

Economic Evaluation of Directions of State Support of Producers of Energy Capacities for Agriculture of Russia

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Abstract: *The main objective of the study is an objective economic assessment of the mechanisms of state support for producers of energy capacities for Russian agriculture. According to the results of the study, the article presents an in-depth analysis of the security of Russian agriculture with modern technology, the development of agricultural engineering, an assessment of the effectiveness of state support measures, and suggests key areas for stimulating the development of agricultural engineering in the context of the implementation of import substitution and food security. The following conclusions are formulated and justified: the formation of food security at the state level can be realized only under the condition of resource independence of the agricultural sector; the technological breakthrough observed in agriculture in recent years has become possible only under the condition of technical and technological modernization; dependence on imports of machinery and other productive resources does not allow the formation of a food security system, even if the state provides itself with food in bulk parameters.*

Keywords: *agricultural economics, technical modernization, energy efficiency of agriculture, state support of agricultural machinery.*

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I. THE MAIN PROVISIONS

The effectiveness of modern agricultural production financially dictates the vectors of technical and technological modernization to agricultural engineering. The need for the accuracy of technological operations creates demand for agricultural machinery, not only energy-intensive and productive, but also equipped with geolocation systems, precision farming and other digital farming systems, and this applies to both self-propelled and trailed equipment. The vector of import substitution and ensuring food security of the state requires agricultural engineering to master new market niches. All this is not possible without state support of both enterprises producing agricultural machinery, developing new models of it, mastering innovations, and without stimulating agricultural producers to modernize the equipment fleet and introduce new technologies. Within the framework of the State program of the direction (subprogram) "Technical modernization of the agro-industrial complex", it is advisable to assess the promising areas of agricultural engineering. In this regard, comprehensive support is needed both for agriculture and agricultural engineering in the direction of technical and technological modernization, in terms of reducing the energy intensity of production, and increasing economic efficiency. It is advisable to single out certain areas of support for the development of new technology that occupies new market niches, including in the development of export potential and the development of the Russian technology market in segments dominated by foreign companies.

II. INTRODUCTION

The formation of the basis for food security of the country is possible only with the intensive development of agricultural engineering. Moreover, this development should be comprehensive and develop all technological elements, as well as all cultivated crops. The peculiarity of Russia is a wide variety of types of agricultural products and conditions of its production. In this regard, the comprehensive development of agricultural machinery is of particular relevance, especially in the implementation of the policy of import substitution in the resource markets.



III. LITERATURE REVIEW

Theoretical sources for the development of the problem of formation of economic conditions for the development of agricultural machinery, as a supplier of energy capacity for agriculture were modern concepts, Federal and regional programs for the development of the industry, methods of economic evaluation of the effectiveness of the use of agricultural machinery. The issues of development of agricultural mechanical engineering is reflected in the writings: Suh K., Suh S., Walseth B., Bae J., Barker R. [1], Henning, N., Christianson S., Kofoed S [2], Graeme R. Quick, Wesley F. Buchele [3], Dong F., Hennessy D. A., Jensen H. H., Volpe R.J [4], Lapple, D. and Thorne, F. [5], Bekker, M. G., Collins R. A [6], N. D. Avarskiy [7], A. G. Papcov [8], V. V. Taran [9]. Problems of increase of efficiency of use of technical potential of agricultural organizations is investigated in the works of: Polukhin A.A., Alpatov A. V., Stavtsev A. N. [10, 11], Polukhin A. A., Lisutsenko N. N. [12] Alekseev, K. I., Miroshnikov A. G., Klimova S. P., Parfenov A. S., Fedotenkova O. A., Borkhunov N. A. Polshakova N. V. Altukhov A.V. [10], Yerseitova, A., Issakova, S., Jakisheva, L., Nauryzbekova, A., Moldasheva, A. 2018 [13]; Vlasov, A.I., Shakhnov, V.A., Filin, S.S., Krivoshein, A.I. [14]. As most scientists, we considered this problem from the standpoint of analyse comparability reasonmag support measures for agricultural engineering and target indicators implemented strategic development programs.

IV. PROPOSED METHODOLOGY

A. General description

Research is conducted in the framework of the thematic research plan of the FSBI Federal Research Center VNIIESH. The object of the study was the state support of agricultural machinery as a supplier of energy capacity for agricultural production. Sources of empirical information were official statistics, data from the National report on the implementation of the state Program 2013-2020, data from the Ministry of agriculture of the Russian Federation. The study is a logical continuation of the earlier work on the study of the organizational and economic mechanism of energy saving in agriculture [7, 9-12].

