.1. Part 3,1993, c. 43.

- the distribution of land resources (in sovkhozes — of some other resources) accomplished by the State;
- the use of the State repressive bodies for the struggle against workers' behavioral opportunism;
- the simple system of economic control in the context of direct planning of agricultural production and resource supplies, the prices determined by the State, the attaching of suppliers to customers, etc.;
- soft budgetary restrictions; if AgOs suffered from the deficiency of cash resources, the State usually compensated the deficiency, and wrote-off their debts; the bankruptcies were out of practice;
- the restrictions for small business; large enterprises survived because they had no competitors on domestic market; the State used various measures to restrain small business;
- the absence of external competitors.

Within the transition to market economy, the above mentioned factors lost their importance or their impact was significantly weakened. It is impossible to force peasants to work in AgO; AgOs should buy or lease land and other assets; the State can hardly be helpful in the struggle against the workers' opportunistic behavior. The choice of agricultural product line, customers, and prices for products and resources is the issue of AgOs' managers. The insolvent enterprise becomes a bankrupt. AgOs survive under the permanent competitors pressure, both internal (small agricultural business) and external. Can the role of AgOs be maintained under such conditions?

## **2. The Trends in the Development of Agricultural Organizations**

The most important trends in the development of AgOs that had been revealed in the course of the study, include the following.

- The impetuous changes of the organizational and legal forms of enterprises still continue. The reforms have started 14 years ago, but the forms of enterprises had not stabilized yet. In the initial stage of reforms, limited partnerships and closed joint stock companies had been predominantly created, but by the mid-1990-s, most of them have been re-registered as agricultural production cooperatives (although it was less efficient form of enterprise). During the recent two years, the backward trend was observed, i.e., the re-organization of agricultural production cooperatives into limited societies and closed joint stock companies.
- AgOs have lost the most of their assets, which they possessed in the initial stage of reforms. From 1996 to 2002, fixed capital stock (in constant prices) has decreased 700% and net assets 800%.
- In AgOs, the fast concentration of capital takes place. By the moment of privatization, 100% of authorized capital stock and votes were in the hands of peasants; by the beginning of 2003, they possessed at most 25% of votes.
- The differentiation of AgOs by their financial performance grows. A part of enterprises (nearly 40%) becomes richer, and the rest ones suffer from growing debt. The volume of debt is so large that they can hardly pay it off on their own.
- In AgOs sector, the concentration of production and resources takes place. The share of the largest producers grows, and the role of others becomes less important.
- In the Russian agriculture, the super-large organizations are forming, i.e., agrofirms and agroholdings. Each of them possesses dozens and even hundreds thousand hectares of land, and dozens of thousand hired workers.

- The major part of AgOs has transformed into small enterprises;
- The fast process of the liquidation of AgOs (mainly small and insolvent ones) takes place.
- The resources of liquidated enterprises are passed to the hands of new users and owners, predominantly again to AgOs and agrofirms, but not to farmers and individual subsidiary plots of population.

### 3. Small Business in Agriculture

**Small agricultural enterprises.** By the beginning of 2003, in Russia there were 29.8 thousand small and other enterprises engaged in agricultural production. In 2002, small enterprises and other agricultural producers possessed 7.8 million ha of agricultural land. The total volume of agricultural output achieved 23.3 billion rubles. Small agricultural enterprises and other agricultural producers specialize mainly in crop production (in 1999, their share in total crop output constituted 76%). In 2002, they produced 6 million tons of cereals and 0.8 million tons of oilseed. The number of cattle and the volume of livestock output in small enterprises are insignificant and tend to decrease.

**Peasant (farm) holdings.** Despite the expectations, in Russia farm sector had not become the dominant agricultural sector. In 2002, its share in the total agricultural output constituted only 3.7%. However, peasant (farm) holdings are the most rapidly developing sector of the Russian agriculture. During the recent five years, the area of land possessed by farmers annually increased by one million ha. The increase was caused mainly by the lease of land owned by land share holders. Farmers win the competition with AgOs for the additional land because they are able to pay higher rent to land share holders.

