CHALLENGES OF THE GREEN REVOLUTION IN AGROECONOMIC PRACTICE

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Research within the framework of the Green Revolution should be multidisciplinary, where in addition to the biological sciences, it should include genetic engineering and socio-economic aspects. The goals of the Green Revolution in our economic practice would relate, above all, to the transfer of new technologies that could meet the real needs of users. Special attention should be paid to strengthening production and economic efficiency, with a change in the structure of production according to the requirements of the European and world markets. For this purpose, it is necessary to classify the collected data according to the degree of importance, perform the correct processing of the given data, and finally carry out the interpretation of the obtained results.

Keywords: challenges, green revolution, new technologies, market

New challenges of the Green Revolution - development and practice

In the last 40 years or so, the Green Revolution has played an important role in advancing agri-food production globally. Wheat, rice and corn yields in developing countries have increased from 100 to 200% since the 1960s, whose primary mission was to increase yields. From the beginning of the 20th century until today, agricultural production has had four stages of development. The first stage of development appeared at the beginning of the 20th century and was characterized by a large share of human labor and low productivity, where even ⅓ of the population was engaged in production. The second stage of development appeared in the late 50s of the 20th century and was called the "Green Revolution", which was marked by highly productive mechanization, high yields and new varieties. The selection and creation of new varieties also meant the intensification of the use of mineral fertilizers, pesticides, irrigation, as well as a more developed awareness of agroeconomists in the field of biodiversity conservation. The third stage of development was marked by the beginning of the 21st century, when the application of the so-called precision agriculture, which we associate with the release of GPS (so-

called global positioning system) signals by the military that appeared in the 90s of last century. In the same years, the application of sensor technologies on grain harvesters began, which enabled the measurement of yield and its mapping using GPS locations in the operation of the machine. In parallel with the development of precision agriculture, software solutions used for data management have been developed and they have become widespread. At this stage of development, the focus in agricultural production has shifted from efficiency in terms of cost reduction to profitability through the search for ways to reduce costs and improve quality. The last stage of development of precision agriculture begins at the beginning of the second decade of the 21st century and is based on the development and application of cheap advanced sensors, actuators and microprocessors, as well as broadband network communication infrastructures (so-called smart technologies within *Big data*).

The goals of the Green Revolution were achieved with the help of an advisory system, as well as national and international companies that contributed to the transfer of new technologies from research centers to practice. The European Commission states that food systems remain one of the main drivers of climate change and environmental degradation. To this end, we cite a practical example of the Farm to Fork Dairy, which aims to shift the food system in the European Union to the environment, health and social benefits to ensure that recovery from the covid-19 crisis is put on a sustainable path. One way to achieve this goal is to convert waste streams into value-added products. This Dairy is the second largest sector in the European Union with more than 12 thousand locations for milk processing and production in the member states. For each liter of milk produced, about 2.5 liters of wastewater are generated. In this regard, a pan-European project based in Ireland called "REFLOV" started in 2019, developing biological techniques for removing phosphorus at different stages of the wastewater management process. In this way, sludge is created, which reduces the use of chemicals, which achieves greater efficiency in the cultivation of various plant species.

It is desirable that researchers in scientific research work achieve active cooperation with agroeconomists, agricultural producers, consumers, creators of agricultural policy and public opinion in general. Research should focus, above all, on designing and testing new technologies that would be socially responsible and that respect the principles of environmental protection. Taking into account the fact that in the world there are less and less arable land, fossil fuels that are becoming more expensive, less water with increasingly drastic climate change, the only system that will be able to withstand these challenges is a high level of diversity, productivity and efficiency.

The influence of modern technologies in agricultural practice

Research shows that a maximum of 24% of farmers in Europe use information and communication technologies (ICT) in their daily work, while in the United States their share reaches 80%. The cause of this disparity should not be sought in the underdevelopment of technology in Europe, but in market access. ICTs have great potential for improving many aspects of agricultural production and the ability to provide safe sources of healthy food for the European market, while reducing the harmful effects that this type of production has on the environment. The solution to

overcoming these problems is in connecting and closer cooperation between ICT companies and farmers, where as many as 25 million people in Europe are employed in agriculture.

