The Development of Purchased Agricultural Inputs Market in Russia

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1. The Background

In the Russian agrarian establishment, the consistent view has settled that agrarian sector suffers from critical divestment caused mainly by financial restrictions for agricultural producers. In general, this premise serves as the basis of national agrarian policy that is aimed towards the compensation of inputs supplies and the substitution of governmental or quasi-governmental institutions for market ones. The main task of this part of research project is the evaluation of purchased inputs deficiency, the efficiency of their use in agriculture, and the uncovering of the basic problems of inputs market development.

In order to examine the problem, four inter-related research studies have been accomplished, including analysis of basic purchased inputs market, analysis of agricultural producers' inputs use efficiency, analysis of the governmental policy in the sphere of purchased agricultural inputs, and analysis of distribution system development at agricultural machinery market (the latter study is not finished yet). This article summarizes the results of analysis of basic purchased inputs markets (supply and demand, market institutions development, and the impact of governmental policy on the development of these markets).

For the analysis, three sources of information were used: official statistics, data obtained in the course of sampled survey that was common for the entire project (the evaluation of agricultural demand), and the data of special pool of agricultural equipment and mineral fertilizer producers (the evaluation of supply).

In agriculture, purchased inputs include wide range of commodities. In order to avoid the tradeoff between the coverage of study and its profoundness, we have focused on the investigation of five basic groups of purchased inputs, including agricultural machinery (tractors and combines), mineral fertilizers, fuel and lubricants, seed, and fodder.

2. Supply Characteristics

During the reform period, the drop of demand for agricultural machinery and limited export opportunities have led to dramatic decline in agricultural machinery production that was much more serious than one in entire industrial sector or in machinery construction industry in particular. There was a period in Russia, when some kinds of machinery were not produced at all. During the period of recovery growth in agriculture that followed the crisis of 1998, a certain growth in this sector also took place. However, the growth potential has exhausted as early as in 2002-2003.

Agricultural machinery manufacturers can be divided into two large groups. The first group includes giant plants that produce tractors and combines. This group is highly concentrated: five plants produce nearly 90% of tractors, and two plants produce 95% of combines.

During the reform period, giant plants used quiet similar sales patterns. In 1999-2000, *Rosagrosnab* held the lion's market share together with regional administrations (75-76% of sales). The rest 24-25% of sales was controlled by large-scale farms and commercial firms (agro-holdings), the share of last prevailed. Since 2000 the share of governmental institutions in sales was diminished to 55% mainly at expense of growth of the commercial firms. The export of agricultural machinery was oriented mainly to the CIS countries. Exports to other countries were negligible.

Because of rigid binding to the distribution system of *Rosagrosnab,* the development of manufacturers own marketing, dealer and service networks has started only in 2000.

Frequently it followed the reorganization of enterprises, the change of manager teams, or the coming of new owners and investors (for example, to the *Rostselmash* and Krasnoyarskiy plants).

Before 1999, mutual debt offsets and other barter arrangements of payments for agricultural machinery supplies were widespread. But as early as in 1999 practically 100% of payments was arranged via bank accounts. Giant plants' price policy includes tariff scales, price cuts for large purchases, and seasonal discounts as well as price cuts and discounts for dealers and major customers.

During the recent years, in this group of manufacturers the trend of agro-holdings forming, vertical integration, and horizontal concentration of business was observed. This trend was probably caused by the forthcoming threat of import intervention. Thus, in 2000, the *Rostselmash* plant has joined the holding *Novoye Sodruzhestvo* (New Commonwealth). The Siberian Machine-Building Holding has been founded, and some tractor-producing plants have also united.

The second group of manufacturers include all the rest enterprises — medium and small plants and manufacturers of machinery and equipments for a wide range of customers (i.e., plants that produce mini-tractors, attached implements, spare and component parts, provide repair works, etc.).

Sales patterns used by the enterprises of this group are more diversified than ones used by the manufacturers of the first group (Table 1). Since 1999-2000, however, the role of dealers became more serious (as in the group of giant plants).

Table 1. Agricultural equipment sales patterns, %[1]

Buyers:	1998	1999	2000	2001 *(plan)*
mini-tractors				
dealers		6	10	8
regional administrations			6	5
large-scale farms	33	2		
family farms	32	31	21	17
commercial firms	5	13	23	19
household plots	30	38	40	51
attached implements, drawbar hitch, etc.				
dealers		5	9	9,5
regional administrations			4	5,5
large scale farms		2		
family farms		25	17	20
commercial firms	26	20	20	22
household plots	74	48	50	43
spare and component parts				
dealers			20	10
Rosagrosnab	90	95	28	40

Unlike large plants, medium and small enterprises have their own dealer networks and service centers that exist and work for 4-8 years. Obviously, distribution networks have appeared earlier than large plants' ones, because governmental programs did not support the production of small and medium enterprises.