In farm sector, the highest growth rates of agricultural output are observed. From 1998 to 2000, agricultural output increased 225% (in AgOs sector, it increased 25%, i.e., growth rates were 10 times lower than ones of farm sector).

Although in general the share of peasant (farm) holdings in gross agricultural output is not high, farm sector significantly contributes to the production of some agricultural products. In 2002, farmers produced 19.9% of oilseed, 12.2% of cereals, 7.2% of sugar beet, and 7.8% of wool.

In some regions of Russia (the Republic of Ingushetiya, Evreyskaya autonomous region) farmers produce more agricultural products than AgOs. In Saratov region, the districts of “total farmerization” have appeared, where all the AgOs had been liquidated, and their land and assets had been passed to the hands of farmers. In Saratov region, sown area in farm holdings exceeds one million ha, and total cereals output exceeds 1.3 million tons. Farmers produced 35% of cereals and 37.2% of oilseed in the region.

**The plots of population.** During the years under the study, the area of land used by the plots of population has increased 2 times. However, the RF *Goskomstat* data on the use of land by the plots of population are obviously not comprehensive.

*First*, these data do not include lands of several categories which are used by population, i.e., lands allotted to population for hay-making (15,253 thousand ha of agricultural land), individual and collective livestock production (532 thousand ha), individual home building (395 thousand ha), individual agricultural business (201 thousand ha), and land plots and land shares allotted without the permitted type of land use (2973 thousand ha). According to the data of *Roszemcadastre*, by January 1, 2003, the citizens of Russia (farmers excluded) legally possessed 27.8 million ha of agricultural land (14% of the total area of agricultural land allotted to agricultural producers).

*Second*, in addition to legally allotted land, people owning cattle use a part of common-used land of rural administration for pasturing and hay-making. By the beginning of 2002, the area of this land

amounted 7.8 million ha<sup>2</sup>.

Thus, the total area of land used by population constituted not 8.6 million ha (the Goscomstat of the RF data) but 27.8 million ha of legally allotted agricultural land plus 7.8 million ha of unofficially used land (land in the disposal of rural administration), i.e., 35.6 million ha.

In the Russian statistics, the data on the number of workers in the plots of population are not available. In 2002, the number of workers engaged in agricultural commodity production in the plots of population can be roughly estimated as 3.3 million people (the total number of employees in 2002 (7,683 thousand people) minus the number of workers in large and medium AgOs, small AgOs and peasant (farm) holdings (3,800, 186.6 and 417 thousand people, correspondingly)).

The number of workers engaged in commodity production in the plots of population is nearly equal to the number of employees in large and medium AgOs. However, the major part of workers in the plots of population is engaged in non-commodity production which statistics relates to family holdings. The studies accomplished by the Goscomstat of the RF, the average annual number of workers in family holdings amounts nearly 10 million people<sup>3</sup>.

Therefore, the total number of workers in the plots of population amounts 13.3 million people. This number is threefold higher than the total number of workers in the other types of enterprises.

The role of individual subsidiary plots in the life of rural population is reflected by the following figures. According to the budgetary studies accomplished by the Goskomstat of the RF, in 2002, the per capita monthly revenue of individual subsidiary plots of rural population constituted 4,192 rubles<sup>4</sup>. In 2002, the workers' compensation paid by agricultural enterprises (cash and products, payments to non-budgetary funds and income tax excluded) amounted 43 billion rubles<sup>5</sup>, or 900 rubles per capita of rural population. Hence, the revenue of agricultural population gained from individual subsidiary plots were 4.7 times higher than one in large enterprises.

#### **4. Agrarian Reform and the Changing Role of Large and Small Business**

During the years under the study, the role of agricultural enterprises on labor market has dramatically decreased. From 1990 to 2002, the average annual number of workers in large and medium AgOs fell from c 8.3 to 3.8 million people, while the number of employees in small business engaged in commodity agricultural production has increased from 14 to 3.9 million people. In addition, nearly 10 million people were engaged in small non-commodity agricultural enterprises<sup>6</sup>, i.e., the real number of employees engaged in small business was 3.6 times higher than the number of employees engaged in large business.

