

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
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ПРИРОДОКОРИСТУВАННЯ УКРАЇНИ
ІНСТИТУТ МЕХАНІКИ ТА АВТОМАТИКИ АПВ НААН
ДЕРЖАВНИЙ БІОТЕХНОЛОГІЧНИЙ УНІВЕРСИТЕТ



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ENGINEERING MANAGEMENT OF CROP YIELD SENSORS IN SMART TECHNOLOGY SYSTEM

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Precision agriculture is a complex complex of various elements that apply to almost all field operations during the cultivation of agricultural crops [1]. Many farms use technologies aimed at achieving a specific goal [2]. Thus, yield mapping has gained wide popularity in Ukraine, i.e. determination of the exact results of grain yield and moisture in different fields, varieties and hybrids of crops, as well as field sections [3]. Thanks to this, agricultural producers are able to obtain detailed information about yield indicators on certain areas, and, accordingly, draw certain conclusions for the next season, in particular, improve cultivation technology or, conversely, minimize capital investment [4]. For this, special yield monitoring systems are used during harvesting [5], which are integrated into grain harvesters (Fig. 1). The "eyes" of such systems are sensitive sensors that transmit information to a computer, as well as to any devices convenient for farmers, in particular at a distance [6].

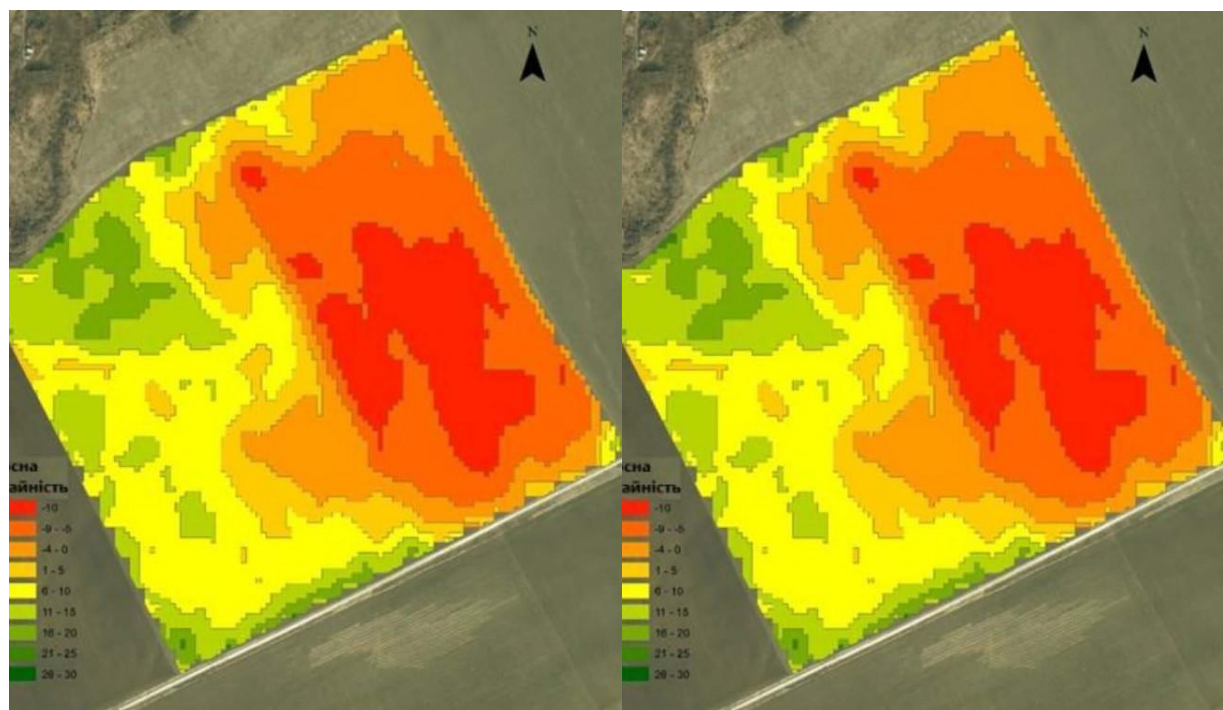


Fig. 1. Yield sensors.

Sometimes the choice of the optimal yield monitoring system turns into a difficult task for the farm manager, since the Ukrainian market is represented by a number of well-known global manufacturers, each of which offers its own technical

solutions. On the other hand, you will have to choose between good and very good, so we do not see a particular problem here and, accordingly, suggest that you familiarize yourself with the yield monitoring technologies of the world's leading brands. Two types of sensors are usually used for yield control: mechanical and optical, and the latter are the most common. Optical sensors for grain flow measurement are fixed with the help of brackets on the grain conveyor. The use of optical sensors shows a more accurate result compared to weighing plates, but they cannot be used for bucket conveyors. Most often, the error of yield measurement sensors does not exceed 5%. In the case of regular correct calibration of the sensors by volume or weight of the material, the measurement error can be reduced to 1%. During operation, the system takes into account the required time delay for moving the harvested mass from the harvester to the grain elevator. There are systems on the market that provide for automatic or manual sensor calibration. The first type is the most convenient, although there are certain nuances. Usually, it is recommended to calibrate the harvester at full load twice during the work shift. Its parameters depend on a number of factors: harvesting conditions, type of harvested mass, position of the header, etc.

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