[1] Hereafter the survey data are used

The products of small and medium enterprises are more diversified and include a lot of low-value items, so their sales and settlement patterns are also more diversified than ones of large plants. These plants prefer to deal with payment in cash although still use barter deals.

Table 2. Forms of payment for small and medium plants' products

Forms of payment	%	The trend «+» — increase, « - » — decrease
Fund transfers	60	+
Payment in cash	17	+
Barter	16	-
Other	7	-

Three world largest agricultural machinery manufacturers — John Deere, Case Corp. and Claas — are very much interested in the promotion of their products in Russia. However, even their modest attempts aimed towards production (or at least assembling) development in Russia did not succeed.

During the Soviet period, Russia practically did not import agricultural machinery from abroad, except the Soviet republics. Byelorussia and Ukraine were the largest exporters of agricultural equipment to Russia. When the USSR has collapsed, the imports of various kinds of machinery from non-NIS countries have increased form 1/4 to 1/2. By the end of 1990s, the share of imported tractors at annual sales of them amounted 67%.

The main obstacle for the enlargement agricultural machinery import to Russia was its low price competitiveness in comparison with corresponding domestic machinery. For example, the price of imported tractors was 50% higher than of one produced in Russia or assembled in a NIS. The quality of imported machinery and equipment is usually higher than one of domestic ones, but the quality/price ratio of domestic equipment is still seemingly better. Furthermore, domestic machinery is subsidized from federal and regional budgets.

At present, Russia holds the leading position among the world largest producers and exporters of all kinds of mineral fertilizers. In the export of potash, phosphate, and nitrogenous fertilizers it occupies the fifth, second, and first place, correspondingly.

Nearly 80-85% of fertilizer output is exported, and only 10-12% is supplied to domestic agriculture (the rest fertilizers are further processed).

After 1998, mineral fertilizer production also raised, but unlike the growth in agricultural machinery construction, this raise was caused not by the recovery growth in agriculture, but mainly by favorable state of world fertilizer market and the devaluation of ruble. Practically all the increase of fertilizer output comes to export.

In the structure of mineral fertilizer production, the shares of nitrogenous, potash, and phosphate fertilizers constitute correspondingly 48%, 32%, and 20%. Ten largest plants provide 74% of the total nitrogenous fertilizer output, however, 62% of their output is exported. Four largest plants produce more than 70% of the total output of phosphate fertilizers. The largest producers of potash fertilizers are two enterprises in the Perm region; both of them are controlled by one financial group and work predominantly for export.

All mineral fertilizer-manufacturing plants are privatized, except ones located in Bashkortostan and Tatarstan republics. Private plants' sales patterns seriously differ from ones used by the enterprises that were not privatized.

In private enterprises' sales patterns, the share of regional administrations is insignificant. Domestic supplies are mainly oriented towards agricultural producers (direct sales without intermediaries) (Table 3). On the contrary, the major part of state enterprises' domestic supplies is controlled by regional administrations.

Table 3. Mineral fertilizer sales patterns, %

Buyers:	1998	1999	2000	2001 *(plan)*
regional administrations	0.05	0.14	0.08	0.05
Large-scale farms	5.5	6.7	4	3
Family farms	0.02	0.03	0.04	0.04
export to non-NIS countries	94.4	93.2	95.8	96.9

Fund transfers prevail in private enterprises' settlement patterns (its share constitutes 92-94%). Obviously, these are the payments for export supplies. Barter deals for which the higher selling prices are established ultimately dominate at domestic market (Table 4). Private enterprises use flexible pricing tariff scales that vary according to volume of sales and season. In state enterprises' settlement patterns, the share of fund transfers constitutes 55-60%, and the rest part of supplies is accomplished in the form of barter deals.

