



## THE PURCHASED AGRICULTURAL INPUT MARKET IN RUSSIA

by **Eugenia Serova** serova@iet.ru and **Olga Shick** shick@iet.ru

### Evaluating inputs

RUSSIAN POLICYMAKERS often argue that agriculture suffers from severe decapitalization due to financial constraints faced by producers. This view is the basis of national agricultural policy, which emphasizes reimbursement of input costs to producers and substitutes government or quasi-government organizations for market institutions. This BASIS brief evaluates the availability of purchased farm inputs, the efficiency of their use, 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. We focused on five groups of purchased inputs: farm machinery (tractors and harvesters), fertilizers, fuel, seeds, and animal feed.

In the Soviet period, all sectors of the economy were served by a state supply system, which delivered inputs in centrally-planned quantities and provided financing through state banks. Farms paid lower prices for inputs than the manufacturers' wholesale prices, and the difference was covered from the national budget. As another way of subsidizing agriculture, relative input/output prices were kept fixed, favoring agricultural producers at the expense of industrial manufacturers. 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 was only after the 1998 financial crisis that agricultural recovery spurred a renewed demand for farm inputs leading to a certain growth in domestically manufactured machinery.

### Supply of farm inputs

Farm machinery and fertilizer manufacturing in Russia are highly concentrated industries. Five plants produce nearly 90% of tractors, and 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 two plants produce the total output of potassium fertilizers. The trend toward concentration 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, 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 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 lost its monopolistic position. 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 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. They began creating their 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 also resulted in a greater diversity of payment arrangements. These manufacturers accept cash payments and continue to rely on barter deals.

After the dissolution of the Soviet Union, imports from countries outside the CIS 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. An imported tractor costs 50% more than a tractor assembled in Russia or the CIS. Imported machinery usually has a significant quality advantage, but the cost/benefit ratio remains better for domestic machinery. Moreover, federal and regional subsidies are available only for domestic machinery.

Russia is one of the leading fertilizer manufacturers and exporters in the world. About 85% of Russia's fertilizer output is exported and only 10% is sold domestically (the remainder is used for further processing). The fertilizer industry has experienced significant growth since 1998, attributable not to demand but to advantageous world prices, and the entire additional output is exported. All fertilizer plants have been privatized, except those in Bashkiria and Tatarstan. A 2001 survey shows that, in state-owned enterprises, domestic sales are mainly to the regional administration. Private fertilizer manufacturers, on the other hand, sell very little to regional administrations; most of their domestic sales are directly to agricultural producers. Export accounts are settled by bank transfers, while domestic sales are predominantly in the form of barter transactions.

## Domestic demand

With the onset of market reforms in the early 1990s, agriculture was faced with a severe cash crunch. 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, and labor was relatively cheap (see **BASIS Brief 37** on labor issues). 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.

Price increases encouraged a more efficient use of purchased inputs. Unlike in the Soviet era, today all 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. Even though farms do not purchase these inputs directly for themselves, credit commodity arrangements actively influence the market demand for inputs by channeling 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. In the past, a farm had to have a full complement of machinery as prescribed by its technology, land endowment, and the cropping cycle. Even today, the Ministry of Agriculture continues to calculate sufficiency and shortage of farm machinery based on this “total coverage” approach. Yet, this is no longer necessary because various commercial entre-

preneurs offer machinery rentals and custom farming services, often in return for a share of the harvest. This change of 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.

## Use of purchased inputs

The use of purchased inputs by agricultural producers is one of the issues addressed by the 2003 BASIS survey of corporate and individual farms in three oblasts. 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. Corporate farms generally show a higher frequency of input purchases than individual farms, particularly for purchases of fertilizers and machinery.

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. 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 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. The availability of machinery is highest among 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. Overall, the data 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 emphasis has shifted to commercial trade channels, with reliance on commercial suppliers greater for individual farms. Corporate farms have access to two new supply channels that appeared during the 1990s: they receive inputs from buyers of agricultural commodities and also from “mother companies,” i.e., commercial holding companies that acquire farms as part of their business strategy (see **BASIS Brief 35**). The reliance on the mother company is particularly noticeable for machinery pur-

chases, where fully 15% of reported transactions are organized in this novel way.

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. 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 reform—is still practiced by corporate farms for 10-15% of their purchases, but by virtually none of the individual farms.

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 significantly lower for individual farms (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.

## Government support

Reimbursement of input purchase costs is one of the main tools of government support to agricultural producers, with 33% of agricultural support funds in the federal budget earmarked for input cost reimbursement. Oblast budgets supplement this allocation in varying degrees depending on regional policy priorities. 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).

The various support programs 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 allow producers to sign contracts with any supplier. Fuel subsidy programs often take the form of



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### Authors

#### Eugenia Serova

Analytical Centre for  
Agri-food Economics,  
Russia

#### Olga Shick

Analytical Centre for  
Agri-food Economics,  
Russia

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Edited and layout by  
**BASIS CRSP**

Comments encouraged:  
Department of Agricultural  
and Applied Economics,  
University of Wisconsin,  
Madison, WI 53706 USA  
[basis-me@facstaff.wisc.edu](mailto:basis-me@facstaff.wisc.edu)  
tel: +608-262-5538  
fax: +608-262-4376  
<http://www.basis.wisc.edu>

commodity credits, stipulating payment by delivery of farm products to federal or regional stocks.

The effectiveness of support programs can be assessed (at least in principle) by comparing the subsidized prices with general market prices. An attempt has been made to conduct such a comparison for the corporate farms in the 2003 BASIS survey. Results allow us to see the regions and inputs that have ineffective subsidies (where subsidized prices are higher than market prices) and those regions and inputs that have effective subsidies (where subsidized prices are lower than market prices). 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, with the price of subsidized gasoline essentially equal to market price. In Nizhnii Novgorod Oblast, on the other hand, subsidized fertilizer and fuel are cheaper, while leased tractors are more expensive. 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.

This price information is highly unreliable, as 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 subsidy programs. There is a strong need for a careful analytical assessment and revision of the existing support mechanisms.

### 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. It seems that cash shortages are forcing farms to substitute land and labor—the two cheapest factors of production—for some purchased inputs, 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.



### Further reading

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