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# **Markets for Purchased Farm Inputs in Transitional Agriculture: Russia's Example**

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*Paper prepared for presentation at the XI<sup>th</sup> International Congress of the EAAE*

*(European Association of Agricultural Economists),*

*'The Future of Rural Europe in the Global Agri-Food System', Copenhagen, Denmark,  
August 24-27, 2005*

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# MARKETS FOR PURCHASED FARM INPUTS IN TRANSITIONAL AGRICULTURE: RUSSIA'S EXAMPLE

## Abstract

The common a priori persuasion is that agriculture suffers from decapitalization due to financial constraints faced by producers. This view is the basis for the national agricultural policy, which emphasizes reimbursement of input costs and substitutes government and quasi-government organizations for the missing market institutions. The article evaluates the availability of purchased farm inputs, the efficiency of their use, the main problems in the emergence of market institutions, and the impact of government policies. The analysis focuses on five groups of purchased inputs: farm machinery, fertilizers, fuel, seeds, and animal feed. The information sources include official statistics and data from two original surveys.

**Keywords:** Russian agriculture, transition economies, farm supply channels, government support programs

**JEL Classifications:** P230, Q180

## 1. Introduction

The main content of the transition in agriculture is a formation of output and input markets. With price liberalization almost in all transitional countries the agricultural and food markets emerged quite quickly, during last 10-15 years the main institutes and infrastructure of these markets were established. The establishing of main agricultural factor markets requested rather longer period of time. Studies of Russian experience demonstrate an evidence of the following sequencing of factors markets emerging: right after output markets the most rapid purchased inputs markets emerged, they are followed by the financial markets in agriculture, then land markets is being developed, and rural labor market is most lagging behind.

The common a priori persuasion is that transitional agriculture suffers from severe decapitalization due to financial constraints faced by producers. This view is the basis of the national agricultural policy, which emphasizes reimbursement of input costs to producers and substitutes government or quasigovernment organizations for market institutions. The present article evaluates the availability of purchased farm inputs, the efficiency of their use in agriculture, and the main problems in the development of input markets. It analyzes supply and demand, the emergence of market institutions, and the impact of government policies. Purchased farm inputs include a wide range of goods. To keep a proper balance between breadth and depth of analysis, we focus on five groups of purchased inputs: farm machinery (tractors and harvesters), fertilizers, fuel, seeds, and animal feed. Three sources of information were used in the analysis: official national statistics, data from the 2003 BASIS survey of agricultural producers (to evaluate the demand for farm inputs, November 2002 and February 2003 in three Russian provinces), and data from a 2001 AFE survey of farm machinery and fertilizer manufacturers (to evaluate supply, April-May, 2001 in around 30 agricultural machinery and fertilizers plants in Russia).

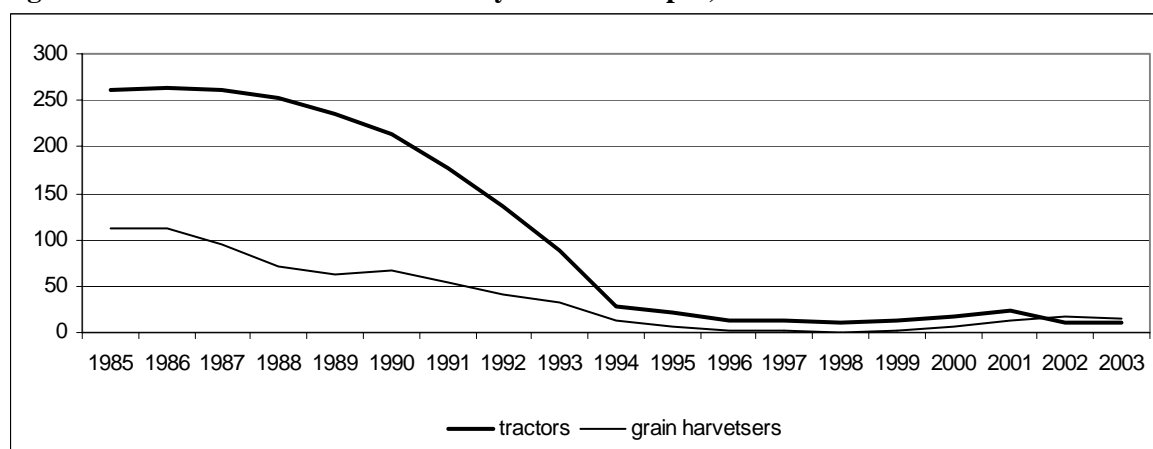
In the Soviet period, all sectors of the economy, including agriculture, were served by a state supply system, which delivered inputs in centrally planned quantities and provided financing through state banks. The farms paid lower prices for inputs than the manufacturers' wholesale prices, and the difference was covered from the national budget. The relative input/output prices were kept fixed, favoring agricultural producers at the expense of industrial manufacturers as another way of subsidizing agriculture. Price liberalization after 1991 aligned the terms of trade in agriculture with the average world level.

