THE ROLE OF MOTODELTAPLANES IN SOWING DESERT PLANT SEEDS

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Abstract. *The article analyzes the existing deserts in the world and in Uzbekistan, their degradation, methods of sowing desert plant seeds, and the technical means used in their implementation. Based on the analysis, it is recommended to use motorized hang gliders and equip them with seed sowing equipment to carry out sowing of desert plant seeds in all flat and uneven areas with low costs and high efficiency.*

Keywords: *desert, degradation, desert plant seeds, sowing, costs, motorized hang glider, sowing device, bunker, main shaft, stirrer, distributor.*

Introduction. As of today, deserts cover an area of 21.0 million square kilometers worldwide, accounting for 14% of the total land surface. According to the United Nations (UN), drought is currently observed in more than 100 countries, affecting 30% of the Earth's surface and impacting nearly 2 billion people. Due to climate change, drought is intensifying globally, leading to a reduction in vegetation cover and contributing to the expansion of desertification [1-3].

In Uzbekistan, the total area of desert and semi-desert lands is 32 million hectares, of which 16.6 million hectares are used as pastures. This constitutes 79% of the total pastureland in the country [4]. However, currently, 40% of desert pastures have undergone various levels of degradation, resulting in a 20-30% decrease in their average productivity. The degraded pastures that require immediate restoration in Uzbekistan cover nearly 8.0 million hectares [5-6].

Desertification is also increasing in Uzbekistan. As a consequence of the Aral Sea disaster alone, a desert known as the Aralkum has formed over an area exceeding 5.5 million hectares. Due to the impact of dust storms and strong winds, sand movement continues to spread, increasing the extent of desert and semi-desert areas in the country [7-10].

According to geobotanical research conducted on pastures, nearly 13% of pasturelands have undergone degradation, while vegetation cover has significantly declined in 32% of them. As a result, the productivity of desert pastures has dropped to 1.5-2.0 centners per hectare, which is twice as low compared to neighboring countries like Kazakhstan and Kyrgyzstan.

Analysis indicates that the most effective method for sowing plant seeds in deserts is aerial seeding, utilizing motodeltaplanes as the primary sowing tool. This method allows for cost-effective sowing even in uneven and sandy areas where ground transport vehicles cannot reach or operate efficiently.

Research methods. The state of desert pastures worldwide and in Uzbekistan was studied based on internet data, scientific articles, manuals, monographs, and dissertations by researchers in this field. Within this study, severely degraded desert pastures in different regions of Uzbekistan were identified, and their total area, as well as the share of degraded land in each region, was determined.

Methods of sowing plant seeds in desert pastures, along with the machinery and devices used for this process, were analyzed based on literature sources, electronic resources, and articles published in journals and collections.

The design of the equipment and the technological process were evaluated by conducting morphological analysis and synthesis, as well as by applying the ARIZ method to determine their advantages and disadvantages.

The constructive scheme of the seed-sowing device for desert pastures was developed using CAD/CAM/CAE methodologies.

Research results and discussion. The “AGRO-PARVOZ” Multisectoral Aviation Production Enterprise ("AGRO-PARVOZ" MAPE) has been utilizing motodeltaplanes for sowing desert plant seeds.

The advantage of using motodeltaplanes for sowing desert plant seeds lies in their higher work efficiency compared to machine-tractor aggregates, especially in conditions where ground vehicles cannot operate. Additionally, they offer a more cost-effective alternative to airplanes for carrying out agro-technical measures.

Currently, "AGRO-PARVOZ" MAPE primarily employs Poisk-06 SX model motodeltaplanes, which have been specially equipped for performing agro-technical tasks in seed-sowing operations (Figure 1).