According to the official statistics, from 1990 to 2002, the area of land allotted to agricultural enterprises, decreased from 209.8 to 150.4 million ha, i.e., nearly by 30%, and the area of land allotted to family sector increased nearly by 20 times and by the beginning of 2003 constituted more than 44 million ha. This land area does not include the lands of rural administration (nearly 8 million ha of agricultural land), and the lands of AgOs that are unofficially used by population.

AgOs did not succeed in the competition with family holdings. During the reform period, the

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<sup>2</sup> Land Fund, RF, January, 1 2002 M., Roszencadastr, 2002, p. 7234, 766.

<sup>3</sup> Economic Activity of Russian Population. M., Goskomstat RF, 2002, p. 106.

<sup>4</sup> Selskohozyaistvennaya Deyatel'nost' Hozaystv Naseleniya v Rossii: Goskomstat RF. - M., 2003, p. 151.

<sup>5</sup> Summary Annual Report of Agricultural Enterprises, Russia, 2001.

<sup>6</sup> Russian Regions. Social-Economic Indices. M., Goskomstat RF, 2002.

agricultural output of family holdings has increased by 30%, while the AgOs' output has dropped 2.3 times.

Before the economic and agrarian reforms of 1990s, AgOs played the dominant role in gross agricultural output, and family holdings played a subsidiary role. In the course of the reform, the situation changed. By mid-1990s, the role of these two sectors has equaled, and by 1998, 60.8% of gross agricultural output was produced in family sector while agricultural enterprises produced only 39.2% of gross agricultural output.

After 1998, due to the changes in the general economic policy and the realization the of agrarian reform, the trends have changed. The output of agricultural enterprises begun to grow, and their share in the gross agricultural output tended to increase. However, in 2002 the AgOs' share in gross agricultural output has decreased again.

As a result of reforms, the structure of the Russian agriculture has changed dramatically.

— The share of family holdings (peasant (farm) holdings and the plots of population, including individual subsidiary plots, orchards and gardens) in the gross agricultural output has increased. From 1990 to 1998, it has increased from 26.3% to 60.8%. During this period, the output of large enterprises has decreased 2.8 times, and the output of individual subsidiary plots of population (individual subsidiary plots) has increased by 12.3%. From 1999 to 2001, the share of family holdings has decreased, but in 2002 the trend has changed again.

— During the period under the study, the share of family holdings in the output of agricultural products of all kinds grew. The most significant growth concerned vegetables (54%), meat (32.3%), milk (28.6%) and potatoes (28.2%).

— Specialization and the appearance of enterprises of various types took place. Collective enterprises maintained their dominant position in cereals and industrial crops production, while family holdings dominated in potatoes, vegetables, fruit and berries production.

— The share of family holdings in livestock production also grew (livestock, milk, and wool production increased by 59.4%, 52.2%, and 62.4%, correspondingly).

## **5. The Typology of Regional Agrarian Structures**

In the beginning of 1990s, the agrarian structure of all the regions of Russia was quite similar. During the reform period, the changes of agrarian structure of various regions also were similar. In all the regions, the share of collective enterprises in gross agricultural output decreased and the share of family holdings (peasant (farm) holdings and the plots of population) grew. However, the rates of changes varied by regions. As a result, regional agrarian structures significantly differ.

Virtually one can determine three types of regional agrarian structures: corporate, mixed and family one. The corporate structure is typical for the subjects of RF in which the share of agricultural enterprises in gross agricultural output exceeds 50%. The mixed structure is typical for regions where their share constitutes 30-50%, and family structure is typical for regions where their share is less than 30% (correspondingly, the share of family holdings exceeds 70%).