The inevitable rise in the relative prices of farm inputs led to shrinking machinery stocks and extensification of production, significantly jeopardizing the potential for growth. The declining demand for inputs affected the supply of domestically manufactured farm machinery, while fertilizer manufacturers shifted to exports, reducing their dependence on the domestic market. It is only after the 1998 financial crisis that agricultural recovery has spurred a renewed demand for farm inputs leading to a certain growth in domestically manufactured machinery.

## 2. Supply of Farm Inputs

As a result of a sharp fall in demand for farm machinery and of a limited export potential in the years of the reforms a machinery industry collapsed (Figure 1) and collapsed more deeply than other industries. Manufacturing of some kinds of machinery and equipment were stopped. In reaction of recovery growth after crisis 1998 machinery sector also got to recover (ibid.)

**Figure 1. Russia: Main Farm Machinery Annual Output, '000 units**



Source MoA, Goskomstat, various years

Farm machinery and fertilizer manufacturing in Russia are highly concentrated industries. Thus, five plants produce nearly 90% of tractors, and just two plants produce 95% of grain harvesters. In the fertilizer industry, ten manufacturers produce 74% of nitrogen fertilizers, four manufacturers produce more than 70% of phosphorus fertilizers, and just two plants produce the total output of potassium fertilizers. The concentration trend in the farm machinery industry is continuing, as the giant machinery manufacturers have recently begun creating vertical and horizontal holding structures, probably in anticipation of impending competition from importers.

Sales of farm machinery are also highly concentrated: in 1999-2000, fully 75% of the market was controlled by Rosagrosnab (a former state monopoly privatized in the mid-1990s) that operated jointly with the regional administrations; the remaining 25% were sales through agroholdings and other corporate farms. Since 2000 the market share of Rosagrosnab and regional governments has dropped to 55%, primarily due to rapid growth of agroholdings and corporate farms as channels for machinery sales. Independent dealer and service networks also began to develop in 2000, after Rosagrosnab had lost its monopolistic position. These initiatives often followed reorganization and management shakeup in the manufacturing plant, or takeover by a new investor (as in the Rostov and Krasnoyarsk farm machinery plants). Up to 1999, the standard payment mechanisms were mutual account offsets or barter deals. Since 1999, virtually all payments have shifted to bank transfers.

Alongside the giant tractor and harvester manufacturers there is a group of medium and small plants that manufacture a broad range of farm equipment (mini-tractors, hitched implements, spare parts and components) and accept repair and maintenance contracts. The sales channels of these medium and small

manufacturers are much more diversified than those of the giant tractor and harvester plants (Table 1). They began creating own dealer and service networks earlier than the giant manufacturers, probably because their products were never entitled to government support. The wider range and the generally lower cost of equipment manufactured by the medium and small plants have also resulted in a greater diversity of payment arrangements (Table 2). These manufacturers accept cash payments and continue to rely on barter deals.

**Table 1. Sales channels of medium and small machinery manufacturers (percent by volume)**

	1998	1999	2000	2001
<i>Mini-tractors</i>				
Regional administration			6	5
Dealers		6	10	8
Commercial firms	5	13	23	19
Corporate farms	33	2		
Peasant farms	32	31	21	17
Household plots	30	38	40	51
<i>Hitched implements, trailers, etc..</i>				
Regional administration			4	5,5
Dealers		5	9	9,5
Commercial firms	26	20	20	22
Corporate farms		2		
Peasant farms		25	17	20
Household plots	74	48	50	43
<i>Spare parts, components, assemblies</i>				
<i>Rosagrosnab</i>	90	95	28	40
Dealers			20	10
Commercial firms	10	5	52	50

Source: 2001 AFE survey.