Mathematical and statistical data processing was carried out using generally accepted methods of economic analysis. The monographic method, methods of expert assessments, analysis and synthesis were used to substantiate the directions of development.

B. Algorithm

At the initial stage, a brief comparative analysis of the provision of agriculture in Russia and the EAEU countries with equipment was carried out. Further documents of strategic development of agriculture and agricultural engineering were studied, measures of support and indicators of development were estimated.

The impact of measures of state support of agricultural machinery on the development of the industry was assessed. Conclusions are presented and proposals for diversification of targeted support for agricultural machinery in Russia are substantiated.

V. RESULT ANALYSIS

Agricultural engineering is a key element in the development of agriculture, forming the energy capacity to perform technological operations in the production process. At the same time, in a number of segments of the agricultural machinery market, there is a technological lag and import dependence. Despite the openness of the agricultural machinery market, state support is the basis for the innovative development of the industry [7] such necessary resources include agricultural machinery that implements the full cycle of production and meets the necessary technological parameters, seeds and genetic material for livestock, plant protection products, veterinary drugs, fertilizers and fodder, as well as adequate professional requirements of human resources. Foreign authors pay special attention to the qualitative characteristics of agricultural machinery [1-3, 5, 6].

At the same time, the agricultural machinery industry is represented by 270 large and medium-sized enterprises with the number of employed about 31.3 thousand people. The high level of import dependence of equipment increases the cost of production and creates serious risks in the context of economic sanctions [8].

Russia lags behind not only the world leaders, but also Belarus and Kazakhstan in terms of security and energy availability. This is due to multiple reduction of the fleet of the main types of agricultural machinery (for the last 28 years the number of tractors decreased by 918 thousand units of grain harvesters decreased by 282 thousand units, forage harvesters fell by 102 thousand units).

As a result of the study of the implemented mechanisms of state support, we have identified its key elements and strategic documents. At the same time, it is important to realize that the strategy of import substitution should involve a gradual transition from the production of simple goods to science-intensive and high-tech products through the modernization of production and technologies. The most important regulatory legal acts in the implementation of programs of the state strategy of import substitution include:

- * Federal law No. 264-FZ of 29.12.2006 "on the development of agriculture".

- Strategy of development of agricultural mechanical engineering of Russia for the period up to 2030 (decree of the RF Government dated 07.07.2017, № 1455-R).

- * Export development strategy in the agricultural machinery industry for the period up to 2025 (RF Government decree No. 1876-R of 31.08.2017).

- Approval by Federal scientific and technical program of development of agriculture for the 2017 - 2025 year (decree of the RF Government dated 25.08.2017, No. 996).

In order to achieve the indicators of strategic development of agricultural machinery the following measures are implemented:

- Developed and approved the passport of the departmental project "Development of national component base for engineering industries" (approved by the minutes of the meeting of the coordinating body from 23.06.2017, No. 38-NG/02).

- Implemented the program of preferential crediting (the Russian Federation Government decree from 17.02.2018, No. 163 "About approval of Rules of provision of subsidies to Russian credit organisations on compensation of shortfalls in income on loans for the purchase of agricultural, road-building and municipal machinery and equipment for food and processing industry").

* The program of subsidizing producers of agricultural machinery is implemented within the framework of (RF Government resolution No. 1432 of 29.12.2012 "on approval Of the rules for granting subsidies to producers of agricultural machinery").

In the programme for 2019 budget has been increased from 2 billion rubles to 10 billion rubles.

- We believe an important element of the state support of development of agricultural machinery subsidizing of the cost of production and selling pilot batches of the means of production (decree of the RF Government dated 25.05.2017, No. 634).

- Loans at concessional interest rates (decree of the RF Government dated 17.02.2018, No. 163).

* An important factor in the innovative development and development of new market niches are subsidies to Russian organizations to compensate for part of the costs of research and development work in the framework of the implementation of complex investment projects by such organizations (RF Government resolution No. 1312 of 30.12.2013). Subsidies are provided to Russian producers to compensate up to 100% of R & d costs in the implementation of investment projects the cost of 100 million rubles, aimed at the creation of production import-substituting products [9, 15].

We also consider assistance in promoting agricultural machinery in foreign markets to be an important element of state support for agricultural machinery. Such measures

include:

- Subsidies to producers of high-tech products to offset some of the costs associated with certification of products in foreign markets (decree of the RF Government dated 17.12.2016, No. 1388).Subsidies are provided to Russian producers to compensate for up to 90% of the costs of certification of products exported.