The corporate enterprises dominate in only nine regions. In these regions, the share of AgOs in the gross agricultural output amounts 60%. The agrarian structure of family type has formed in 26 regions in which the share of AgOs in gross agricultural output amounted only 22.7%, and the share of family holdings exceeds 71%. In Ingushetiya, the share of family sector in gross agricultural output amounts 95.4%, and in seven regions it exceeds 80% (Dagestan, Buriatiya, Yakutiya, Astrakhan region, and others). In the rest of the subjects of RF, agrarian structure is of a mixed character and family farm sector prevails (its share in the gross agricultural output exceeds 60%).

For the subjects of RF in which the agrarian structure of family type has formed, not only the low share of AgOs in the gross agricultural output, but also small sizes of the maintained AgOs is typical. In these regions, collective enterprises include mainly small enterprises.

The most important factors that cause such a high differentiation of regional agrarian structures include natural conditions, the provision with land, ethnic factor, the efficiency of corporate enterprises, and regional agrarian policy.

*Natural conditions.* The regions in which the agrarian structure of family type has formed are characterized by worse bio-climatic potential (94 points), than regions with corporate type of agrarian structure (102 points).

On the contrary, the corporate enterprises survive in the regions with the most favorable natural conditions, such as Krasnodarskiy kray, Stavropolskiy kray, Belgorod region, Mocsow and Leningrad regions. In the last two regions, not natural but economic conditions play the key role.

*The provision with land* also seriously influence the type of agrarian structure. In the regions with family type of agrarian structure, the area of land used in commodity and family agricultural holdings per one employee (1.8 ha) is less than the same area in the regions with corporate type of agrarian structure (3.4 ha).

*Ethnic factor.* The detailed analysis of the impact of ethnic factor to the agrarian structure one can find in the brilliant study of T. Nefedova<sup>7</sup>. We shall only ascertain the evidence: in the “ethnic” subjects of RF, the family type of agrarian structure prevails. Thus, in six “ethnic” regions out of nine, the agrarian structure of family type has formed, only two regions out of 22 “ethnic” republics and regions are characterized by corporate type of agrarian structure, and in 11 regions agrarian structure of family type has formed.

*The efficiency of corporate enterprises.* The agrarian structures of family type are forming in those regions, where large agricultural enterprises are inefficient and unable to adapt to market conditions. In the regions where the enterprises of corporate type prevail, only 1/3 of agricultural enterprises are unprofitable, and in the regions with family type of agrarian structure, the share of unprofitable enterprises in the total number of agricultural enterprises is nearly 2 times higher.

*Regional agrarian policies.* Alongside with the above mentioned objective factors, agrarian structures are seriously influenced by regional agrarian policies. For example, the agrarian structure of family type which forms in Saratov and Samara regions are probably the result of regional agrarian policies oriented towards the support of family sector. On the contrary, the maintenance of collective enterprises in Tatarstan, Murmansk and Chukotskiy regions can be explained by the strong regional budgetary support of AgOs.

## **6. The State Policy of the Support of Large and Small Business**

As far back as in the beginning of the reform period, the policy of multi-structured agrarian sector and the equal economic conditions for all types of enterprises was declared. All the programs of the development of agro-industrial complex that have been adopted during the recent 15 years, included such statements. However, they has never implemented. The real policy and the major part of acting politicians are oriented towards the support of large and the restraints of small agricultural business.

The system of subsidies and compensations paid from federal budget is oriented only towards large agricultural producers. Individual subsidiary plots are deprived of such support, as they are not even mentioned in the budgetary code. In fact, budgetary cash resources are not available for individual subsidiary plots. In the beginning of the reform period, peasant (farm) holdings

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<sup>7</sup> Неведова Т. Г.. Сельская Россия на перепутье: географические очерки. М.: Новое издательство, 2003.-408с.

received budgetary credits designed for the support of holdings at the initial stage of development. Later on, the support was rejected.

Nominally, peasant (farm) holding are equal in right with other agricultural producers in gaining the partial compensation of interest rate for bank credits. However, only 1% of peasant (farm) holdings have used this possibility, because it is rather difficult for a them to get bank credit as banks are not interested in crediting micro-debtors. Besides, budget did not provided for the subsidies for credits gained from farm credit cooperatives.