Figure 1. Poisk-06 SX Model Desert Plant Seed Sowing Device

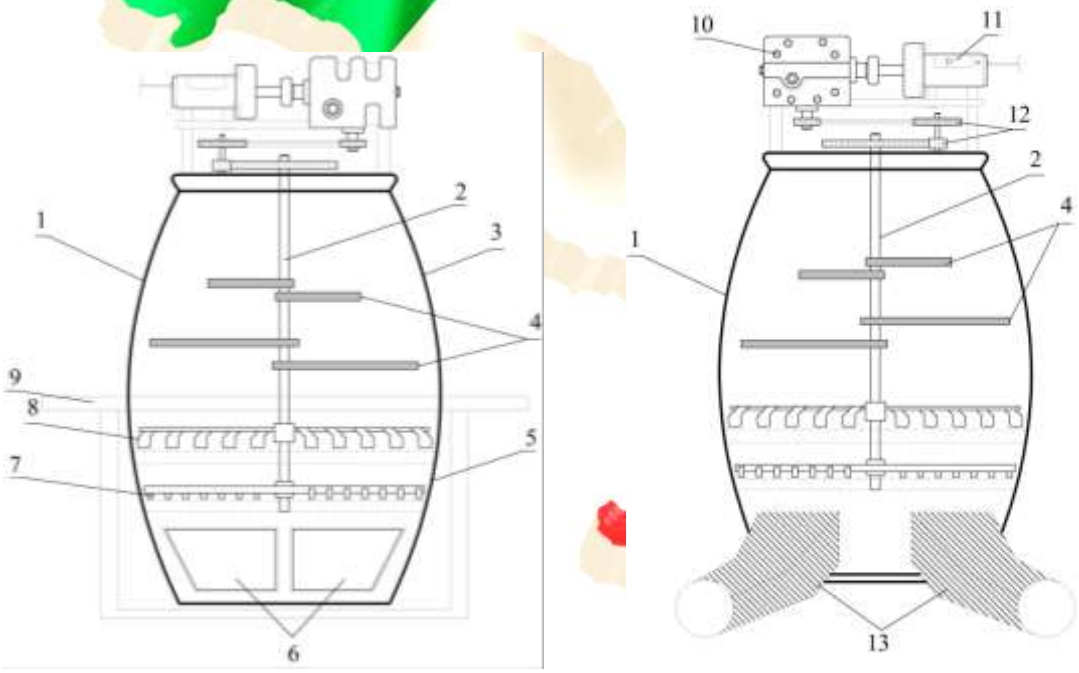
The Poisk-06 SX motodeltaplane consists of a framed chassis, an engine power unit, a pilot seat, an air propeller, wings, a landing gear, a fuel tank, and a control panel.

For sowing desert plant seeds, it is equipped with a specially designed seed-sowing device.

The device includes a seed hopper (1) and a main working shaft (2). The hopper is divided into two sections: the seed storage section (3) and the seed metering section (5). In the seed storage section (3), dust spreaders (4) are attached to the main shaft (2), while in the seed metering section (5), a propeller (7) is installed for seed discharge, along with a distributor (8) that directs seeds into the sowing chamber.

The sowing chamber has air intake vents (6) at the bottom and seed-air mixture outlet tubes (13) at the rear. The main shaft of the device is driven by an electric motor (11) via a belt-gear transmission system (12), which reduces speed through a worm gear reducer (10) mounted at the top of the seed hopper (1).

The entire hopper (1), along with all working and auxiliary components, is mounted on a frame (9), which is used to attach the device to the motodeltaplane (Figure 2).



a) Front view b) Rear view

Figure 2. Schematic diagram of the seed sowing device for motodeltaplanes

Conclusion. To prevent desertification, mitigate vegetation degradation, and increase plant cover in desert areas, additional seed-sowing efforts must be carried out. In these efforts, the use of motodeltaplanes equipped with a completely new seed-sowing device design provides an effective solution. This method allows for seed sowing and

afforestation-melioration work even in areas that are difficult or impossible to access with ground-based machinery, while also minimizing financial costs.

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