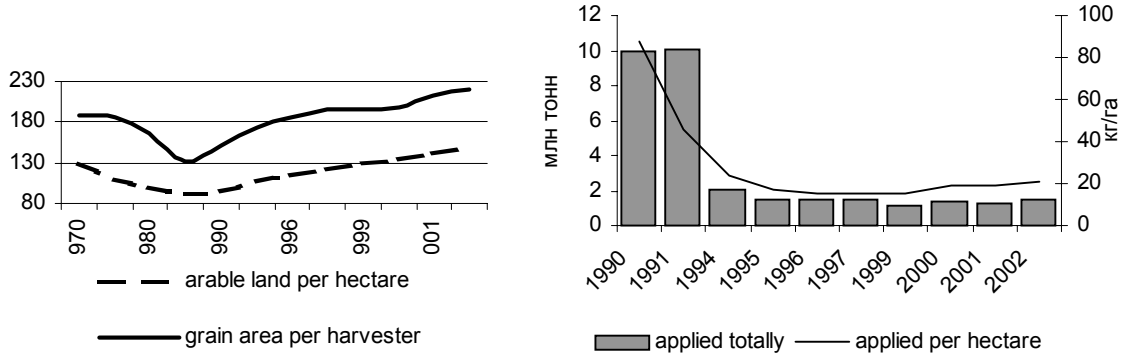
Table 4. Forms of payments for private mineral fertilizer plants' products

Forms of payments	%	The trend «+» — increase,« - » — decrease	Rating (1 — maximal prices, 7 — minimal prices)
Fund transfers	94	+	2
Payment in cash	0.1	-	2
Barter	5.9	-	1

3. Domestic Demand Characteristics

Within the beginning of economic reforms, agricultural sector was faced with a set of factors that seriously limited its financial opportunities, and practically have led it to financial collapse. Land that have neither been brought up into market turnover nor *de facto* recognized as a commodity was (and remains to be) free of charge agricultural resource. The excessive labor resources in agriculture got swiftly cheapen. This situation has led to the substitution of purchased inputs by labor and land resources, and serious decrease of agricultural producers' demand for the first. The divestment of agricultural sector began. Since 1990, the number of tractors and combines in agricultural sector permanently decreased as well as organic and mineral fertilizer use (that is one of the basic factors of intensive agricultural production) (Figure 1).

Figure 1 . The dynamics of agricultural inputs use



Source: Calculated by the Goscomstat RF data

The inputs price increase in the course of reforms has led not only to the divestment of agriculture, but also to more efficient use of purchased inputs. It is well known that in the Soviet economic system nearly the entire annual tractor output was used for the replacement of wrote-off machinery. It meant that equipment had short lifetime because of its low quality and inappropriate exploitation. Only 80% of supplied mineral fertilizers were really applied, and fertilizer use was inefficient (40% of supplied fertilizers were lost). At present, purchased

fertilizers are undoubtedly applied. The lifetime of agricultural equipment increased, and obsolete equipment is used for the repair of new one.

While in 1991-2001 the gross agricultural output decreased by 40%, during the same period the use of gas, diesel oil and electricity in agriculture has decreased by 76%, 63%, and 51%, correspondingly. It meant that large-scale farms used these resources more efficiently.

Since mid-1990s, unfavorable financial conditions and indebtedness of agricultural producers have resulted in the widespread of various forms of barter deals in inputs supplies. Federal and regional bodies (through authorized companies) provided commodity loans of various types, and many trade and processing firms provided commodity loans to their raw suppliers. As commodity loans were provided in the form of means of agricultural production (in-kind), these companies also demonstrated the demand for inputs and consequently influence inputs market.

On the other hand, after 1998, vertically integrated agro-holdings rapidly developed. These holdings acted as new mass buyers of agricultural machinery and other agricultural inputs.

Another actual characteristic of the demand for agricultural machinery is the development of financial leasing. In the past, agricultural producers had to possess the complete set of agricultural machinery, which could be used during a limited period of time. At present, leasing services of machinery for soil treatment and harvesting has emerged. These services are provided by large-scale farms (mainly to their workers, but sometimes to neighbor enterprises), but more frequently they are provided by individual farmers. Furthermore, during the recent years a new phenomenon appeared, i.e., the provision of harvesters by foreign (mainly Turkish) or domestic companies to large scale farms. These services are provided during harvesting season in exchange for a part of harvested grain. These companies move their harvesting machinery from the South to the North of the country in the grain producing areas and significantly increase the working period of machinery unit during the harvesting season. Such a change of paradigm of agricultural machinery exploitation has sharply decreased the demand for new machinery.

In other words, at present the demand for agricultural machinery decreases not only due to the reduction of agricultural output in the period of transformational crisis, but also due to the change of approaches to its exploitation. Besides, not only traditional agricultural producers, but new agricultural operators and downstream companies make demand for inputs.