Large and medium AgOs are the major recipients of subsidies and compensations, but the major share of these subsidies is received by the largest AgOs.

*The distribution of subsidies among AgOs.* In Russia, agricultural production is subsidized from regional and local budgets. In 2001, only 29.4% of subsidies has been paid to AgOs from federal budget. The thrusts of subsidizing are also significantly differ. Subsidies paid from federal budget are used mainly for the compensation of losses caused by natural disasters, for capital investment, for the support of cattle breeding and seed-growing. Small subsidies paid from regional agrarian budgets are used for livestock production, the increase of soil fertility, etc.

*The recipients of subsidies.* Both agricultural producers and intermediaries such as processing plants, suppliers, and traders have the right to get subsidies form agrarian budget. For example, in 2001, the federal agrarian budget constituted 20.8 billion rubles, of which only 5.4 billion rubles was transferred directly to agricultural enterprises. The rest funds were used for the maintenance of bureaucracy or distributed among intermediaries, suppliers, contractors, etc.

*The availability of subsidies.* The subsidies are not equally available for various AgOs: 15.2% of enterprises has not received subsidies at all, and 19.8% has received in average 45 thousand rubles. At the same time, 1.4% of enterprises received 22.5% of all the subsidies (each enterprises of this group has received more than 10 billion rubles in the form of subsidies and compensations). Some AgOs have received even greater amounts of subsidies. Three largest recipients have received nearly 200 billion rubles.

In many countries, the total amount of budgetary subsidies and compensations that an enterprise can receive is restrained. For example, in the USA, a farm can not receive from the budget more than \$ 50,000. Thus, large corporations can not receive super-large subsidies and compensations from the budget. In Russia, there are no such restraints, so the Russian agrarian budget is used to the benefit of large business while the USA budget is used mainly for the support of small business.

## **7. The AgOs Impact to the Development of Family Holdings**

In Russia, collective enterprises and individual subsidiary plots are traditionally closely interconnected. In individual subsidiary plots, a part of work is accomplished with the help of machinery of collective enterprises. For example, the AgO's machinery is used for ploughing, furrow cutting, hilling, and digging the most important crops produced by individual subsidiary plots, e.g., potatoes.

The role of collective enterprises in livestock production of individual subsidiary plots is even more serious. Usually, individual subsidiary plots acquire young animals (calves, piglets, and chickens) in collective enterprises which also helps in hay-making and hay transportation. Collective enterprises distribute among the workers and sell them at a cut prices grain and grain wastes which are used for cattle and poultry feeding in their individual subsidiary plots. Collective enterprises also support the sales of livestock products. In harvesting, transportation, and milk sales, their role is vitally important.

A lot of Russian economists and politicians share the opinion that there is a direct correlation between the level of the development of collective enterprises and individual subsidiary plots,

i.e., the higher the level of the development of a collective enterprise, the higher the level of the development of and individual subsidiary plots allocated at the same territory. Family holdings are closely linked with collective enterprises as they use their resources, so they can not develop without the support of collective enterprises. This support is the basic condition of the survival of individual subsidiary plots.

But the opposite view also exist: family holdings allocated on a given territory become more developed as the collective enterprises weaken, because people loss their work in collective enterprise and have to spend more time in their individual subsidiary plots or create peasant (farm) holdings. The resources of weakening collective enterprises step by step pass to the hands of family holdings.

Finally, the third view exists: peasants' plots existed during centuries, they existed before the appearance of collective enterprises, and they exist on the territory where there is no collective enterprises today. Thus, there is no direct correlation between these two forms of enterprises. For the efficient work of large agricultural enterprises, it is necessary to put their relations with individual subsidiary plots on a commercial basis, otherwise individual subsidiary plots will destroy collective enterprises, stealing their resources and using them in individual subsidiary plots.

