

## ЦИФРОВИЗАЦИЯ СЕЛЬСКОХОЗЯЙСТВЕННОЙ ОТРАСЛИ DIGITALIZATION IN THE AGRICULTURE

**Кучеровский Макар Александрович**, студент 1 курса института экономики имени А. В. Чаянова, ФГБОУ ВО РГАУ–МСХА имени К. А. Тимирязева, e-mail: makar9204@ya.ru

**Евсина Анастасия Олеговна**, студентка 1 курса института экономики имени А.В. Чаянова, ФГБОУ ВО РГАУ–МСХА имени К.А. Тимирязева, e-mail: 0ayevsina@gmail.com

**Меджидова Наима Раджабовна**, студентка 1 курса института экономики имени А.В. Чаянова, ФГБОУ ВО РГАУ–МСХА имени К.А.Тимирязева, e-mail: buterathebest@gmail.com

**Научный руководитель – Синицына Ирина Андреевна**, к. филол. н., старший преподаватель кафедры иностранных и русского языков ФГБОУ ВО РГАУ–МСХА имени К. А. Тимирязева, e-mail: sinitsyna@rgau-msha.ru

***Abstract.** This article deals with digitalization in the agricultural sector. It tells about what technologies can be used in this process. The article also touches on the problems of digitalization and ways to solve them.*

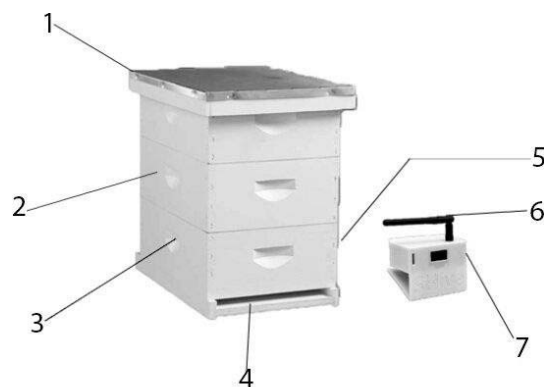
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To start with, we will speak about some history. From ancient times to the present, hunger has been one of the most essential problems for people. Back to the time when first human had just started its existence as a specie, it understood that primary task for existence was food. And if it was simple enough to find water, food extraction was much more difficult problem to deal with. That's why human has always dreamt to grow its own plants and animals.

Turning now to the modern time, the problem of food production is still persisting. Only this year 81,2 million hectares of land were sown in Russia. But this need is constantly growing and the amount of fertile land is depleting. To solve this problem, we need new approach. Rationalization of the sowing of certain crops in a certain place, collecting meteorological data directly from the fields, smart irrigation and spraying of crops, analysis of soil conditions using drones and many other useful solutions require modern technologies.

The next point we would like to emphasize is what technologies can be used in agricultural industry. Robotics has the greatest number of applications. For example, drones can monitor soil conditions in fields. They can produce photos of agricultural land, and drones can also sow various crops. There are also robots for apiaries, they are called smart hives. They collect and analyze information such as the initial and current weight of the hive, noise levels, and other

factors important to beekeepers (figure 1). The next direction is production technology. A prime example is urban "vertical" farms, which are gaining in popularity (growing products in a limited space). This is a variety of hydroponics, aeroponics and aquaponics. The direction of artificial intelligence with elements of self-learning allows introducing autonomous tractors. It can also help in the automatic detection of plant diseases. Another technology, called the Internet of Things, can allow controlling the condition of animals. On the other hand, this technology can be used to solve the optimal irrigation. Taken together, these and other areas combined in a single ecosystem will greatly facilitate and streamline work in this area, as well as increase both productivity and profits of businesses.



**Figure 1 – The smart hive device:**

- 1 – hive cover with built-in heater; 2 – hive body; 3 – moisture indicator noise meter;  
 4 – entrance for bees; 5 – power supply and data collection terminal; 6 – antenna;  
 7 – scales

It is important to note here that in 2021 Vladimir Putin signed a strategy, in which he pointed the direction of agricultural development towards digital technologies. Thus, large corporations that have already implemented such technologies declare an increase in profits by 12...23 % and an increase in yields by  $\approx 20$  %.

Next we come to the problems. The main problems of the agriculture in digitalization are the following:

1) Firstly, a lack of IT-specialists. This problem can be solved by introducing such subjects as programming and computer science in agricultural universities and adding individual IT-faculties, like in Timiryazev academy, for example.

2) Secondly, low interest in agriculture of IT-specialists. This problem can be solved by creating comfortable working conditions and a clear formulation of the technical tasks.

3) Thirdly, high cost of introducing technology into small and medium-sized enterprises. Our generation will have to find the solution to this problem. Our peers have already created many projects that can significantly reduce the cost of technology and its implementation, which will be very useful for small and medium-sized enterprises of agro-industrial complex.

In conclusion, we would like to say that digitalization is a new stage in agricultural development. Our generation will definitely solve these problems because it is our responsibility to increase yields and rationalize agricultural industry. We hope, that we will be able to solve all the issues and digitalize agriculture successfully.

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