**Table 2. Structure of payments for medium and small machinery manufacturers**

	Percent of respondents	Trend
Bank transfers	60	Increasing
Cash payments	17	Increasing
Barter	16	Decreasing
Other	7	Decreasing

Source: 2001 AFE survey.

During the Soviet period, Belarus and Ukraine were Russia's main sources for farm machinery. After the dissolution of the Soviet Union, imports from countries outside CIS have increased substantially, and in the late 1990s the share of imported tractors was 67%. High price is the main obstacle to wider penetration of imported machinery in Russia. Thus, an imported tractor costs 50% more than a tractor assembled in Russia or CIS. Imported machinery usually has a significant quality advantage, but the cost/benefit ratio still remains better for domestic machinery. Moreover, federal and regional subsidies are available only for domestic machinery. Three major international companies (John Deere, Case, and Claas) are vitally interested in expanding their market share in Russia. So far, however, their attempts to launch manufacturing or assembly plants have not been successful.

Russia is one of the leading fertilizer manufacturers and exporters in the world. It ranks first, second, and fifth in world exports of N, P, and K fertilizers, respectively. About 85% of Russia's fertilizer output is exported and only 10% is sold domestically (the remainder is used for further processing). Similarly to farm machinery, the fertilizer industry has experienced a significant growth since 1998. This growth,

however, has not been in response to demand recovery: it is attributable to advantageous world prices and the entire additional output is exported.

All fertilizer plants have been privatized, except those in Bashkiria and Tatarstan. The 2001 AFE survey has shown that in state-owned enterprises the domestic sales are mainly to the regional administration. Private fertilizer manufacturers, on the other hand, sell very little to regional administrations and most of their domestic sales are directly to agricultural producers, without any intermediaries (Table 3). Export accounts are naturally settled by bank transfers (Table 4). Domestic sales, on the other hand, are predominantly in the form of barter transactions (e.g., “fertilizer for grain”).

**Table 3. Sales channels of private fertilizer manufacturers (percent by volume)**

	1998	1999	2000	2001
Regional administration	0.05	0.14	0.08	0.05
Corporate farms	5.5	6.7	4	3
Peasant farms	0.02	0.03	0.04	0.04
Exports	94.4	93.2	95.8	96.9

Source: 2001 AFE survey.

**Table 4. Structure of payments for private fertilizer manufacturers**

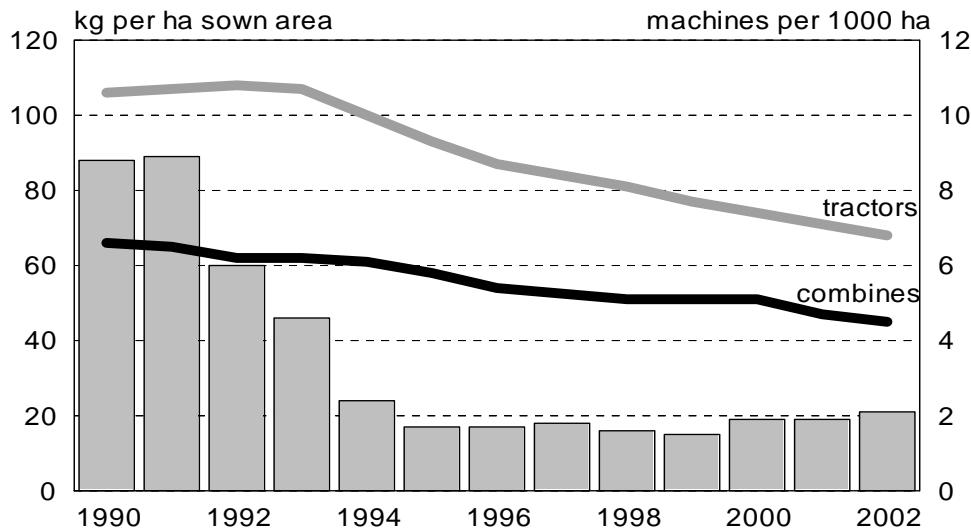
	Percent of respondents	Trend	Prices received
Bank transfers	94	Increases	Lowest
Cash payments	0.1	Decreases	Lowest
Barter	5.9	Decreases	Highest

Source: 2001 AFE survey.