For more profound analysis of agricultural producers' demand for basic purchased inputs, the results of selective survey of agricultural producers in three regions of Russia (the Rostov, Nizhny Novgorod, and Ivanovo regions) were used. The main characteristics of sampling are shown in Table 5.

Table 5shows that regardless the relatively large sampling, only a part of respondents really participated in inputs market. It seriously limits the representativeness of the obtained results. Nevertheless, we can conclude that agricultural demand for all the inputs (except fuel and lubricants) is seriously restricted. The major part of producers purchased small lots of inputs.

Table 5. Characteristics of sampling[2]

Index	Large-scale farms (N=144)		Family farms (N=425)	
	Number	as % of the sample	Number	as % of the sample
Mineral fertilizers				

[2] Hereinafter in the section the data of the survey are used.

Total number of farms purchased the fertilizers	109	76	138	32
Minimal lot, tons	5	X	0.001	X
Maximal lot, tons	811	X	287	X
Gas				
Minimal lot, tons	2	X	0,1	X
Maximal lot, tons	636	X	25	X
Diesel oil				
Minimal lot, tons	5	X	0,001	X
Maximal lot, tons	811	X	110	X
Seed				
Total number of farms purchased seed	68	47	142	33
Minimal expenses, thousand rubles	20	X	2	X
Maximal expenses, thousand rubles	1772	X	444	X
Fodder				
Total number of farms purchased fodder	44	31	183	43
Minimal lot, feed units	76	X	2	X
Maximal lot, feed units	3,785,467	X	1,440,000	X
Agricultural machinery				
Total number of farms purchased any machinery unit	18	13	33	8
Minimal number of purchased units	1	X	1	X
Maximal number of purchased units	7	X	6	X
The number of farms that have no tractors	10	7	197	46

However, the results of survey let make several conclusions on the demand for the examined inputs. These conclusions are discussed below.

The survey showed that the inputs prices for small producers was lower than ones for large plants (Table 6). Large producers more actively participate in various governmental support programs that frequently cause the growth of inputs prices. Individual enterprises usually purchase inputs at a marketplace where prices are lower.

Table 6. Average prices of purchased inputs, thousand rubles/ton

Inputs	All enterprises	Large-scale farms	Family farms
Gas	5.9	6.4	5.4
Diesel oil	5.6	5.7	5.4
Fertilizers	3.2	2.7	3.6
Tractors, thousand rubles per unit	234.6	263.5	205.7
Grain harvesters, thousand rubles per unit	630.9	611.7	650.0
Seed	13.5	14.7	12.7
of which cereals seed	4.3	4.7	3.6
sunflower seed	22.8	2.5	21.9
Fodder, total	8.8	39.2	3.4
of which combined fodder	8.8	2.4	2.1
hay	0.9	142.3	0.8

Large-scale farms partially compensate higher prices paid for purchased inputs by the delay of payment for supplies. Although large-scale farms and farmers purchase resources through the same distribution channels and use the same settlement patterns, large scale farms' delay of payment for purchased inputs is two times longer than farmers' one.

The significant shifts in the structure of inputs supplies to agricultural producers are observed. Since mid-1990s, in purchased inputs supplies to agriculture, the share of administrative channels (commodity loans, mutual debts offsets, etc.) was rather high. The survey showed that by 2001, the role of regional administrations in basic inputs supplies to producers became insignificant. Commercial intermediaries dominate in distribution channels (Figure 2 and Figure 3).

Figure 2. Purchased inputs supplies channels in three regions of Russia, as % of the total supplies