- Subsidies from Federal budget for compensation of part of expenses on transportation of production (decree of the RF Government dated 26.04.2017, No. 496). Subsidies are provided to Russian producers to compensate up to 80% of the costs associated with the transportation of products to consumers located abroad (including CIS countries).

- Subsidies to Finance part of the costs associated with the participation of Russian enterprises in foreign exhibitions.; (decree of the RF Government dated 24.04.2017, No. 488). Subsidies are provided to Russian manufacturers to compensate up to 80% of the costs associated with the participation of enterprises in the exhibition events (the cost of transportation of products to the venue and back, rental of exhibition space, construction of stands) [15].

Analysis of the measures implemented and their impact on the development of agricultural machinery showed that despite the comprehensive approach of the state to support agricultural machinery, there are market segments for which there is dependence on foreign suppliers.

The analysis showed a number of systemic problems facing the agricultural machinery industry - despite the currently implemented in Russia unprecedented measures of state support for producers and consumers of agricultural machinery deficit is estimated at 35 - 45%. In Russia, agricultural machinery is quite developed, so table 1 presents a list of the main manufacturers of self-propelled agricultural machinery.

Table 1. List of Russian manufacturers of self-propelled agricultural machinery [10]

Type of equipment	Russian manufacturers
Tractors	Petersburg Tractor Plant JSC ASM-Altai LLC, Troitsky Tractor Plant LLC (Chelyabinsk Region), Altai Branch (Barnaul) Agrotekhmash CJSC VgTZ Tractor Company OJSC Sareks OJSC PO ELAZ, TD MTZ-EIAZ LLC, TD MTZ-Stavropol LLC, Buzuluksky Mechanical Plant OJSC, Continent LLC, Cherepovets Foundry-Mechanical Plant OJSC, Shimanov Machine-Building Plant Cranspetsburmash CJSC , Rubtsovsky Plant of Spare Parts, Special Equipment LLC
Combine harvesters	LLC "Combine Plant" Rostselmash "LLC" VKZ ", CJSC JV" Bryanskselmash "CJSC" Shimanovsky Machine-Building Plant "Kranspetsburmash"
Forage harvesters	LLC Combine Plant Rostselmash CJSC JV Bryanskselmash CJSC Shimanov Machine-Building Plant Kranspetsburmash

In 37 regions, Russian and foreign models of tractors are assembled in Russia, with a large share of the large-unit assembly of Belarusian models. The total annual production of tractors does not exceed 8 thousand units. A similar situation is observed in the market and other major types of agricultural machinery. We point out that the production of self-propelled sugar beet and potato harvesters of Russian brands in the country is not carried out, which indicates the technical and technological dependence of these sectors. If we talk about agricultural machinery production in the EAEU

countries, the key role of Belarusian tractor manufacturers should be noted (MTZ-HOLDING - Minsk Tractor Plant, Bobruisk Tractor Parts and Units Plant, Smorgon Aggregate Plant, Mozyr Machine-Building Plant, "Minsk Gear Plant", "Vitebsk Tractor Spare Parts Plant", "Gomel Hydroprivod Plant"), which dominate the market, and manufacturers of grain and forage harvesters (OJSC "Gomselmash").



We also note that in the republics of Kazakhstan and Kyrgyzstan there is also the production of self-propelled agricultural machinery (Semipalatinsk Automobile Assembly Plant LLP, Agrotechmash LLP,

AgromashHolding JSC Vector Combine Plant LLP, Ak-Zhol Niva 2 Joint Russian-Kyrgyz Enterprise ") [7, 8, 10]. Table 2 presents a list of the main manufacturers of trailed and mounted agricultural equipment.