### 3. Domestic Demand

With the onset of market reforms in the early 1990s, agriculture was faced with a severe cash crunch, which bordered on a total financial collapse. Lack of financial resources constrained the purchase of farm inputs, and purchased inputs began to be replaced with land and labor. Land was treated as a free input because of the prohibition of land sales and the long-standing Marxist tradition that did not attach any costs to the use of land; labor was relatively cheap because of the rapid and uncontrolled slippage of agricultural wages (Bogdanovskii, 2005). Russian agriculture was thus launched on the dangerous path of decapitalization and extensification. The stock of tractors and combines has decreased sharply since 1990; the consumption of fertilizers—the main factor sustaining intensive agricultural production—dropped by a staggering 85% between 1990 and 2002 (Figure 2).

**Figure 2. Fertilizer consumption (kg per hectare of sown area) and machinery availability (pieces of machinery per 1,000 hectares) for corporate farms, 1990-2002.**



Source: Goskomstat, various years.

However, price increases have also encouraged a more efficient use of purchased inputs. In the Soviet era, fertilizer losses on farms reached 40% of deliveries, while farm machinery had a very short lifetime because of low quality, careless exploitation, and poor maintenance. Today, all the fertilizer delivered to the farm is actually applied; farm machinery remains in use for a much longer time, and old equipment is often cannibalized for maintenance and repairs. The reduction of fuel and power consumption in agriculture outstripped the decrease in production: while agricultural gross product decreased by 40% between 1991 and 2001, the use of gasoline dropped by 76%, diesel fuel by 63%, and electric power by 51%. These numbers also point to a more efficient use of purchased inputs in agriculture.

In the mid-1990s, growing liquidity constraints and high indebtedness of agricultural producers led to proliferation of various barter arrangements for provision of farm inputs. Federal and regional programs offer various commodity credits, while traders and processors provide inputs to farms that supply them with produce and raw materials. Even though the farms do not purchase these inputs directly for themselves, the credit commodity arrangements actively influence the market demand for inputs by channeling the actual purchases through market intermediaries. Another active channel for the purchase of farm machinery and other inputs began to develop in 1998 in the form of vertically integrated agroholdings, which purchase these factors of production for their affiliated farms.

An opposite effect on demand for farm machinery can be traced to changing patterns of machine use in Russian agriculture (Serova and Khranova, 2003). In the past, it was taken for granted that each farm had to have a full complement of machinery as prescribed by its technology, land endowment, and the cropping cycle. Even machinery that was needed for a very short time during the year had to be acquired and held by the farm. To this very day, the Ministry of Agriculture continues to calculate sufficiency and shortage of farm machinery based on this “total coverage” approach. And yet this is no longer necessary, because various commercial entrepreneurs (both domestic and foreign) are offering machinery rentals and custom farming services, often in return for a share of the harvest. Waves of Turkish tractor and harvester teams move every year from the south to the north, following the harvest frontier with their own

machinery and equipment. Corporate farms and especially individual farmers are also willing to rent out their machinery stock with or without an operator to any producer who happens to suffer from some shortage. This change of machine-use practices has sharply reduced the overall demand for new farm machinery, reinforcing the trend triggered by the decline of agricultural production and the increasingly parsimonious behavior due to rising relative prices. Moreover, machinery purchases are no longer limited to agricultural producers: upstream and downstream businesses have also begun to enter this market.

