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From machines in clusters in the agricultural sector system effective use

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Abstract. The article discusses the issues and a number of technical recommendations for the effective use of existing agricultural and reclamation equipment available in the clusters of the republic, as well as the prospects for their development for large-scale use in the implementation of technological processes and those technical problems that may arise during operation and ways to eliminate them in production conditions. A number of irreplaceable technical recommendations are given for the modernization of machine and mechanism designs, improvement of reliability indicators, i.e. work without breakdowns, the strength of parts during manufacture, their resistance to friction, wear resistance, maintainability, storage, diagnostics, maintenance and repair, adaptation to storage and increase of technical resources, further increase of their resource conservation.

1. Introduction

Since ancient times, our farmers have been using the phrases: "If you have tools, your work will be less" and "Technician-farmer's iron "wing"" have been used. These phrases are the motto of our engineers-mechanics, mechanizers, and watermen who are directly involved in the mechanization of agriculture and water management. Because our techniques are the factors that make it possible to perform their heavy, manual work with tools such as a hoe, shovel, ax, hoe, machine, mechanism, unit and other technological processes correctly, qualitatively and within the terms specified in agrotechnical maps, cheaply and increase productivity.

Over the past three years, improving and preparing machines, mechanisms, aggregates and work equipment used by farmers, farmers, water farms, owners of private farms and greenhouses with large land areas in the agrarian system of the Republic, creation of a stable system of delivery to farms with the help of preferential loans and subsidies, technical maintenance and repair of machines and mechanisms, increasing their resource efficiency and fully implementing maintenance, as well as ensuring the achievement of the harmonization of science and production in order to create a system of exemplary technical service centers in the districts and regions of our Republic, serious attention was paid to research institute laboratories, departments of higher education institutions, and necessary state grants to carry out scientific research in this field, to attract young researchers, researchers to this field is paying great attention.



2. Materials and methods

There are a total of 77,554 farms in the agrarian system of Uzbekistan, the average land area of which is 48.1 hectares. Farms have 261,600 pieces of agricultural machinery, including 4% of machinery in the tractor fleet of JSC "Uzagroservis", 27% are attached to the machine-tractor fleet, 6% are private and legal entities, and 62.9% are widely used in farms.

In 2021, more than 33,900 machines were delivered to agricultural producers. Their cost was reduced by 20%. Also, on the initiative of Russia, China, Germany, Turkey and other countries, long-term preferential loans were introduced, joint ventures were established, preferential loans were allocated and subsidies were given. Up to 80% of the road expenses are allocated by the State in order to deliver the equipment to the repair workshops.

In addition to the provision of modern equipment meeting international standards in our republic in the next two years, 20.9 percent of them are used for 20 years, 18.5 percent for 16-20 years, and 25 percent for more than 15 years. Also, based on the plans to provide agricultural farms with machinery in 2020-2030, 27,900 units of agricultural machinery will be produced in 2021, and 32,700 units of agricultural machinery in 2028 at the enterprises of "Uzagrotexsanoatholding" JSC. [1].

The analysis of the service life of agricultural machinery shows that 65.4 percent of agricultural machinery has been in service for more than 10 years, and 44,100 units or 16.9 percent of agricultural machinery are completely obsolete. Therefore, it remains a priority to provide farmers and peasant farms with high-quality, modern, cheap, reliable, resource-saving, agrotechnical and operational equipment. While increasing the efficiency of these works is supported by the State (preferential loans, price reduction, subsidies, payment of road expenses, etc.), timely maintenance of agricultural and land reclamation equipment delivered to farms for efficient and full use of technical resources, full compliance with the rules of technical processes, such as troubleshooting, repair and proper maintenance, imposes a great responsibility on farmers, peasant farms and employees of "DUKs". And these make it possible to extend the service life and make full use of the machine resource. The analysis of the use of techniques shows that 65% of the park of agricultural and land reclamation machinery is obsolete, economically ineffective and in need of urgent renewal. "Intelligent" machines, mechanisms and aggregates used in farms, farmers and water farms depend on the high adaptability of technical and reliability indicators (unbroken operation, accuracy, maintainability, maintainability). It enables the effective use of tractors, excavators, cotton pickers, seed drills, cultivators with these indicators, and full use of their resources [2].

