4. Malik M.Y. Motivation of production activity in agrarian sphere of economy: Methodology and organization. Kyiv: UAE, 1995. 177 p.

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THE INNOVATIVE MEANS OF MECHANIZATION OF AGRICULTURE

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By 2050, the number of people on the planet will grow to 9.7 billion people. All of them will need food, of a high quality, because the welfare of society will also increase. To feed such a large number of people, agriculture must change radically and become less of an economy and more of a large-scale production. To achieve this we need new technologies. The most interesting trends and phenomena are from led drones to farm management and harvesting robots.

The analysis shows that in order to improve the efficiency of equipment use, first of all, a radical reorganization of the technical service system, the introduction of a proprietary method of its maintenance is required. However, in the context of reducing the production of domestic equipment, this process was delayed, although it is necessary to solve this problem immediately.

Domestic cars entering the market, as a rule, have low technical and economic indicators and insufficient reliability. This does not allow to effectively realize the advantages of modern agricultural technologies and encourages agricultural producers to acquire more productive and reliable foreign equipment. Innovation – the end result of innovation, which has been implemented in the form of a new or improved product sold on the market, new or improved technological process used in practice.

Let’s consider the main innovative technologies:

1. Sensors and counters

Today, there are already smart systems for plant caring — they automatically water and fertilize seedlings, taking into account every nuance. This technology, which saves up to 20% of water, falls under the concept of smart farming — a system of accurate calculation of planting, watering, fertilizing and harvesting using computer systems. Modern sensors also analyze the composition of the soil and predict its fertility, the degree of saturation with moisture and fertilizers.

2. GPS Navigation

GPS navigation systems allow you to know the exact location of tractors and other agricultural machinery up to centimeters. Thanks to this technique does not cultivate the same pieces of land several times and does not miss important areas that previously occurred everywhere. This approach allows to reduce fuel costs up to 40%, as well as more efficient use of fertilizers, herbicides and pesticides.

With the help of GPS systems maps of the crop have already drawn up on many farms maps of. Shows which pieces of land are more efficient and productive, and accurate cartographic survey gives an understanding of how water affects a particular parcel of land.

3. Aircraft and drones

Farmers also use small aircraft to collect data on their land. They measure the area of the crop and distinguish crops from weeds. The technology of polyspectral analysis explores how plants absorb and reflect sunlight with different wavelengths. Based on this information, you can determine which plants grow and which do not.

Polyspectral cameras are so accurate that they can take pictures of individual plants, which can further improve productivity.

Many companies are adopting in agriculture quadcopters. Modern farmers even use satellites. For example, the lab planet relies on the acclaimed mini-satellites CubeSat satellites, which are easy to launch into orbit and just as easy to decommission. Companies sometimes have access to satellite data archives and can examine how individual fields and land have changed over time, how much biomass they have produced from year to year, and then compare these data with current figures.

4. Farm management Systems

Nowadays the connected farm is business as usual. A number of startups offer management systems of agricultural affairs in different formats: in the form of a cooperative Bank of anonymized data, in the form of a standard management system or in the form of specialized programs, for example, to manage the collection of grapes.

All these projects allow valuable data from sensors, satellites and other sources not to be wasted, but to benefit and increase productivity and productivity.

5. Robots for crop and care

Developed at the University of Sydney, Rippa's solar-powered robot finds weeds and deftly destroys them using carefully selected doses of pesticides.

Rowbot systems is working on a device that will be able to move independently in the maize field and throw fertilizer where necessary, without damaging the fragile shoots.

Emerge are robots-collectors and crop. For example, AGROBOT SW6010 uses the camera to recognize ripe strawberries and then collects them.

In General, a real robotic boom is expected in the next decade, which will affect agriculture.

6. LEDs

Led bulbs have become so cheap and efficient that closed greenhouses are gradually more profitable than open gardens and vegetable gardens. Plants are grown in supermarkets, warehouses and even in basements. British startup grows underground grows 20 types of lettuce under the ground in the territory that remained after the Second world war bomb shelters.

The brightness of the light coming from the LEDs can be easily adjusted, as well as other indicators such as temperature and humidity.

Vertical farms that widespread are also go beyond the usual greenhouses and landings and can be adapted to different spaces.