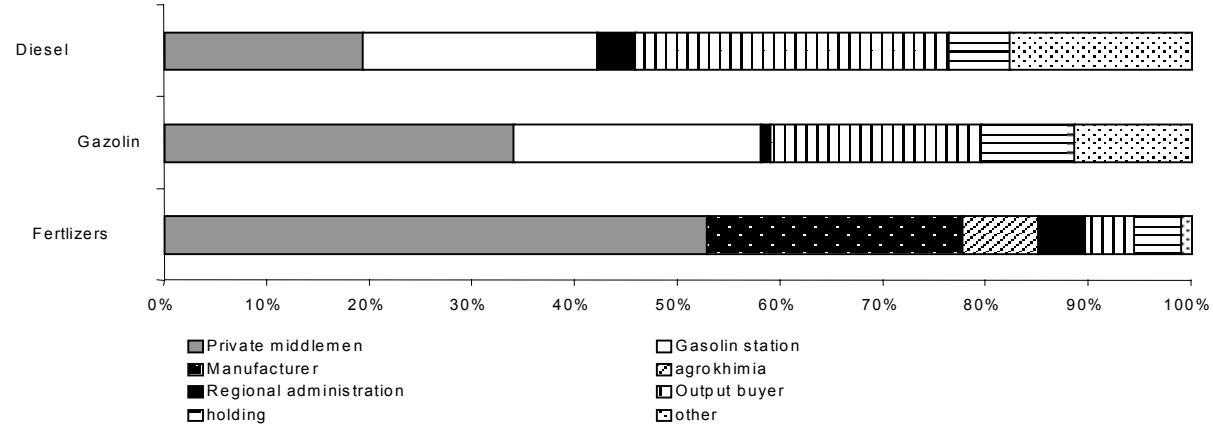
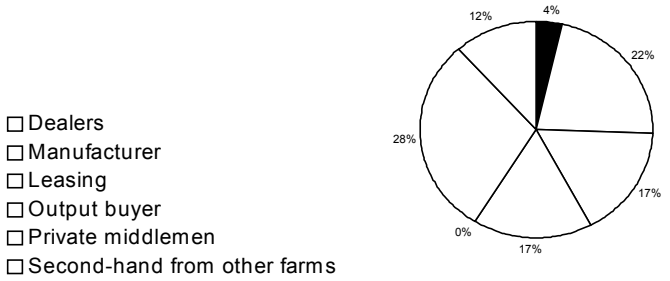


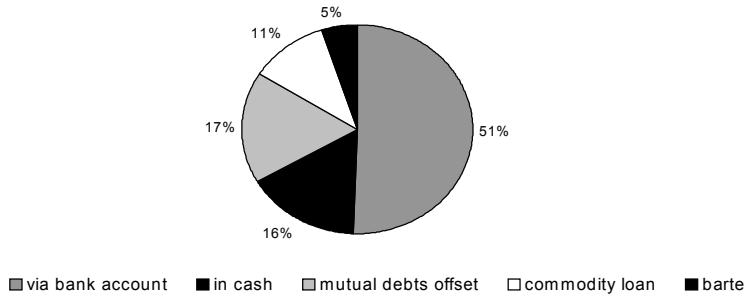
Figure 3. Agricultural equipment supplies channels, as % of the total supplies



During the recent years, large volume of agricultural inputs was supplied through contractual schemes. Large-scale farms that use forward or vertical integration contracts purchased a significant part of inputs although their share in the total number of surveyed enterprises was not high.

In the Rostov region, the share of vertical integration contracts (nearly 1/3) is even higher than one for the entire sampling. This region is characterized by highest concentration of agro-holdings in comparison with other surveyed regions.

Figure 4. Forms of payments for mineral fertilizer supplies, as % of the total supplies



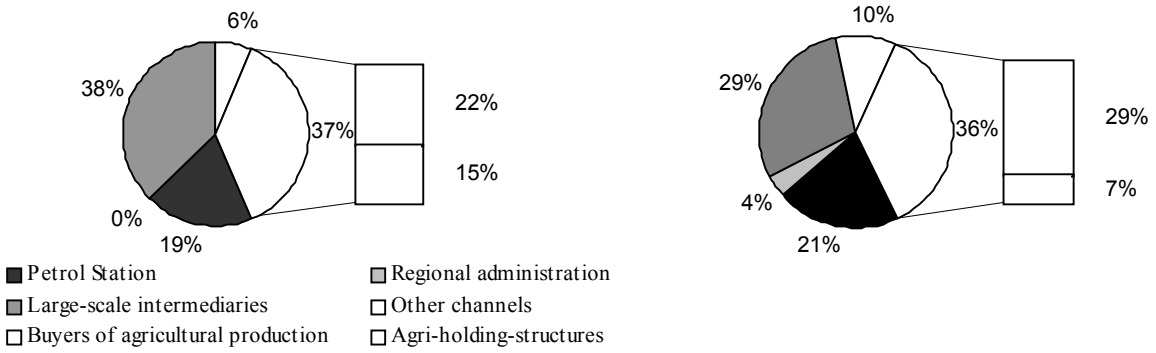
In the framework of vertical coordination, inputs supplies restrict free inputs market. This factor is important for analysis of market structure and purchased inputs supplies to agriculture. It also influences the estimate of average purchased inputs prices, because vertical integration contracts can provide for transfer prices that significantly differ from market ones.