#### 4. Use of Purchased Inputs: Evidence From The BASIS Survey

The use of purchased inputs by agricultural producers is one of the issues addressed by the 2003 BASIS surveys of corporate and individual farms in three oblasts (the individual farms were broken down into peasant farms and household plots). Purchases of diesel fuel and to a lesser extent gasoline are reported with the highest frequency in the survey. These seem to be the essential inputs, while all other inputs are purchased much less frequently. Corporate farms generally show a higher frequency of input purchases than individual farms (Table 5); they also purchase larger quantities of inputs because of their larger size). The gap between corporate farms and peasant farms is particularly noticeable for purchases of fertilizers and machinery.

**Table 5. Use of purchased inputs by corporate and individual farms (percent of farms reporting input purchases)**

	Corporate farms (n=142)	Peasant farms (n=223)	Household plots (n=202)
Fertilizer	74	57	5
Gasoline	96	61	32
Diesel fuel	98	98	20
Seeds	49	49	16
Animal feed	32	4	90
Farm machinery	29	7	1
Mechanical field services	18	17	40
Farms without machinery*	4	15	80

\*Tractors, harvesters, feed combines, and trucks.

Source: 2003 BASIS survey.

Among individual farms, there is a striking difference in the frequency of input purchases between the larger peasant farms and the smaller household plots. Peasant farms show a higher frequency of input purchases for most inputs (Table 5). Two notable exceptions are animal feed and mechanical field services. Virtually all household plots purchase animal feed because of their high reliance on livestock production and their small size (leading to insufficient capacity for feed production). Very few households have farm machinery of their own, and this in turn explains the high frequency of household plots that purchase mechanical field services (plowing, tilling, harvesting). The availability of machinery is highest among the corporate farms, which apparently continue to use the old machinery stocks accumulated during the Soviet period, while peasant farms rely on new machinery acquired during the last decade. Still, 85% of peasant farms have at least one piece of motorized machinery (a tractor, a harvester, a feed combine, or a truck). Overall, the data in Table 5 seem to suggest that the use of purchased inputs increases with the increase of farm size from household plots to corporate farms.

In sharp variance with the Soviet practice, the state no longer plays a major role as a supplier of farm inputs. The share of input purchases from regional authorities is very low (Table 6). The emphasis has shifted to commercial trade channels. These include wholesalers, fertilizer manufacturers, and gas stations. The reliance on commercial suppliers is greater for individual farms (the table combines peasant farms and household plots into one category). Corporate farms have access to two new supply channels



that appeared during the 1990s: they receive inputs from buyers of agricultural commodities (dairy and meat processors, vegetable marketers, grain elevators) and also from “mother companies”, i.e., commercial holding companies that acquire farms as part of their business strategy (Rylko and Jolly, 2005). The reliance on the “mother company” is particularly noticeable for machinery purchases, where fully 15% of the reported transactions are organized in this novel way.

**Table 6. Supply channels for corporate and individual farms (percent of inputs purchased from each channel)**

	Gasoline		Diesel fuel	
	Corporate	Individual	Corporate	Individual
Regional government	1	4	2	3
Gas station	35	85	23	55
Trade	28	8	30	24
Buyer	20	2	28	4
Mother company	2	--	2	--
Other	14	1	15	14
Total quantity	100	100	100	100

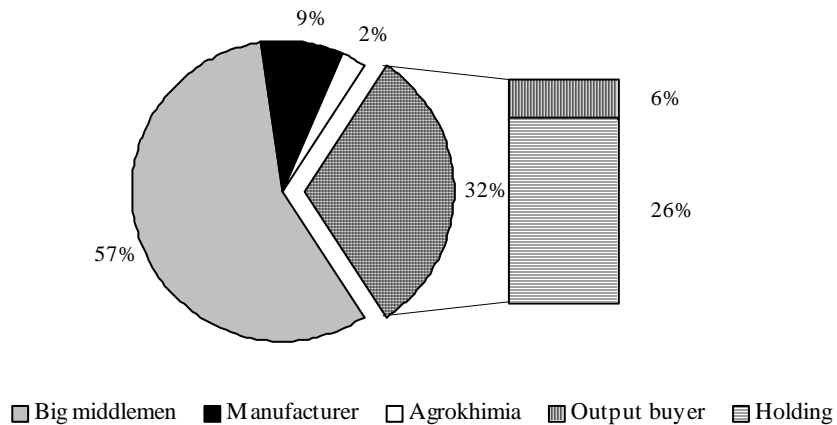
	Fertilizer			Machinery*	
	Corporate	Individual		Corporate	Individual
Regional government	4	1	Leasing	28	21
Gas station	16	17	Manufacturer	14	0
Trade	68	76	Trade, dealers	24	35
Buyer	6	2	Buyer	0	3
Mother company	2	--	Mother company	15	--
Other	4	3	Other farms (used)	19	41
Total quantity	100	100	Total	100	100

\*Percentage of all reported machinery purchase transactions in the sample (104 transactions for corporate farms, 34 transactions for individual farms).