For the testing of the hypothesis of the interrelation of the level of the development and efficiency of large AgOs and one of family holdings, the subjects of RF were grouped according to the share of unprofitable large and medium AgOs. The analysis of the results of the study let draw a set of important conclusions.

1. The output of the plots of population calculated per a family is rather sustainable and practically does not vary by regions. The variance coefficients are 1.5-2 times lower than ones of the output of AgOs and individual subsidiary plots (per one rural family). The variation of the output of the plots of population by the subjects of RF weakly correlates with the variation of AgOs' output. By the regions, the volume of output in the plots of population does not correlate with the efficiency of AgOs.
2. The lower the efficiency of AgOs, the lower their role (and, consequently, the higher the role of family holdings) in agricultural production in the region. While in the first group AgOs produce 51.5% of the gross agricultural output, in the last group they produce only 26,1% of the gross agricultural output (Figure 17).
3. The change of the share of family holdings in gross agricultural output does not at all correlate with the change of the area of the used agricultural land. This most likely can be explained by the invalid statistical data concerning the area of land used by individual subsidiary plots and gross agricultural output.
4. The worse the conditions of AgOs development, the lower the level of the development of peasant (farm) holding in a region, and the higher the role of family holdings in agricultural production. While in the first group the share of employees engaged in agricultural production in family holdings was 49.8%, in the last group it was 69%.

The impact of the basic factors on the gross agricultural output in a region (in all categories of enterprises) is graphically illustrated by the regression model based on the data on 77 regions of Russia. In AgO regions, financial conditions, volume of production, the area of agricultural land, and the number of employees do not significantly influence the development of agricultural production in the plots of population. Only the production facilities of AgOs were important for the development of the plots of population.

## **8. Large and Small Business in Agriculture: à Comparative Analysis of the Efficiency**

The comparative analysis of the efficiency of large and small agricultural business let draw the following conclusions.

— The most efficient use of land resources is typical for the plots of population in which the output per hectare is 8-9 time higher then in AgOs and peasant (farm) holdings. These figures seem to be over-valued, because a part of land area, which is actually used by the plots of population, is legally possessed by AgOs, and livestock production is developed mainly due to the forage provided by collective enterprises.

Despite this, the efficiency of the use of land in the plots of population is obviously much higher than in the enterprises of the other types. This can be proved by the data on the output per hectare of agricultural land reflecting the same efficiency gap between the plots of population and AgOs as for the output.

The higher land use efficiency in the plots of population can be explained by the fact that their product patterns are absolutely different from ones of agricultural enterprises and peasant (farm) holdings. In individual subsidiary plots, the most intensive crops prevail (potatoes, vegetables, fruit, and berries), while in peasant (farm) holdings and AgOs the less intensive crops dominate (cereals, industrial crops, and forage crops).

— The output per capita of average annual worker in the plots of population is much lower (2.2-2.3 times) than one in AgOs and peasant (farm) holdings. As for livestock production, this gap is even more serious. Taking into consideration the primitive technology used by the major part of the plots of population and the prevailing of manual labor, a conclusion on the low labor productivity in the plots of population is not a surprise.

— In peasant (farm) holdings, the output per hectare is slightly lower than in AgOs. Peasant (farm) holdings use 8.7 % of agricultural land, and provide only 3.7% of agricultural output. In Russia, the opponents of farm sector have wrote about it time and again, trying to demonstrate the inefficiency of farm holdings compared with AgOs. Such a comparison is incorrect, because peasant (farm) holdings are compared not with AgOs, but with all enterprises including the plots of population. In comparison with AgOs, peasant (farm) holdings are more efficient in crop production and less efferent in livestock production.

Taking into consideration the fact that the major part of livestock output is produced in large complexes which are very efficient in the use of resources, peasant (farm) holdings should be more likely compared with a group of AgOs with the lowest volume of sales. For example, in 2002, the output of AgOs that have received from the sales of products and services not less than 4.1 billion rubles (47% of the total number of AgOs), was nearly equal to the output of peasant (farm) holdings. These AgOs possessed 58 million hectares of agricultural land, i.e., the efficiency of the use of land was 3.4 times lower than one of peasant (farm) holding.