Due to the above reasons, a number of systemic problems remain in equipping agriculture with modern and energy-saving, "Smart" agricultural, animal husbandry and land reclamation techniques adapted to use, use, repair, maintenance and diagnostics.

First of all, it is known from the Internet that in the districts of our Republic agricultural and reclamation machinery, as well as machine-tractor fleets, workshops and technical service material and technical base, equipment, equipment and machine tool fleets are outdated, unusable and measures to renew specifies the determination;

Secondly, since 65% of the agricultural equipment park is obsolete, it is economically inefficient and needs urgent renewal and repair;

Thirdly, the reason for this is the obsolescence of machine tools, equipment and facilities in the agricultural machinery manufacturing enterprises, and the low quality indicators of the finished machinery.

During the next 3 years in our republic, in the life of our people, in every aspect of the socio-economic and political spheres, among the great creativity and changes, the equipment and machinery in the agrarian system (farmers, farmers, water farms, farms and greenhouses with a large area) and "DUKs", mechanism, efficient use of pumps, full use of their resources, as recommended in the decisions and orders of the President, the Cabinet of Ministers, the minutes of the Councils and the "Roadmap" for the strategy and implementation until 2030, improving the techniques, providing them with technical service - repair workshops, areas for storage and other material - Meaningful work on the creation of technical centers is planned and promising developments are being created [3].

Decisions and Orders on the execution and implementation of these works until 2030 (PQ-5394 29.10.2018; PQ- 4268 04.04.2019; PQ-4410 31.07.2019; PF-5853 23.10.2019; PQ-4801 11.08.2020. and others) and there are instructions in the "Strategy of Actions" and it is planned to increase the average labor productivity in agriculture by 1.7 times and to reduce the costs of the mechanization program by 5.4% compared to the funds allocated for 2022.

On the basis of the decisions of the President and the Cabinet of Ministers, the mechanization of agriculture produced for systematic farms, the modernization and improvement of the constructions of the equipment to the world standards, the creation of material and equipment centers for their technical service, repair, diagnosis and maintenance, equipping with equipment and other problems. extensive work is being done [10-11].

According to the Resolution of the President of the Republic dated July 31, 2019 PQ-4410 - rapid development of agricultural machinery, providing farms in the agrarian system with equipment, state support, use, repair, full use of the resource of parts and aggregates, proper storage, extensive use of diagnostic processes, study and analyze transparently the problems of saving and reducing costs, fuel and spare parts, Recommendations and "Roadmaps" have been developed in the regions of our republic on the organization of technical service centers, turning them into model districts for the use of equipment, repair and diagnostics, and providing them with modern stationary auto workshops. Workers' councils and groups were formed in the republic, regions and districts (under the leadership of their leaders). Their activity is defined as permanent. The groups were tasked with learning, collecting data, analyzing and making recommendations in a short period of time to use the techniques correctly and transparently [4].

From the results of their study and analysis, it is known that in 2021 alone, more than 33.7 thousand agricultural and reclamation equipment were delivered to farms and cotton textile clusters. This means that compared to the previous 2020 indicator, it has increased by 1.5 times, and more than 12 percent of the equipment in our Republic has been updated. In the Republics of Russia and Kazakhstan, this figure is 3-5 percent.

The total number of machines available at the Koson, Nishon, Yakkabog and Kasbi subcontracting enterprises of the Kashkadarya region: 149, of which 141 are damaged, 5 are defective, 3 are unusable, excavators are 39, of which 31 are defective, 5 are defective, 3 are unusable, bulldozers 10 in total and 50 others. There are repairable machines and repair shops are needed to bring them back into working order. In the same way, machinery and tractor parks in Namangan, Andijan, Fergana and other regions need repair shops, technical service and mobile workshops [12].