Source: 2003 BASIS survey.

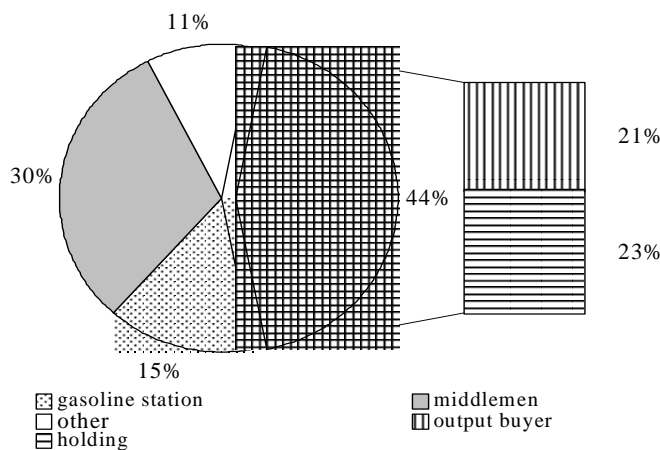
The share of inputs purchased through the mother company is substantially higher in Rostov Oblast, which is a “hotbed” of agrohholding activity (Rylko and Jolly, 2005). Thus, holding structures supply 16% of gasoline, 7% of diesel fuel, and 9% of fertilizers to corporate farms in Rostov Oblast (compared with about 2% of these inputs in all the three oblasts surveyed). Together with inputs supplied by buyers of agricultural commodities, the share of vertical integration arrangements in Rostov Oblast approaches 40% of the total quantity of purchased inputs (Figure 3 and Figure 4). These new channels may be regarded as part of a trend toward vertical integration of input supply and agricultural production, which has become possible only with progress in market reforms.

**Figure 3. Rostov oblast: Vertical Coordinated Contracts for Purchases of Mineral Fertilizers, as % of total purchases**



Source: 2003 BASIS survey

**Figure 4. Rostov oblast: Vertical Coordinated Contracts for Purchases of Gasoline, as % of total purchases**



Source: 2003 BASIS survey

The payment arrangements in the survey are primarily cash and bank transfers, with individual farms emphasizing cash transactions to a greater extent than corporate farms (Table 7). The prevalence of barter transactions, which characterized the early 1990s, is gone. Mutual offsets of payables and receivables—another payment method that emerged in the atmosphere of severe cash shortages at the beginning of the reform—is still practiced by corporate farms for 10%-15% of their purchases, but practically by none of the individual farms (Russia’s Agri-Food Sector, 2000).

**Table 7. Forms of payment for fertilizers and machinery in corporate and individual farms**

	Fertilizer*			Machinery**	
	Corporate	Individual		Corporate	Individual
Commodity credit	9	7	Commodity credit	8	5
Barter	6	2	Barter	4	5
Cash	25	54	Cash	22	66
Bank transfers	51	34	Bank transfers	51	24
Mutual offsets	9	3	Mutual offsets	16	0
Total quantity	100	100	Total quantity	100	100

\*Percent of quantity purchased, as reported by 98 corporate farms and 138 individual farms.

\*\*Percentage of all reported machinery purchase transactions in the sample (104 transactions for corporate farms, 34 transactions for individual farms).

Source: 2003 BASIS survey.

Despite anecdotal claims, there is no evidence of price discrimination against individual farmers in input markets. On the contrary, individual farms surveyed generally appear to pay lower prices for inputs than corporate farms, but the differences in most cases are not statistically significant. Only the prices of diesel fuel and concentrated feed are statistically significantly lower for individual farms (but only by about 5%-10%). This may be due to the fact that individual farms purchase these inputs at market prices, whereas corporate farms often receive diesel fuel and concentrated feed as part of government commodity credit programs, which charge a higher markup.