The forms of payments for purchased inputs have significantly changed. The share of various barter schemes that dominated at inputs market in the beginning of 1990s has significantly decreased. At present, the basic forms of payments include payments in cash or fund transfers,

although mutual debts offsets are also used (Figure 4). The decrease of large scale farms' losses after 1998 undoubtedly was the main reason of fund transfers widespread.

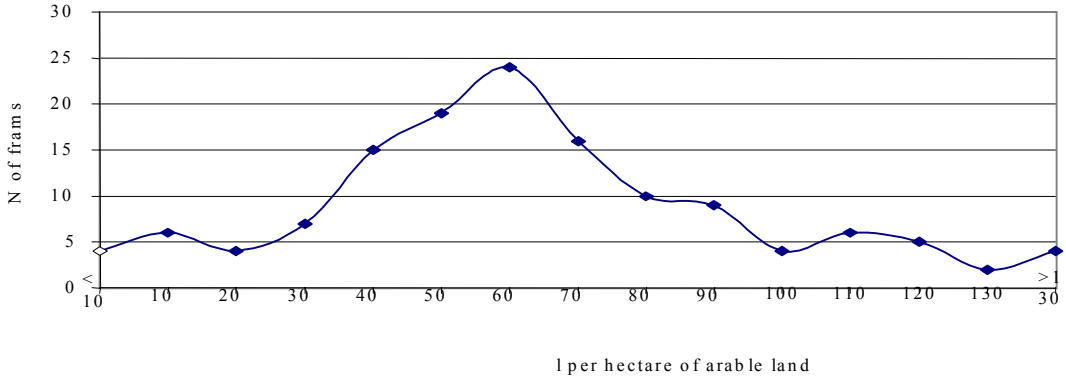
Agricultural producers buy nearly 50% of fuel and lubricants at gas stations or from intermediaries, but 1/3 of this input is supplied by the buyers of agricultural products (Figure5).

Figure5. Gas and diesel oil supplies channels, as % of the total supplies



The use of diesel oil per hectare directly depends on the crop production technology. In the surveyed large-scale farms, the use of diesel oil per hectare of arable land is close to normal distribution. It means that crop production technologies used by these enterprises are highly homogenous (Figure 6).

Figure 6. The distribution of 135 large-scale farms by the use of diesel oil per hectare of arable land



In 2001, the main kind of purchased mineral fertilizers were nitrogenous fertilizers. Their dominance in the structure of fertilizer use means that this structure is not optimal (Table7).

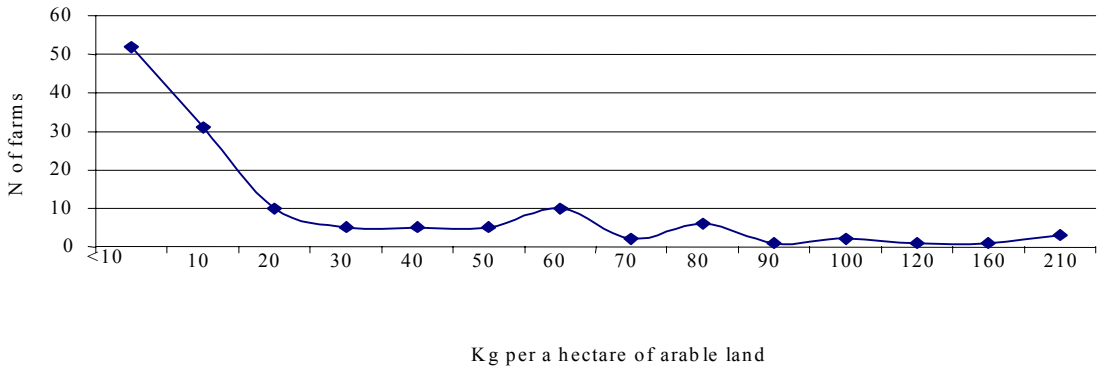
Table7. The distribution of mineral fertilizer use by crops, %

	Cereals	Sunflower	Flax	Fodder	Other crops
Nitrogenous fertilizers	58	16	17	65	37
Potash fertilizers	2	2	1	6	18
Phosphate fertilizers	3	11	3	16	13
Compound fertilizers	37	71	79	13	32

For the entire sample, the average per hectare mineral fertilizer use (calculated per active substance) amounts 10 kg (i.e., 24 kg in physical weight). Large-scale farms use 12 kg of mineral fertilizers per hectare. As for the entire sample, 2/3 of large-scale farms use less than 12 kg of mineral fertilizers per hectare (Figure 7). At the same time, in the Rostov region, 2/3 of large-scale farms use more than 40 kg of mineral fertilizers per hectare. This level of

fertilizer use that contrasts to the average one means that these enterprises develop intensive agriculture.