## **9. The AgOs' Efficiency in the Use of Resources**

For the analysis of the use of resources, the Goscomstat of the RF data on AgOs were used for the calculation of the parameters for seven Cobb-Douglas functions (three functions for the total number of AgOs, two for crop production and two for livestock production). The correlation of the return on sales with land area, the number of workers, and the value of fixed and working capital (Model **11**), with the effect of state subsidies, and total material costs (Model **12**), and material costs by items (Model **13**) was analyzed. The methodical issues of calculations are represented in the report, and below the main conclusions are formulated.

All the functions for AgOs demonstrate rather high coefficients of determination (0.824, 0.876, and 0.826), all the factors which are included into the model are statistically relevant (except

arable land area in Model **11**, and subsidies and compensations in Model **12**). Model **12** demonstrates the negative influence of arable land area on the return on sales: the more the land area, the lower the return.

— In all functions, the coefficients for *working capital* are the highest. In the first model, the growth of working capital by 1% causes the growth of return by 0.667%. In the second model, the growth of material costs by 1% causes the growth of return by 0.793%.

Financial conditions is the key factor that influence the efficiency of AgOs, the balance of factors of production and the return on resources. Those AgOs that have not sufficient working capital and for which debt financing is not available, lose labor resources, but maintain land and material resources. This leads to the further worsening of their financial performance.

— The second relevant resource is *the number of employees*. The growth of this factor by 1% provides the growth of return by 0.71% in the third model and by 0.593% in the first model. This is the evidence of relative deficiency (compared with other resources) of labor resources.

— To determine the influence of production facilities and groups with various financial conditions to the efficiency of AgOs, the corresponding variables were used in regression functions. The calculations showed that limited societies and stock holding companies were the most efficient, and agricultural production cooperatives and state enterprises were the less efficient;

— The functions for crop and livestock production prove the conclusions about the highest relevance of working capital and labor resources. As in the models **14** and **15** (crop production) coefficients for arable land was positive, the marginal product of land (i.e., the value of land) was calculated by the groups of enterprises. Even in the advanced groups of enterprises, the marginal product of land was extremely low.

— The calculation of marginal product of labor showed that the compensation for labor in AgOs is undervalued, particularly in the enterprises with good financial performance, in which it was significantly lower than marginal product.

— On the whole, material costs are not repaid: the return on a ruble constituted 0.8 rubles. The playback of some items of material costs (products and services, spare parts, electricity, fuel and oil products) is rather high. The use of mineral fertilizers provide the highest return (6.0 rubles per 1.0 rubles of costs). Regardless this fact, 35.4% of AgOs did not buy and use mineral fertilizers.

## **10. Agricultural Organizations: the Trends in Resource Use Efficiency**

For the analysis of the trends of the efficiency of the use of resources by agricultural enterprises, a panel of data for the period from 1995 to 2002 was used. On the basis of this data, the parameters of production functions were calculated for the models **11**, **12**, and **13**.

The calculations showed that the coefficient of resource efficiency was rather sustainable during this period.

The calculations for the model **11** showed, that the average annual number of employees was the most relevant resource during all the period. Moreover, during all the period the increase of the number of employees by 1% led to the growth of the return on sales of products and services by more than 1%.

During all the period, the efficiency of fixed capital stock also was high (although lower than one of labor), and varied from 0.206 to 0.456.

During the period under the study, the land remained to be the excess resource. In the function, the negative coefficients show that the growth of land resource by 1% led to the decrease of the return on sales by 8.9-12.9%. Sum total of the positive coefficients in the regression function that was significantly higher than 1, provided serious economies of scale.

The analyzed factors explained 73.8-82.8% of variation of the return on sales gained by the enterprises.

The calculations within second and third variants prove the conclusions mentioned above: the values of coefficients correspond to the average data by years, land is the most important factor, land is the excess resource, the economy of scale seriously influence the efficiency of AgOs.