## 5. Government Support Programs for Purchased Inputs

Reimbursement of input purchase costs is one of the main tools of government support to agricultural producers. One-third of the agricultural support funds in the federal budget is earmarked for input cost reimbursement. Oblast budgets supplement this allocation in varying degrees depending on regional policy priorities. Cost reimbursement programs include subsidies for fertilizers, fuel, electric power, elite seeds, and breeding livestock. Soil amelioration activities are also entitled to government support. An important segment of agricultural subsidies consists of programs that partially reimburse the interest expense of producers on commercial loans (this is the only form of credit subsidy in Russia today). Another category of support programs provide medium-term loans that allow machinery leasing. These loans are administered by regional leasing monopolies subordinated to the state leasing agency Rosagrolizing and do not go through the government budget (Yastrebova, 2005).

The various support programs – both federal and regional – typically incorporate conditions that severely restrict the functioning of input markets. Thus, to be entitled to federal subsidies for fertilizer purchasing and machinery leasing, the producer must deal with suppliers and manufacturers from a limited list approved by the government. Most regional support programs incorporate similar restrictions, although some oblasts with relatively liberal policies (most notably, Vologda and Perm) allow producers to sign contracts with any supplier. The administrative allotment of input producers with the monopolistic power within a region results in the rise in prices for inputs for agricultural producers. Fuel subsidy programs often take the form of commodity credits, stipulating payment by delivery of farm products (e.g., grain) to federal or regional stocks. The coordination of the commodity credit with the supplying for the regional funds gives the regional authorities the formal grounds for prohibitions on export of agricultural production that results in the separation of the singular market in the country and the deterioration of the exchange proportions for agricultural producers.

For the quantitative estimation of the efficiency of the state support of inputs use we are based on the supposition that the aim of the support programs of inputs use is the reduction of the actual price for inputs for agricultural producers. The efficiency of the support program can be measured by the reduction of the

price for inputs by agricultural producers as the result of its realization. The effectiveness of support programs can be assessed by comparing the subsidized prices with the equilibrium price for inputs, i.e., from the price fixed in the analogous market by the absence of any state interference. The conventional NPR (nominal protection rate) index was used as an index of efficiency.

The index compares the value of inputs for agriculture in the actual and equilibrium prices. It is expressed as a percentage:

$$NPR_{inputs} = \frac{\sum_i P_i^b Q_i - \sum_i P_i^d Q_i}{\sum_i P_i^d Q_i}$$

where  $P_i^d$  — actual prices for inputs  $i$ ,

$P_i^b$  — equilibrium price for inputs  $i$ ,

$\sum P_i^d Q_i$ ,  $\sum P_i^b Q_i$  — value of inputs  $i$  in the actual and equilibrium prices.

**Table 8. NPR for corporate farms in three oblasts**

	Rostov	Ivanovo	Nizhnii Novgorod
Fertilizer	-6	n.a.	10
Gasoline	+0.3	-0.1	+3.3
Diesel fuel	-5.3	+3.2	+3.1
Tractors	+5.1	0.0	-46.4
Grain harvesters	-48	-91.0	n.a.

Source: 2003 BASIS survey.

An attempt has been made to conduct such a comparison for the corporate farms in the 2003 BASIS survey. The results are summarized in Table 8. Negative differences (NPR) indicate that subsidized prices are higher than market prices (ineffective subsidies), whereas positive differences indicate that subsidized prices are lower than market prices (effective subsidies). We see from the table that input subsidies have a mixed effectiveness record across inputs and across regions.

In Rostov Oblast, most subsidized prices appear to be higher than market prices; only the price of leased tractors is less than the market price (the price of subsidized gasoline is essentially equal to market price). The aim to make inputs cheaper is not reached: the prices at which producers purchased fertilizers within the framework of the program were higher than they would be by its absence. It may be the result of the existing situation when the authorities of Rostov oblast choose both suppliers of fertilizers and agricultural producers that take part in the program, and the distribution of guarantees between them is approved by the decree of the government.