Figure 7. The distribution of 134 large-scale farms by mineral fertilizer use per hectare of arable land



Practically all the purchased fertilizers are used during the same year. Three fourths of mineral fertilizers were used for cereals (in the Rostov region, the share of cereals in the total mineral fertilizer use was even higher).

The results of regional survey prove that the share of imported mineral fertilizer at the Russian market is insignificant. On average, their share in the structure of purchased mineral fertilizers hardly exceeds 2% (only in the Rostov region).

In the surveyed enterprises, agricultural machinery is characterized by rather long lifetime. Agricultural producers evaluate the quality of their equipment as satisfactory (Table 8).

Table 8. The quality of agricultural equipment used by agricultural producers, 2001

The average:	All enterprises	Large-scale farms	Family farms
Tractors			
capacity per hectare, h. p.	0.521	0.494	0.549
age, years	10.86	11.000	10.720
quality evaluation, points	3.06	3.000	3.121
Grain harvesters			
grain tank capacity per hectare of cereals sowing area, tons	0.082	0.082	n/a
age, years	10.48	11.160	9.8
quality evaluation, points	3.04	2.970	3.11

As the data of Table 8 shows, the availability of tractors in large and small farms does not significantly differ (the farms use the same technologies). However, large farms more frequently purchase agricultural machinery, while family farms prefer to use machinery services. For example, in 2001, only 14 of surveyed large farms used tractors services and only 17 farms combines services, while 206 and 89 surveyed family farms correspondingly use tractors and combines services. On the other hand, family farms more frequently provide services of their machinery to other agricultural producers. Out of the total number of surveyed family farms, 25 and 11 farmers correspondingly provided services of their tractors and combines. As for large-scale farms, such services were provided correspondingly by 5 enterprises (tractors) and 2 enterprises (combines). Services provided by family farms are cheaper than ones provided by large-scale farms.

The major suppliers of these services for family farms are large-scale farms that provide such services on non-profitable basis. However, at least a part of large-scale farms use more expensive services provided by various third agents that act at the market of agricultural machinery services.

Table 9. The average cost of workday, thousand rubles

	Large scale farms		Family farms	
	Received services	Provided services	Received services	Provided services
Tractor	1.1	0.8	0.8	0.6
Grain harvester	4.4	1.3	1.3	2.2
Truck	0.8	0.5	0.5	0.6

During the recent decade, more than 1/4 of large-scale farms' machinery inventories have been renovated. In 1991-1997, the purchases of tractors grew faster than after the crisis of 1998. Per hectare tractor capacity of 3/4 of farms do not exceed one h. p., while one fourth of farms possess excessive capacities in comparison with the majority of producers. Nearly 60% of surveyed large-scale farms possess up to 20 tractors.

Harvester grain tanks capacity of nearly 90% of surveyed farms does not exceed 20 kg per hectare of cereals sowing area. At the same time, the capacity of harvester grain tanks used by some farms amounts 40 kg, 80 kg, or even 190 kg. In the Rostov region, i.e., the largest grain-producing region in the sampling, the distribution of combines was even more homogenous, because the total capacity of harvester grain tanks of 97% of farms in this region is not more than 20 kg.

There is the settled opinion that large-scale farms suffer from serious deficit of tractors and other agricultural machinery. But in reality, many large-scale farms have accumulated the excessive (in comparison with their output inventories of agricultural equipment. The depreciation of agricultural machinery inventories is a natural process, and the managers of farms do not strive for its complete renovation. The estimation of the potential demand for agricultural machinery on the basis of its depreciation is overvalued therefore.

The survey showed that the items of agricultural machinery that are used and purchased by farms do not differ by regions. Tractor models include *MTZ* of various modifications that constitutes up to 45% of tractor inventories and *DT-75*. Combine models include *SK-5 «Niva»* and *«Don-1500»*.

Seed could be considered as purchased inputs with a proviso. For the entire sampling, in 2001, seed were purchased practically only by family farms, and large scale farms preferred to use own-produced seed (only 48 farms out of 144 surveyed farms purchased seed). In large-scale farms, the average cost of cereals seed was nearly 1.5 times higher than the average marketed grain price. The cost of purchased cereals seed was on average 2.5 times higher than the cost of own produced ones, and 2.6 times higher than average marketing grain price.