In model Ì2, another three independent variables were added: the number of cattle, budgetary subsidies and compensations, and material costs. The addition of these variables significantly changed the values of coefficients in the regression function for land, labor and fixed capital and let draw a set of new trends in the dynamics of the resource use efficiency.

During all the period, material costs (working capital) remained to be the most important and the most deficient resource. From 1995 to 2002, the deficit of working capital has permanently grew. The growth is proved by the values of coefficients in the function for this independent variable (growth from 0.701 in 1995 to 1.0 in 2002), as well as by the growth of t-statistics for this variable (growth from 144 to 384).

The growth of the deficiency of working capital led to the decrease of the influence of the other important resource such as labor. If in 1995 its influence was rather serious (the growth of the number of employees by 1% led to the growth of the return on sales by 0.655%), in 2002 its influence decreased by more than 3.5 times (to 0.206).

## **11. The Relative Efficiency of Agricultural Organizations**

The analysis let assess the average efficiency of the use of resources of all agricultural enterprises in Russia. However, it did not answered the question: “Are the available resources used efficiently?”. To answer this question, it is necessary to accomplish the analysis of relative (technical) efficiency of agricultural enterprises. The methodology of such analysis was elaborated by M. Farrell, T. Coelly and A. Charns. In Russian, it is described in details in the articles of A. Lisits and T. Babicheva<sup>8</sup>.

The basic concept of the method of relative efficiency assessment is the determination of sample agricultural organizations, which completely and efficiently use their resources. In these enterprises none of the factors of production can be decreased without the decrease of the output of one ore more products, or the increase of other factors of production. An vice versa, the production of none of the products can be increased without the increase of one or more factors of production or the decrease of the production of other products.

If the efficiency of sample enterprises is equal to 1, the efficiency of all the other enterprises will be less than 1, i.e., they are able to produce more products within the same quantity of resources, or to increase the input of resources for the existing output.

Within the concrete calculations, the results of which are represented below, the resource-oriented model with variable economy of scale was used. In the model, the factors of production included the area of arable land used by enterprise, average annual number of workers, fixed capital, and working capital (material costs).

The basic outlet parameters included the volume of sales of crop production, livestock products and non-agricultural kinds of activity.

The calculation of the efficiency of AgOs was accomplished across the groups of specialized enterprises. To compare the dispersion of AgOs by their efficiency in dynamics, the calculations

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<sup>8</sup> Lisitsa A., Babicheva T.. Teoreticheskie osnovy analiza productivnosti i effektivnosti selskohozyaistvennyh predpriyatii. Halle, IAMO, Discussion Paper No 49, 2003r.

were accomplished for the period from 1995 to 2002.

The results of the calculations of the efficiency of the AgOs specialized in cereals production and industrial crops, potatoes and vegetables, and poultry products let draw a set of the following conclusions.

1. In Russia, agricultural enterprises are highly differentiated by the efficiency. The relative efficiency of the major part of AgOs is less than 0.5.
2. Among the AgOs producing potatoes and vegetables, poultry, and pork there are large groups of enterprises with the efficiency equal to 1 (as for pork-growing complexes, the share of such enterprises slightly exceeds 20%, for poultry plants and enterprises specializing in potato and vegetables production — 12-14%). However, alongside with these “leading lights” with the efficiency close to maximal (0.7-0.9) there are very few enterprises. In Russia, the allocation of producers close to a group with maximal efficiency that is typical for developed countries, is not observed. “Leading lights” are far away from the major part of enterprises.
3. During the analyzed period, the weighted average ratios of the efficiency of the use of resources remained constant (excluding enterprises that specialize in grain production which faced with serious decrease of average efficiency — from 0.39 in 1995 to 0.24 in 2002). However, during the same period the differentiation of AgOs by their relative efficiency took place. The share of enterprises with maximal and minimal efficiency has grew and the share of enterprises with moderate efficiency has decreased.