In Nizhnii Novgorod Oblast, on the other hand, subsidized fertilizer and fuel are cheaper, while leased tractors are more expensive. The program subsidize the costs of fertilizers for all agricultural producers independently of the source of purchase. The structure of the program in the Nizhnii Novgorod Oblast turns to be more effective than the program used in the Rostov Oblast when the authorities strictly regulate the delivery of fertilizers.

In Ivanovo Oblast, subsidized diesel fuel is cheaper, leased harvesters are more expensive, while the price of subsidized gasoline and leased tractors is essentially equal to the market price (there are no general fertilizer subsidies in Ivanovo). Besides, the correlation of the leasing prices for machinery with the prices of purchase through other channels shows the inefficiency of the leasing schemes

As we have noted previously, this price information is highly unreliable: it is based on very small numbers of respondents and suffers from large data errors. Yet even this crude evidence is sufficient to raise serious doubts concerning the effectiveness of input subsidies programs. There is clearly a strong need for a careful analytical assessment and revision of the existing support mechanisms.

**Table 9. Scores for level of administrative interventions in agriculture and regional wealth in selected regions 2002 (0 – lowest, 3 – highest)\***

	Vologda	Nizhnii Novgorod	Perm	Ivanovo	Rostov	Chivashia	Chelyabinsk
Intervention level	0.39	1.01	1.02	1.59	1.67	2.20	2.78
Regional wealth	2.75	2.26	3.00	0.00	1.55	0.81	2.05

\*Intervention level score based on number of support programs for general services; share of agricultural budget expenditure on food funds; number of restrictive government decisions affecting agriculture. Regional wealth score based on share of transfers from federal budget in regional budget revenues; gross regional product per capita; ratio of average per capita income to minimum standard of living.

Source: Calculated by the authors from data provided by regional and federal statistical organs and by the Russian Ministry of Finance.

Since detailed examination of input subsidies produces such a mixed picture, we have combined several characteristics of regional support programs into a single index that can be used to rank the oblasts by the level of administrative intervention in agriculture (Table 9). Vologda, Nizhnii Novgorod, and Perm appear to be the most liberal oblasts, characterized by the lowest government intervention level. The agricultural policies of Chuvashia and Chelyabinsk, on the other hand, are highly interventionist. Ivanovo and Rostov fall somewhere in the middle on the administrative intervention scale. Table 9 also shows that, on the whole, rich regions adopt liberal agricultural policies, while poorer regions are more interventionist.

This result is based on a very small non-representative sample of 7 out of 77 Russian regions. However, we made an attempt to choose the system of stable criteria for estimation intervention level and regional wealth. That is why there are grounds to suppose that by the increase in number of investigated objects the results are going to be the same.

## 6. Conclusion

In parallel with the development of markets for farm products, we are witnessing the emergence of new market channels for farm inputs. The state no longer has a role as a direct supplier of inputs to agricultural producers. This function has shifted to wholesalers, traders, and manufacturers, who sell mainly for cash and bank transfers, not barter. The strong imperfections that still prevail in input markets have encouraged vertical integration, with fertilizers, fuel, and machinery delivered in substantial quantities through internal channels of large holding structures.

Fuel is the one input that is purchased by most producers. Fertilizer purchases are reported less frequently, whereas seeds and animal feed are mostly used from own production (despite lower quality). It seems that cash shortages are forcing farms to substitute land and labor—the two cheapest factors of production—for some purchased inputs (fertilizers, seeds, feed), a process that inevitably leads to extensification of farm production and abandonment of productivity improving technologies.

Although the government no longer delivers farm inputs, it has a strong negative influence on input markets through a wide range of federal and regional support programs. Government-sponsored leasing programs with their restrictions of approved suppliers and models have created severe obstacles to the development of dealer networks, which will have a detrimental effect on the competitiveness of Russian manufacturers in the long run. The cost reimbursement policy for fertilizers only increased the demand for this input and encouraged the export-oriented manufacturers to raise prices in the domestic market. In regions characterized by lower levels of government intervention we are witnessing significant growth of competitive trading in both machinery and fertilizers.

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.

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