If tractors, reclamation machines, agricultural, water aggregates, and machinery used in livestock farming are used lovingly, if they are efficiently saved and maintained, timely technical service is provided, and if repair work is performed in good quality, these farms will be efficient, full of resources, and many years old. We want to create an opportunity to improve the culture of our agriculture by reducing the amount of manpower and resources used. As a result, the productivity, efficiency, and productivity of farmers, peasants, and landowners in agriculture will increase, and agrotechnical works will be completed on time and with reduced costs. Therefore, it is necessary to increase the level of mechanization of agriculture and water management, to radically change the attitude towards cars, tractors, machinery, agricultural machinery in general, food, innovations and innovative technologies [9].

In the agrarian system of our republic, farmers, peasants, water farms, as well as landowners and large-area greenhouses will be provided with many simple and complex agricultural machinery, tractors and reclamation machines during the next 2.5-3.0 years. Their constructions are improved, and their reliability indicators: work without damage, accuracy of details, durability, wear and tear resistance, maintainability, maintainability, adaptability to diagnostics, maintenance, repair, storage, and the complexity of their constructions are becoming noticeable. In their design, new for our mechanized tractors, land reclamation and agricultural machines: a hydraulic system that activates the transmission, hydraulic control amplifiers, electronic measuring devices consisting of various sensors,

etc. To a certain extent, these lead to failure of units, mechanisms and details in different periods (due to different resources) and increase the amount of maintenance and repair works [4].

3. Results and discussion

More than 80 types of machines, aggregates and mechanisms are produced in the enterprises of JSC "Uzagrotexsanoatholding" (there are more than 70 of them in our republic) and they are widely used in farms of the agrarian sector of our republic. Farmers, peasants and water management mechanizers should produce and prepare constructions according to the wishes, desires and requirements of world standards. These are:

- improvement (modernization) of reliability and technical indicators of machines;
- improvement (increase) of agrotechnical parameters and indicators;
- creating machines that can control (monitor) agrotechnical parameters using a sensor and a combined system;
- machines designed by designers, created by technologists and prepared by machinists;
- adapted to eliminate malfunctions in field conditions;
- adapted to technological processes during repair;
- adapted to maintenance during storage, retrieval and storage;
- should be adapted to diagnostic (diagnostic) processes performed during maintenance, repair and storage.

Also, to improve the reliability indicators of machines and mechanisms in accordance with the wishes, desires and requirements of farmers, farmers and mechanists as follows, their operation without damage and their adaptation to the elimination of malfunctions in field conditions, the strength of details, resistance to friction and bending, reparability, and the elimination of malfunctions with less labor and time. is adaptation.

In addition, development of recommendations for workshops for the repair of agricultural, reclamation and animal husbandry machines, mechanisms and aggregates, workshops for the repair of machines with energy (engine, electric motor), workshops designed for the repair of small (simple) aggregates used in farmers and peasant farms and their preparation for the season, improving the work efficiency of workshops specializing in the repair and adjustment of hydraulic systems and electrical equipment, lubrication systems of machines used in land reclamation and agriculture [5].

In 2017-2030, the amount of machines and tractors that will appear in agricultural farms (by 2030, more than 32,700 agricultural machines will be produced in one year) will dramatically increase the amount of maintenance, repair, and maintenance work. However, as a result of the change of the economy of the Republic - meeting with the reformation, the maintenance and repair bases have decreased to a certain extent. These days, there are no specialized maintenance and repair bases, workshops, workshops, departments, storage areas and sheds, fuel and lubrication departments in the districts and regions of our Republic, and there are many places where they are adapted to perform other types of work. The "Scheduled-warning" complex control system for maintenance and repair of machines is broken. Service, repair, proper maintenance, diagnostics of quality equipment, the availability of regulatory and technical documents is broken and not used in farms in the field system. All this did not allow to use the equipment effectively and resources for many years (15-25 years) in the agrarian farms and reduced the culture of mechanization. [10]

In order for farmers, farmers, water farms to become "Smart farms", the constructions of the machines and mini-techniques they use are improved, conform to world standards, have high reliability indicators (operation without damage, durability, maintainability, maintainability), adapted to technical service, repair and maintainability, diagnostics. should be. At the same time, in order to ensure that the technical condition of the machines is always ready and ready for work, the presence of material and technical bases and technical centers and mobile workshops providing them with technical service in farms, district and regional territories is of great importance.