Table 2. List of Russian manufacturers of trailed and mounted agricultural machinery

Type of equipment	Russian manufacturers
Sprayers, spreaders	Eurotehnika JSC NPF Belagrospetsmash LLC Pegas-Agro LLC Kormmash LLC Salskselmash LLC Taospectrum
Seeders, sowing complexes	Eurotehnika JSC, Agro LLC, John Deer Rus LLC, Millerovoselmash OJSC AO Petrovskoe Repair and Engineering Enterprise Selmash LLC SibzavodAgro LLC Belgorod Plant RITM PC CJSC PK "Yaroslavich" OJSC "Agricultural equipment" LLC PPP "BearingMash"
Mowers, balers, rakes	JSC "Clever", LLC "Navigator-New Machine Building" LLC "Bezhetskselmash Plant" LLC "Krasnokamsk Mechanical Repair Plant FSUE" Omsk Experimental Plant "CJSC Tekhma"
Soil-cultivating equipment, cultivators, plows, harrows	PK Agromaster LLC, Rubtsovsky Spare Parts CJSC, Agrocenter LLC, GOLAZ OJSC AZSM JSC, Agropromtehnika Kirov John Deere Rus LLC, LLC "BDM-Agro", LLC "DIAS" LLC "Plant Bezhekskselmash" LLC "Promzapchast" LLC "PromAgroTehnologii" LLC "Kanmash AGRO" JSC Repair and technical enterprise "Petrovsky" LLC "Selmash" CJSC "COMZ-Export" FSUE "Omsk experimental plant "New Ton LLC" JSC "Kormmash" CJSC "Dorozhnik" JSC "Gryazinsky cultivator plant" JSC "Belinskselemash" JSC "Belagromash-Ser EC of the VM Ryazanova "CJSC" PC "Yaroslavich" OJSC "Agriculture" OJSC "Agropromtehnika" Stavropol Territory CJSC "Logia"
Loaders	LLC Agrocenter LLC Big Earth LLC Salskselmash LLC Bashselmash LLC
Potato harvesters, conveyors, sorters	Kolnag LLC

The described situation indicates that at present there are no machine-building enterprises of agricultural machinery in Russia that are able in the short term to meet the country's demand for high-quality modern equipment using digital technologies that meet the requirements of precision farming at competitive prices on the market. Table 3 presents a list of Russian manufacturers of stationary agricultural equipment.

and technologies developed and adapted to the existing climatic and soil conditions in Russia. Implementation of projects on localization of individual units of imported agricultural machinery, not adapted for use within a single system of machines will not fully contribute to the growth of competitiveness and export orientation of domestic agricultural products, can be considered as a risk factor for food security under sanctions [9, 11, 15-17].

Table 3. List of Russian manufacturers of stationary agricultural equipment [11]

Type of equipment	Russian manufacturers
Elevators, grain cleaning equipment, grain dryers, grain pre-treatment machines, bins, grain throwers	PJSC "Melinvest" JSC "Kuzembetyevsky mechanical repair plant" LLC "Voronezhselmash" LLC "OKB on heat generators" LLC "ROMAKS" LLC "Technograd" LLC "Voronezh Agricultural Machines Plant" LLC "Corporation" SKESS "LLC SEZ" Triumph "
Shredders-distributors of feeds, mixers-distributors of feeds, manure conveyors	Intensive Technologies LLC Remmash JSC
Installations for milk cooling	LLC Dairy Technologies LLC Almazselmash LLC NPP Energia"

*The author's data

It is important to note that the agricultural machinery used in the country should be part of a unified system of machines

VI. CONCLUSION

The Efficiency of modern agricultural production financial dictates agricultural engineering vectors technical and technological modernization. The need for accuracy of technological operations creates a demand for agricultural machinery, not only energy-intensive and productive, but also equipped with geolocation systems, precision agriculture and other systems of digital agriculture, and this applies to both self-propelled and trailed equipment. The vector of import substitution and ensuring food security of the state requires agricultural machinery to develop new market niches. All this is not possible without the state support of enterprises producing agricultural machinery, developing new models of it, mastering innovations, and without stimulating agricultural producers to modernize the fleet of equipment and the introduction of new technologies. Within the framework of the State program of the direction (subprogram)"



Technical modernization of agriculture " it is advisable to assess the promising areas of development of agricultural machinery. In this regard, it is necessary to provide comprehensive support for both agriculture and agricultural engineering in the direction of technical and technological modernization, in terms of reducing energy intensity of production, and increasing economic efficiency. It is advisable to identify separate areas of support for the development of new technology, occupying new market niches, including in the development of export potential and development of the Russian market of equipment in the segments of domination of foreign companies.

It should be noted that the measures taken by the state support of agricultural machinery have a significant impact on the development of energy capacity producers, which forms the basis for improving their competitiveness in the domestic and foreign markets. However, in our opinion, it is necessary to create conditions for the development of agricultural machinery production in market niches insufficiently mastered by Russian producers, first of all: equipment for precision agriculture and digital production, equipment for livestock, harvesting equipment for tilled crops.

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