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THE IMPORTANCE OF ENERGY-EFFECTIVE, RESOURCE-EFFICIENT, SMALL-SIZED THREE-WHEEL TRACTORS IN AGRICULTURE

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Abstract: The article provides information on the importance of small three-wheeled tractors in agriculture.

Keywords: small three-wheeled tractor, small contour areas, small mechanization vehicle, maximum speed, nominal power, agrotechnical clearance.

Currently, the development of small-scale farmers' farms in our republic has created the need to develop new designs of energy-efficient tractors for small-scale farms and to justify their parameters. The difficulties of high-class tractors in performing technological processes such as plowing, chiseling, leveling, harrowing, etc. on small-contour areas lead to the incomplete implementation of these technological processes. [2,3].

This is considered one of the most pressing problems in implementing the agricultural development strategy in our country. At the same time, the number of small farms, tenants and other private entrepreneurs engaged in production activities on small land plots is increasing.

The volume of agricultural production in the world, in the conditions of peasant farms, homesteads and greenhouses, is rapidly increasing. “ Considering that in the world more than 280 million hectares of irrigated land are cultivated with agricultural crops, and that about 10 percent of these lands are small-scale field contours,” small-scale landowners feel the need for small-scale tractors, small-scale mechanization vehicles (SMV), in their production activities. However, due to the lack of small-scale tractors and their incomplete participation in state tests, agrotechnical activities in small fields are



carried out using traditional large-scale equipment or scientifically unfounded artificial devices. This, in turn, leads to an increase in labor, fuel consumption, product cost and other costs. In this regard, the creation, evaluation and introduction of small-scale, compact, and inexpensive SMTs is of great importance.

Research and development work is being carried out in the world on the issues of creating new models of CCTs, preparing industrial copies, conducting state and field tests, and commercialization . In particular, in this area, targeted research and development work is being carried out to reduce the costs and terms of testing new CCTs, as well as to improve their quality and efficiency .

Currently , farms and the agricultural sector in general are receiving comprehensive support from our state, creating all the necessary conditions and opportunities for them. High efficiency in agriculture largely depends on the provision of modern equipment to the sector and the level of their effective use.

At the same time, 50 thousand hectares of land have been converted into gardens in the Republic over the past four years. Of these, 14 thousand hectares are intensive gardens. In these gardens, soil-cultivating tractors, tree and crop care machines, and mini-machinery are very necessary. The level of mechanization of gardening and vegetable growing in the Republic is 40-45 percent. Planting seedlings, pruning trees, and maintenance are almost always carried out manually. The use of energy-saving machines in gardening is currently one of the urgent tasks. **In our republic** , there has been insufficient research into the working process and justification of the parameters of energy-efficient tractors for cultivating soil on small-contour areas and cultivating horticultural crops .

Therefore, there is a need in agriculture to use small-sized, fuel-efficient tractors with high maneuverability on small-contour areas.

The demand for small-sized tractors has been increasing over the past 10 years. There is a need for these tractors and aggregates in small-scale farms and farms, as their mobility has made them widely available.



Table 1 briefly describes the general characteristics of small-sized tractors. It also lists the design mass and nominal power of these vehicles.

Table 1.

KHT type	Construction Mass +15% kg	Nominal Power, kW	Maximum speed km/h		Between the wheels distance, mm	Agrotechnician slot, mm
			worker	transportation		
KHT (single-axle motoblocks)						
Light	Up to 70	Up to 3	6	15	700	130
Medium	Up to 100	Up to 5				150
Heavy	Above 100	Above 5				300
KHT (two-axis)						
Light	Up to 500	Up to 10	6	15	800	300
Medium	Up to 650	Up to 14	6	25	800	300
Heavy	Above 650	From 17 to 20	6	25	1200	300

According to GOST, small-sized tractors are divided into one- and two-axle small-sized tractors. An analysis of models of small-sized tractors shows that their wheelbase can vary from 660 to 1500 mm , (cross-base) from 990 to 1500 mm , and agrotechnical clearance from 130 to 300 mm . It can be seen that the total engine power is in the range of 3-16 kW. It is clear from this that a single concept for the production of small-sized tractors for agriculture has not been developed. At the request of many consumers, small-sized tractors are developed based on the need to aggregate agricultural machinery [2].

When developing designs for new types of small tractors, it is necessary to use existing standards and specifications.

The following factors are key when using new small-sized tractors or self-propelled chassis vehicles in agriculture.

-Minimum soil compaction and dusting of the walking elements during soil cultivation



-The tractor or vehicle being developed must be suitable for specific requirements, for example, the climatic and regional conditions of Uzbekistan,
-Possibility of increasing productivity at high working speeds
-The possibility of combining these small-sized tractors with various combined units,
Based on the above, the global shortage of fuel and energy resources creates a need to develop new models of energy-efficient small-sized tractors.

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