People can be at peace when they are healthy and well. Our peasants and farmers will be "healthy" only if the machines, mechanisms, aggregates and equipment they use are ready for work, adjusted

and usable. Only then, with the help of machines, he can fully and qualitatively fulfill the agrotechnical requirements and achieve the intended productivity plans. Therefore, material and technical centers consisting of departments for maintenance, repair, maintenance, diagnostics, restoration of detail resources of machines should be established in districts and regions.

There are many professions in the world, but the mechanic profession is considered the most honorable profession. Because he should be responsible for heavy field work performed by tractors, excavators, cotton pickers, combine harvesters, seeders and other machines and strive to achieve effective and full use of their resources. Therefore, attention should be paid to the above recommendations on improving the technical performance of machines, mechanisms, aggregates and pumps used in farms in agrarian sector systems [13].

4. Conclusions

1. Among the changes taking place in every aspect of the socio-economic and political spheres of our Republic in increasing the level of mechanization of work on agricultural farms, creating material and technical bases for improving machines, maintenance, repair, maintenance and diagnostics, and increasing farming culture, the agrarian sector in farms in the system (farmers, peasants, landowners, water farms and DUKs) full use of machine and mechanism resources, modernization of repair, maintenance, storage and diagnostic processes as recommended in the Presidential Decisions and Strategy of Actions, and the machines manufactured in the enterprises of "Uzagrotexsanoatkhol-ding" JSC and brought from abroad have a design that meets the requirements of farmers, farmers and water management should be. Also, at a time when a number of decisions and decrees of the President of the Republic on the mechanization of agriculture, improving the agrotechnical and reliability indicators of machines, the quality of their preparation, and the effective and full use of their resources have been issued and are being implemented, the scientific specialization held in our Republic the recommendations of our conferences and the actions, scientific developments, innovative technologies and proposals of our scientists should be aimed at the implementation of the President's Decisions.

2. In the faculties and departments of a number of higher educational institutions of our republic, research and educational work is being conducted and recommendations are being made in the direction of mechanization of the agricultural sector, improvement of agrotechnical and reliability indicators of machines. In particular, the Republican scientific and technical conference on the topic "Prospects of creating resource-saving innovative technology and technical tools in agriculture and their effective use" at the Karshi Institute of Engineering and Economics; Tashkent Institute of Irrigation and Agricultural Mechanization Engineers at MTU "For the Agro-Industrial Complex:

a) at the international scientific conferences on "Science, education, innovation, problems and prospects", the results of scientific research carried out in the departments of the institute in recent years were discussed, necessary, current developments, technologies and recommendations were given. The analysis of the lectures, conducted by our scientists, research students and young masters, and in accordance with the requirements of today's agro-industry farms and resource-saving innovative in the cultivation of agricultural products a number of developments and inventions have been created in the creation of technologies, they have been put into practice, and these results show the possibility of raising the agrarian sector to a new level.

b) we believe that recommendations on the problems of effective use of existing equipment, repair, maintenance and diagnostic technologies, establishment of technical service centers in farms, districts and regions should be applied to production.

3. Practical solutions and results of the given problems, rational and fully effective use of land, water, machinery and their resources in the strategy of agricultural development of our republic for 2020-2030, their improvement and technical service, repair in farms, districts and regions, it is necessary to provide for the creation of material and technical bases for storage and diagnostics, and to raise the issue of personnel, as well as the level of their material interest.

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