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Mechanization of Agricultural Production of The Republic of Kazakhstan

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Abstract

Nowadays, the mechanization of production process has led to economic crises especially in the agricultural sector. These crises bring to the agenda that states can not provide effective financial support to the whole agricultural sector. For this reason, in order to ensure economic stability of the states and later support for all sectors, it will be appropriate to develop agricultural complexes in a sustainable manner, especially in the rural areas by developing appropriate site and production techniques. Because the inability to keep pace with the development of the market economy and the inadequate implementation of the reforms constitute the first phase of the systematic crisis in the production of local agricultural products. In this study, problems related to commercial structures and technical support problems in Kazakhstan's agriculture sector, direct investments in production of agricultural products and fixed assets, almost all depreciation charges and profit margin were handled as literature review. Within the scope of the study it was determined that the technical data continued to fall and those who live in rural areas should be provided with support to purchase new equipment and new production factors in order to solve technical support problems.

Keywords: *Economics, agricultural service, productivity, development, improvement.*

Kazakistan Cumhuriyetinin Tarımsal Üretim Mekanizması

Öz

Günümüzde, üretim süreçlerinin makineleşmesi özellikle tarım sektöründeki ekonomik krizlerin yaşanmasına sebep olmuştur. Bu krizler devletlerin tarım sektörünün tümüne etkili mali destek sağlayamamasını gündeme getirmektedir. Bu sebeple devletlerin ekonomik istikrarı sağlanmak ve daha sonrasında da tüm sektörlere destek oluşturması açısından tarımsal kompleksleri sürdürülebilir biçimde uygun yer ve üretim tekniklerini geliştirerek özellikle kırsal bölgelere konuşlandırması uygun olacaktır. Çünkü piyasa ekonomisinin gelişimine ayak uydurulamaması ve reformların yeterli olarak uygulanamaması, yerel tarımsal ürünlerin üretimde sistematik krizilerin ilk aşamasını oluşturmaktadır. Bu çalışmada da Kazakistan'ın tarım sektöründeki ticari yapıları ve teknik destek problemleri, tarımsal ürünlerim imalatı ve sabit sermayeye yapılan doğrudan yatırımlar, hemen hemen tüm amortisman giderleri ve kar marjı ile ilgili sorunlar literatür taraması şeklinde ele alınmıştır. Çalışma kapsamında teknik verilerin düşmeye devam ettiği, kırsal bölgelerde yaşayanlara teknik destek sorunlarını çözmek adına yeni donanım ve yeni üretim faktörlerini satın alacak desteklerin verilmesi gerektiği saptanmıştır.

Anahtar Kelimeler: *Ekonomi, tarımsal hizmet, verimlilik, gelişme, iyileştirme.*

1. INTRODUCTION

The development of agricultural services structures, as form of concentration of production and capital, creates the necessary conditions for the output of the agricultural sector from the crisis. For this purpose the country were created machine-technological stations providing agronomic service. However, their development by

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considerable difficulties caused by the lack of sufficient financial resources was accompanied, insufficient economic analysis of the activity of machine-technological stations, which affected the increase in the value of their work the low solvency of agricultural producers. In this regard, a number of existing machine-technological stations failed to show satisfactory results.

Agricultural economics or agronomics is an applied field of economics concerned with the application of economic theory in optimizing the production and distribution of food and fibre—a discipline known as agronomics (Fox, 1987). Agronomics was a branch of economics that specifically dealt with land usage. It focused on maximizing the crop yield while maintaining a good soil ecosystem (Gardner, 2001). Throughout the 20th century the discipline expanded and the current scope of the discipline is much broader (Ford Runge, 2008). Agricultural economics today includes a variety of applied areas, having considerable overlap with conventional economics (Sumner et al., 2010).

Demand for agricultural crops is expected to double as the world's population reaches 9.1 billion by 2050. Increasing the quantity and quality of food in response to growing demand will require increased agricultural productivity. Good agricultural practices, often in combination with effective input use, are one of the best ways to increase smallholder productivity. Many agribusinesss are building sustainable supply chains to increase production and improve quality (International Finance Corporation, 2013).

Currently, the crises in the agricultural sector are particularly affected by the mechanization of production processes. In conditions when the state is unable to provide effective financial support to the entire agriculture sector, one of the most important tasks of stabilization, and then growth and technical support of agriculture is the development of production and technical service, able everywhere to become intensive agricultural products, a reliable partner of the villagers in the cultivation and processing of agricultural crops.