7. Phenotype as the key to perfection

Optimization of the phenotype of the plants is also developing. Scientists are trying to simulate the conditions of growth of different cultures as accurately as possible to reproduce the cultures themselves.

Caleb Harper, a scientist at MIT's media Lab, is working with colleagues to develop a "food Personal computer." This device will allow you to control the lighting, CO2 levels, humidity, air and soil temperature, as well as the quality of water flowing through the soil to the roots, and other chemical characteristics.

The conditions of development of the plant will be continuously monitored by web cameras that are connected to a special software. By the color and shape of the leaves, they determine the degree of growth. Special sensors will identify areas of active photosynthesis — this process, by the way, scientists are also gradually learning to manipulate. Technology even allows you to adjust the taste properties of crops. Several dozen of food Personal computers are already on the market, and 100 others are being prepared for release.

8. Genetic experiments

Farms are increasingly reminiscent of factories, in which all processes are debugged, and products are protected from any whims of nature. The knowledge of plant DNA, its sequence improves the selection process. It is no longer necessary to grow plants until they are fully ripe to understand whether the desired characteristics have been achieved. It is enough to study the genome.

Of course, genetic modification is constrained by public distrust and ethical issues. At the same time, over the past decades, it has not been proven that eating GM foods has a negative impact on health.

DNA editing technology does not stand still — today you can replace or remove just one nucleotide. This approach is more like a natural mutation, on the basis of which the selection is based.

Do not forget about the technology of "genetic scissors" system CRISPR/Cas9, which in the future will allow to edit the genome of plants and protect them from viruses and parasites.

9. Animals: control and modification

Cattle no longer wear bells around their necks — they have been replaced by smart sensors. One such example is Smartbell, which tracks the animal's motor activity and transmits the data to the cloud storage. Motion sensors also let you know if the cow is ready for insemination.

Some devices are installed directly in the first compartment of the stomach — the so-called seam where the measure of acidity and diagnostirovat problems with the gastrointestinal tract.

Scientists also use genetic modification to make animals safer. For example, output Holstein cows without horns. Gene modification is also used to make pigs immune to African swine flu.

10. There are fewer and fewer Farmers

But the main sign of progress is the fact that fewer people are working with the land today. Their work is now performed by special agricultural machinery, fertilizer agrochemicals and spreading systems, robots, drones and other devices.

In 1900, 41% of the labor force in America worked on farms, and today this figure is only 2%. And gradually this trend is coming to other countries, even third world countries.

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TESTS IN TEACHING FOREIGN LANGUAGES TO STUDENTS OF AGRO-TECHNICAL SPECIALTIES

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The process of teaching a foreign language to students of agro-technical specialties, regardless of their level of foreign language proficiency, involves the formation of the ability sufficient to use the language. The level of knowledge of a foreign language is determined in the process and as a result of testing appropriate skills.

Tests are one of the most technologically advanced methods for conducting automated control and thus they are actively used in training future engineers to foreign professional communication.

The process of creating tests is one of the most complex and not completely solved problems in testology. It is difficult because it includes the construction of the test as integrity, and the construction of test tasks, including various types of tasks the test consists of.

In higher educational institution “Belarusian state agrarian and technical university” (BSATU) the process of test creation to evaluate students’ knowledge is based on a tiered approach and logically integrates with the modular and rating educational system adopted at the university. According to the tiered approach, the test is constructed in accordance with the educational element of the module, taking into account its content and with a given goal, which is the level of assimilation of activity (knowledge and skills), i.e. in order to identify each level of assimilation of the educational element, an appropriate test should be created. It is called criterion-oriented testing.

The classification of criterion-oriented tests proposed by V.P. Bespalko is based on the rule described above, which is similar to the classification of levels of assimilation and is characterized by the way to perform the required actions.

1st level: actions with a hint. Recognition activities of previously studied material (identification tests; differentiation tests; classification tests).

2nd level: actions by memory. Reproduction activities (substitution tests; tests-copies (constructive); tests - typical tasks).

3d level: activity in a non-standard situation. Heuristic activity (subjectively new information is obtained) – tests – non-standard tasks.

4th level: research. Creative level (objectively new information is obtained) – tests-problems [1].

It should be noted that when compiling tests, the rule for compiling the test given above should be supplemented with the following provision, e. i. each level of assimilation corresponds to its own types of various test tasks used to compile this test.