Like seed, fodder is not purchased but mainly produced on farms. In the entire sampling, the share of purchased fodder in the total volume of fodder used by farms on average amounts 8%. And like seed, the share of purchased fodder in the total volume of fodder used by family farms is higher than one used by large scale farms (correspondingly, 65% and 7%). Furthermore, the share of purchased fodder in the total volume of fodder use varies by regions. In the enterprises of the Rostov region that have their own grain, the share of purchased fodder in the total volume of fodder use is lower (9% in large farms and 13% in family farms). Mixed fodder is usually purchased. It is notable that hay has become marketable.

The main part of purchased mixed fodder is used for swine and cattle feeding (cattle is fed by mixed fodder of higher quality in respect to feed units output).

4. Conclusions

In Russia, the forming of purchased agricultural inputs markets follows the development of agricultural and food markets. The former are still rather narrow, the demand is limited by

low purchasing power of agricultural producers that begun to grow only a few years ago. For example, there are still no fodder and seed markets in Russia.

The trends of inputs markets development differ, but in large extent they are determined by the governmental agrarian policy and the development of agricultural products market. Thus, the imperfection of the latter resulted in the formation of vertically integrated agro-food companies that actively develop supplies to agricultural sector by internal transfer prices. Governmental programs aimed towards the development of agricultural machinery leasing impeded the formation of the largest manufacturers' distribution systems and thus weaken their competitive advantages in comparison with largest Western suppliers that are ready to enter the Russian market.

Nevertheless, during the years of reforms, the state supplies system was completely dismantled. New market relations between suppliers and producers appear, and market institutions gradually form. Barter deals became less widespread, and the participation of governmental bodies in intermediary operations decreased.

The accomplished survey let draw several conclusions that are important for the governmental policy.

1. In its efforts aimed towards the support of agricultural producers' demand for inputs, the government should not substitute governmental structures for market institutions. Such practice impedes the forming of market institutions and consequently weakens the competitive advantages of the Russian agricultural inputs manufacturers. The world markets of agricultural inputs are characterized by very intensive competition, and world manufacturers of all kinds of inputs (excluding probably fuel and lubricants) are very much interested in the huge market potential of the divested Russian agriculture. The absence of the Russian producers' distribution system significantly weakens their position at domestic market.

2. Supplies to agricultural machinery and mineral fertilizer markets are highly concentrated. The share of the largest five or six companies in total supplies amounts 90-95%. However, the monopolistic character of this sector was mainly determined not by high concentration but rather by the governmental policy that was oriented towards the support of particular companies.

3. The opinion that has formed in the agrarian establishment of Russia concerning the high deficiency of agricultural equipment in farms seems to be incorrect as such deficiency is overvalued. Large-scale farms accumulated the excessive inventories of agricultural machinery that does not fit the decreased output. During the recent four years, the major part of equipment was renovated, and the rest machinery serves for less than a decade. Naturally, if equipment renovation will not be invested during the nearest few years, the immediate sharp increase of demand for new equipment can happen. It will probably take place when agricultural equipment lifetime will exceed ten years. In order to avoid foreign producers' expansion to this market niche, domestic agricultural equipment manufacturers should recognize the possibility of sharp demand increase. However, this sharp increase should not be extrapolated for a long run.

4. At domestic market, mineral fertilizer supplies are very inelastic as export supplies are preferable (not only due to higher export prices). In this situation, the long-term compensations paid to agricultural producers for a part of purchased fertilizers lead only to the increase of internal prices. In order to raise fertilizer use in agriculture, the efforts aimed towards the increase of elasticity of domestic supplies as well as the incentives that will make domestic producers interested in domestic supplies are necessary.

5. The under-development of labor and land markets as well as low cost of these resources for agricultural producers result in the substitution of these factors of production for purchased

inputs. As a rule, agricultural producers cannot radically cut the number of employees, because there are no alternative jobs in rural areas. Hence, the minimization of the use of one of the factors of production is bounded. It can lead to the under-use of other factors of production, including purchased inputs. Thus, the absence of alternative (non-agrarian) working places in rural areas is one of the reasons of inefficient agricultural inputs use. But it also means that excessive labor in agriculture impedes the growth of demand for purchased inputs, mainly for fertilizers, fodder, and seed.

Therefore, our study once again proves the necessity of the governmental policy that is aimed towards the extension of non-agricultural employment in rural areas in order to increase agricultural production efficiency.