With the introduction of GIS and GPS technologies in agricultural mechanization, precision agriculture (*Precision agriculture* or *Precision farming*) began to develop. It implies timely performance of agricultural works, high productivity, reduced number of operations and lower labor costs, and is based on newly developed information machine systems of programmed exploitation potential, small number of high reliability machines and high technological capabilities. The main purpose of precision agriculture is to make more accurate information available to the farmer when making decisions. When it comes to precision agriculture, we will mention one of the ideas that was realized during the covid-19 pandemic, and that is the online network of retail trade in agricultural products, which is a more realistic endeavor on the list of innovations in agriculture. In that regard, lectures should be organized, where the internet and social networks would be closer to agricultural producers, in order to sell their products more easily. The cheapest way of advertising is in the online world, but the problem is still reflected in the fact that some see the penetration of the online market in a very small percentage (about 5%). Not because these groups are not doing their job well, but more because people like to have physical places to procure agricultural products. Most of them like to see, and preferably touch the product they are buying.

Figure 1. Irrigation of plants via SMS

Source: https://irrigazette.com/fr/articles/galcon-gsi-vigne-systeme-dirrigation-intelligent

There are many ideas that have been realized, such as smaller modern technological solutions that have entered agroeconomic practice, and greatly facilitate the work. For example, we can irrigate plants via text message, which can be seen in Figure 1.

We can also make certain actions easier for ourselves by downloading useful applications to our phone, such as calculating the consumption of fertilizers, using an assistant in organic plant breeding or learning how to get rid of almost all possible pests. It is obvious that we are slowly but surely working on eliminating the

challenges in order to improve agriculture, which allows us to apply modern technologies.

Conclusion

The new concept of the green revolution is more than needed today. Emphasis is placed on improving the quality of life of the rural population, where positive results have been achieved in some areas, such as anticipating and designing new technologies. To this end, we cited the practical example of 'Farm to Fork', which aims to shift the food system in the European Union to the environment, health and social benefits to ensure that recovery from the covid-19 crisis is put on a sustainable path. One of the ways to achieve this goal is to convert waste streams into value-added products, which automatically increases productivity.

It was found that productivity needs to be improved in all areas where the rural population lives and works, not just in developed countries. It is also necessary to take into account the protection of the environment and the needs of producers and consumers in regions with poorer natural and economic performance. Great attention was paid to the introduction of GIS and GPS technologies in agricultural mechanization, which began to develop precision agriculture. This new type of business is increasingly present in agro-economic practice, and is based on newly developed information machine systems, a small number of high-reliability machines and high technological capabilities.

References:

1. Anđelković M., Gajdobranski A., Rosić N. (2018): Novi izazovi informaciono-komunikacionih tehnologija od uticaja na ekonomičnost poslovanja u poljoprivredi. 6rd International Conference – Application of New technologies in Menagement and Economy, ANTIM 2018 – zbornik radova 1. Univerzitet Union – Nikola Tesla, Beograd (FPSP i FITI), april 2018, str. 73.

2. Gajdobranski A. (2020): Uvod u zelenu ekonomiju: Zelena revolucija: Univerzitet Union „Nikola Tesla" (FITI i FPSP), Beograd, str. 85, 86.

3. Gazdinstvo (2020): Otpad iz mlekara pretvara se u bioplastiku i fosfatna đubriva: Prvi poslovni list poljoprivrednika i savetodavaca u Srbiji, Novi Sad, broj 151/II, str. 28.

4. http://amacentar.org/wp-content/uploads/2019/03/Prehrambeni-suverenitet-u-kontekstu-Srbije.pdf

5. https://arhub.rs/blog/item/55-primena-gps-tehnologije-u-poljoprivredi

6. https://www.agromedia.rs/blog/agrokutak/savremene-tehnologije-u-proizvodnji-za-koje-jos-nismo-spremni

7. https://irrigazette.com/fr/articles/galcon-gsi-vigne-systeme-dirrigation-intelligent