

**The title of the Project:**

IPH AP19676894 "Development of a soil-cultivating - sowing machine for grain crops in the precision farming system"

**Relevance:**

The idea of this project is to create an improved and affordable tillage - seeding machine for grain crops with inexpensive and easy-to-use machine control software in the system of precision agriculture, compatible with the ISOBUS terminal of the tractor, which provides high quality and allows simultaneously combining several work operations in one pass:

- 1) tillage, sowing and differentiated introduction of mineral fertilizers, leveling and rolling of the soil;
- 2) tillage of the soil, differentiated application of mineral fertilizers with a continuous tape, leveling and rolling of the soil;
- 3) processing, leveling and compaction of soil.

**Purpose:**

Development of a soil-cultivating - sowing machine for grain crops in the precision farming system provides high quality tillage, sowing and differentiated continuous application of mineral fertilizers, with reduced operating costs compared to foreign counterparts, in conditions of high prices for agricultural machinery.

**Expected and achieved results:**

The soil-cultivating part of the sowing unit has been manufactured. Main design technical and economic indicators:

Overall overall dimensions: width 6.2 meters, height 2.6 meters. Weight no more than 10 tons.

The volume of the bunker for seeds is  $V_c = 4.4 \text{ m}^3$  and for fertilizers  $V_t = 1.8 \text{ m}^3$ .

The frame consists of three sections on which 20 working bodies and two distribution heads are installed.

Openers with a tine width of 375 mm and with an overlap of 65 mm, the row spacing is 310 mm. The coulter shares on the machine frame are installed in 4 rows, and the distance between the shares in a row is 930 mm and the distance between rows is 750 mm.

The design power for performing the technological process of the machine under development has been determined, which is 146 kW (198.5 hp), which corresponds to a tractor of traction class 5 (Belarus 2522/2822, John Deere 8050 tractors).

As a result of the project, two articles were published in SCQASHE (Science Committee for Quality Assurance in Science and Higher Education) and one article indexed by CiteScore in the Scopus database: Percentile 66, Quartile Q2 and Web of Science Q1.

1. Ospanova Sh. K., Aduov M. A., Kapov S. N., Nukusheva S. A., Tokushev M. Kh., Isenov K.G. Bulletin of science of S. SeifullinKATRU, Justification of the design parameters of the individual press roller of the seeder for sowing grass. - 2023, - No. 2(117), pp. 87-99.

DOI:

<https://bulletinofscience.kazatu.edu.kz/index.php/bulletinofscience/issue/view/40/31>

2. Aduov M. A., Nukusheva S. A., Volodya K., Isenov K. G. Kaspakov E. Zh. Bulletin of science of S. SeifullinKATRU, Agrotechnical and energy assessment of an experimental wide-cut seeder with an electronic control unit for the process of sowing grain crops. - 2023, - No. 4 (004), pp. 4-18.

DOI: <https://bulletinofscience.kazatu.edu.kz/index.php/veterinary-science/issue/current>

3. Mubarak Aduov, Saule Nukusheva, Talgat Tulegenov, Kadirbek Volodya, Kanat Uteulov, Bolesław Karwat and Michał Bembenek. Experimental Field Tests of the Suitability of a New Seeder for the Soils of Northern Kazakhstan. *Agriculture* 2023, 13(9), 1687; <https://doi.org/10.3390/agriculture13091687> (registering DOI).