Studying foreign scientific developments of scientists of Reuben Robertson, Seithroy Edwards, Gale Da Silva, Helena Tomas, Leroy Jackson of agro service in the modern period of development of agricultural production, we can assume that the production-technical service in the agricultural sector is agricultural services institutions and is a priority providing a wide range of production and technical and other services to farmers on a contractual basis, which includes functional, serving and providing the blocks from the initial to the final operation of the production cycle. Blocks in turn contain mechanized, procurement, information and marketing, legal, staffing, communication, infrastructure etc. the functions of production, processing, storage and marketing of agricultural products (Robertson et al., 2012).

The specific role of production-technical service in the agricultural sector is manifested in the acceleration of development of productive forces; raising the level of efficiency of services and development of economic relations in AC (agricultural complex); the deepening and expansion of scientific-technical progress in agricultural

production; ensure continuity in the efficient production of agro product and rational use of available technical resources; the strengthening of processes of specialization, concentration and integration of production; the acceleration of economic turnover; the reduction of production costs of agricultural producers that use production-technical service agro service structures.

One of the directions of improvement of the development of production-technical service in the agricultural sector is the widespread use of preferential agro leasing basics allowing you to develop and distribute new intensive technologies and increase the efficiency of agricultural production. The system of leasing in agriculture requires improvement of the mechanism of state regulation (Zharekeshov N.B, Saduakasova K.Zh., 2003).

State support in the market conditions and of the diversity of the agricultural sector is necessary because it is important not to destroy but to maintain the production and technical potential. Therefore, the problem of development of agricultural leasing as a mechanism of improvement of the development of production-technical service in the agricultural sector is a key issue.

Thus, improving the development of production-technical service in the agricultural sector is an important factor for stabilization and sustained growth in agricultural production, transfer of agricultural sector to a modern industrial basis.

2. METHODS and APPROACHES

Theoretical issues of the development of production and technical services in different periods were developed in the works of domestic and foreign economists, such as Zh. K. Abdrashev, G.S. Baimuhamedova. Much attention is paid to the issues of financing the acquisition of technical means in market conditions, in particular, the development of leasing. Various aspects of leasing relationships are devoted to the research of scientists N.M.Vasilyeva, E.V. Kabatova. Appreciating their contribution to the development of this problem, it should be noted that in the modern economy, additional research is needed to develop production and technical services in the agricultural sector.

Reforming the agrarian sector of economy in regions of the country began with a radical change of the organizational-economic mechanism of functioning of agricultural production in general. The analysis suggests that the overall result of the economic reform technical means in the agricultural sector for the period in 1995 through 2015 were negative. The presence of all types of agricultural machinery amounted to in 2015 in the range of 6-9% in relation to 1991 (Baymuhamedova G.S., 2005). Given the fact that in recent years, the upgrading of technical equipment of agrarian sector of Kazakhstan occurred in small amounts, it can be assumed that near the critical moment, when the rural producers will not be able to perform its functions.

The existing low level of technical resources, which is a major deterrent to the development of agricultural production, proves the necessity of functioning of the

various organizational forms effective structures of production and technical service in the agricultural sector.

The most promising are two machine-technological stations models running:

- in the agricultural and industrial companies (agribusiness, agricultural factories, etc.) performing a complete cycle of agricultural production;
- on the contract, perform agro-technical works and services of production-technical service for agricultural producers (Abdrashev Zh.K., 2005).

Typical representative of the first model in the thesis is the machine-technological stations "AgroServiceYassy" South Kazakhstan Region, which is part of the regional Agroholding JSC "Yassy", which is at the moment the group of companies containing the two cotton processing plant, the butter factory, the trading company purchasing and selling cotton and the network of petrol stations in South Kazakhstan region. In machine-technological stations "AgroServiceYassy" profitability of cotton production in 2015 above 1.9 times and equipment used 1.4 times more effective than AE (agricultural enterprise) "Ak makta". Performance of machine-technological stations equipment for the analyzed period exceeds, than the farms and the output of reference 1 tractor 34% and seasonal production of 1 cotton harvesters 48% higher (Table 1).

Table 1. Efficiency of production and technical activities of MACHINE-TECHNOLOGICAL STATIONS in comparison with AE South Kazakhstan region of cotton production in 2015.

Indicators	Single change	MACHINE-TECHNOLOGICAL STATIONS "Agro Service Yassy"	AE "Ak makta"	Efficiency of MACHINE-TECHNOLOGICAL STATIONS , % (+) above (-) below
Sown area	Ha	1	1	
Yield	kg/ha	25	17	+47
Cotton production	T.	2,5	1,7	
Seasonal production ha1 harvester	ha	370	250	+48
The output of 1.FL.tractor	FL.ha	1100	820	+34
Cleaning of cotton at the rate of 1 processor	kt.	4,6	3,2	+43
Coeff. land use	%	0,87	0,64	+36
Watering the planting area	cubic meters	10	18	-80
The cost of cotton for 1 t	thousand tenge	31,68	38,2	-20,5
Cost to implement per 1 ton of cotton	thousand tenge	41	44	-7,3
Industries costs per 1 ha.	thousand tenge	79,2	64,9	
The cost of cotton 1 ha.	thousand tenge	102,5	74,8	
The profit from 1 ha.	thousand tenge	23,3	9,9	
Profitability	%	29,4	15,2	93,4

Note: calculated by the author based on materials of the Department of agriculture of the SKR (www.stat.gov.kz)

Increase the production of tractors and combines was facilitated by the presence of machine-technological stations "AgroServiceYassy" a large number of foreign technologies, showing that machine-technological stations is the conductor of the foreign testing of high-performance agricultural machinery to the domestic agro-climatic conditions. In this regard, machine-technological stations have obvious advantages from the point of view of efficiency of investments in development of technical base of agricultural production.

Our analysis allows drawing a conclusion about the need for the rational use of a limited number of machines, concentrating them in machine-technological stations. First and foremost, this allows for certain types of products of agriculture and animal husbandry based on intensive and resource-saving technologies to gain the maximum increase in production. Second, it provides high performance use of agricultural machinery, as evidenced by the work of analyzed machine-technological stations. Third, to focus the technical capabilities to run the most critical and energy intensive field work, especially in farms that are not able to perform them without assistance. In the fourth, thoroughly to ease the social situation of workers of those farms those are not able to produce agricultural products in connection with the difficulties of the implementation of the Finance-intensive mechanized works.

The most cost-effective ways out of this crisis situation for the future are:

- the use of highly reliable and high-performance new generation of technology through agricultural services structure, ensuring the development of new highly profitable technologies of production of agricultural products;
    - ✓ To establish new and support established an effective agricultural services structures of production-technical service agricultural production as machine-technological stations.
    - ✓ To ensure the effectiveness of resource supply industries need to have a program of state support for technical support of agriculture, which currently needs to be improved with respect to the mechanism, forms and methods of effective development of agricultural production.

3. SUMMARY

The agricultural services structures equipment production-technical service necessary technical resources is a major parameter that influences the performance of their production and technical activities. The efficiency of the production-technical service can be obtained only in the case where it will have the total calculated composition of tractors, harvesters, agricultural machinery and vehicles. To this end, we determined the minimum acceptable level of availability of equipment and the forecast of the expected period of coverage, availability of technical means to its normal level.

To calculate the required composition of the agricultural equipment we used the basic principles of optimization of structure of technical resources. According to the principle of information and regulatory justification of the composition technique we

calculated that the required regulatory number of tractors in the reference units in 2015 is – 7462. Gaps in the number of agricultural machinery in the coming years are unrealistic. In this connection it is expedient the structure of production adapted to the technical conditions and capabilities of the producers. As a result of studies to determine the relationship between number of vehicles and the analyzed period of the applied method of correlation-regression analysis of agricultural machinery with finding the main statistical indicators: the correlation coefficient of the regression equation. Agro-food program determined that one of the priority directions of development of agrarian sector of Kazakhstan is the development of cotton, so the solution to this problem we consider the example of cotton pickers.

It can be assumed that the pattern of changes in the volume of services production-technical service dynamics is expressed by the regression equation.

$Km = a + b^* Y$, (1)

where Km is the number of equipment pieces;

Y - serial number year for which you are defining the number of equipment;

a, b – coefficients of the regression equation.

To determine the coefficients a and b need to solve a system of two normal equations with two unknowns using calculated values:

$$na + в \sum Г = \sum K_m \quad (2)$$

$$a\sum Г + в \sum Г^2 = \sum K_m Г \quad (3)$$

where n- the volume of production, m = 15 year. Km = 14630.

$$YKm = \frac{\Delta Km * \Delta Г}{\sigma\Delta Г * \sigma\Delta Km} = \frac{3647}{4,5*932} = \frac{3647}{4194} = 0,87 \quad (4)$$

As a result of calculations we get the regression equation Km = 975 - 195 Г

In 2015, the amount of arable land in the cotton agriculture of Kazakhstan amounted to 200,1 thousand hectares. According to the established regulatory load required needs in cotton harvesters of Kazakhstan, 13.8 thousand pieces on 1 hectare, we find that we need 200,1 * 13,8 = 3024 units. Using these, determine the number of years of coverage needs in engineering, substitute into the equation 3024 = 975-195 Y. It has been estimated that the optimization principle of defining the minimum availability of agricultural machinery at maximum load for one car, determined that it would take 10 years to make up for lack of technique to the normal level of provision for cotton harvesters. Therefore, to create and strengthen the technical base of the Agroservice structures of production-technical service state support is necessary for the provision of preferential Agroleasing services for the purchase of agricultural machinery.

In order to improve state support of production-technical service agricultural sector, we have developed and proposed a phased program, allowing equipment

agricultural services structures the necessary technical means by improving the Agro leasing, which lists the main provisions of this program.

To solve the above tasks in the first phase of the proposed regional state program of development of technical support to production-technical service in the agricultural sector in 2015-2018, where it is assumed to implement a series of effective measures, promote the agricultural sector needs agricultural machinery and complex production and technical services that must be implemented as soon as possible. In the framework of this program the article describes the recommended optimal amount of agricultural equipment in South-Kazakhstan oblast in 2013 to achieve the highest results when processed amounts of arable land and recommended the state program of development of leasing in agriculture "Equipment for the villages of Kazakhstan" for the years 2016-2019, providing leasing borrowed funds in the form of state support for the purchase of agricultural equipment (Table 2).

Table 2. Recommended prospects for funding to leasing companies under the program "Technique for the village SKR" for 2016-2019 yy

№	Name of agricultural equipment	The price of units. thousand Teng	The presence of a one	Standarts thousand.ha	Pos. area, thousand.ha	The necessary units.	Lacking units	The total amount of million	The amount of the cost of equipment by years, mln tenge			
									2014	2015	2016	2017
1	Combine harvesters	1100	435	6,06	205	1242	807	887	221	221	221	224
2	Cotton harvesters	1600	104	13,8	196,4	2710	2606	4169	1042	1042	1042	1044
3	Cultivator	407	250	10,6	672	7123	6873	2797	690	690	690	727
4	Tractor trailers	195	957	5,8	672	3897	2940	573,2	143	143	143	144
5	Seeder	512	356	5,9	672	3964	3608	1847	461	461	461	464
6	Attachments tractor	727	-		672	16	16	11,6	2,5	2,5	2,5	4,1
7	Stand	910	-		672	8	8	7,2	1,8	1,8	1,8	1,8
8	Sprayer	650	-		672	20	20	13	3,25	3,25	3,25	3,25
	Totally							10305	2564	2565	2564	2612

Note: calculated by the author on materials of the Department of agriculture

Such financial state support of agricultural producers on the terms of leasing in agriculture should contribute to the reduction of the share of foreign firms in the market of grain and cotton harvesting equipment by purchasing on the conditions of the state lease only domestic agricultural machinery. The necessary funding can be reduced, concentrating the optimal number of vehicles in the Agroservice centers production-technical service.

To ensure normal activities resource supply industries in the second stage of the proposed implementation of the program of technical support to the agricultural sector for the years 2016-2019. It is expected to improve the status of production-technical service through the establishment of agro-service centers on the basis of Agro leasing as one of the main directions of introduction of progressive technologies and increase agricultural production. Improving the development of agricultural leasing will allow you to create a wide network of services of the leasing companies, which will increase their competitiveness in the market of technical resources.

In the second phase of the state program of the proposed system of compensation of acquisition of agricultural machinery agricultural services centers production-technical service. A uniform compensation payment includes the current cost of production of agricultural machinery and its acquisition using Agro leasing mechanism. A compensatory mechanism of regulation of the markets creates the most solid Foundation for the development of infrastructure of agricultural production, such as: the organization of dealer and distributor networks, technical support of modern non-state leasing companies and the creation of other market institutions technical resources.

Therefore, services providing equipment on farm loans is one of the most effective measures of state support for agriculture and machinery manufacturers.

Improvement development of production-technical service in the agricultural sector due to the creation of a favorable organizational and economic conditions for functioning of various forms of Agroservice structures of production-technical service as a major manufacturer of a wide range of production and technical services in agriculture.

The advantages of the Agroservice centre production-technical service from the existing machine-technological stations is that:

- depending on the volume of services of production-technical service and increase the economic potential of possible bias in the direction of its specialization as technologies of cultivation of certain crops and activities. This will allow the most efficient use of technology, labor resources; reduce the cost of production-technical service, which will contribute to the increase in demand on the part of the villagers;
- agro-service centre can not only increase the number of mechanized brigades to determine their specialization, but also to create new divisions of production-technical service, that is, to expand the area of its production and technical

activities of the units, so the development of the projects of the Agroservice centre should also be pursued on the basis of multifunctional machine-technological stations with developed industrial activity, requires the creation of new objects and renovation of existing ones.

Thus, the proposed methods of improving the development of production-technical service in the agricultural sector are promising ways of enhancing the capacities of agricultural production, which creates the condition for the production of vital for companies of agricultural products, with stable and guaranteed sales on the domestic and foreign markets. The spectrum of problems shows that, despite some adverse conditions, it in the planning period is a fairly reliable way of raising the technical support to the agricultural sector and the overall agricultural production.

4. DISCUSSION

On the basis of economic growth achieved economic and social progress. At the same time, the challenge is to balance the economy, priority development of the processing industry, agricultural sector and infrastructure. Quality growth in agriculture depends on its maintenance. The government of the Republic of Kazakhstan set the task of improving the system of technical support of agricultural production. In connection with the main task of the state our research on improving the production and technical service in agrarian sector, as factor of development of technical support of agricultural production, led to a number of conclusions and proposals:

1) In connection with the impossibility of possession in the market conditions is absolutely accurate information about the conditions of implementation of the us production-technical service defines its essence as a form of interaction of agricultural producers and agricultural structures, which are on the one hand, consumers of technical equipment, with other manufacturers production and technical services. Agricultural services structure of production-technical service has highly skilled mechanical personnel, service and use advanced technology. The service consists of functional, providing supports and blocks, each of which represents a system evolving according to its specific laws. The main aims of the production-technical service are currently associated with the selection of effective markets for its services in the agricultural sector and maximize profits.
2) The objective of the development cost of mutually beneficial relations of the Agroservice enterprises, production-technical service and agricultural producers is a pressing problem at this time. Developed in the work of a promising scheme, agricultural production-technical service allows you to pre-determine the economic parameters of the effectiveness of the use of production-technical service to reflect changes in production costs, yields and current market prices for agricultural products. Thanks to this scheme, agricultural producers will have a real opportunity to choose the best

performers, production-technical service considering the price and quality of service.

3) The main condition of improvement of the development of production-technical service in the agricultural sector is the formation of an effective production-technical service in Agroservice structures. In order to work:
   - recommended effective organizational and functional structure of the production-technical service, which issued the basic conditions as the basis for their cost-effective operation;
   - the effective way of functioning Agroservice structures with the specification economic and technological environment of marketing services production-technical service;
   - proposed measures to reduce the cost of services production-technical service.
4) The choice of rational organizational-legal form, which is one of the basic conditions for satisfactory development of production-technical service in the agricultural sector due to the options for the establishment of machine-technological stations and the sources of their technical base. Carried out analysis shows that the most promising may be the machine-technological stations of the two models employed in the agricultural and industrial companies (agribusiness, agricultural factories, etc.) performing a complete cycle of agricultural production on the example of machine-technological stations "Agroservice" and on contract performing the services of production-technical service on orders of agricultural producers on the example of machine-technological stations "Farmers" in South Kazakhstan region.
5) Improving the development of production-technical service in the agricultural sector should be linked with the principles of the optimization of a rational structure of technical resources that explore the condition and the level of technical means in each case of agricultural production. For these purposes, the estimation of the quantitative composition of the technical Park farms SKR, is determined by the technological deficit of tractors and the optimal number of required agricultural services structures machinery to achieve the highest results when processed amounts of arable land.
6) Developed and proposed a phased program of state support to production-technical service in the agricultural sector, allowing equipment agricultural services structures the necessary technical means by improving the Agroleasing, which lists the main provisions of this program.

In the framework of these programs calculated the prospects for funding for the purchase of the optimal number of machines for the efficient functioning of agricultural services of the centre; establish the rules of rational use of budget funds, the mechanism of financial regulation perspective of leasing in agriculture with a clear definition of the subjects of the relationship, the proposed compensation system of

state purchase of agricultural equipment agro-service centres production-technical service.

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