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# ECONOMIC EFFICIENCY OF IMPLEMENTING NEW TECHNIQUES AND ADVANCED TECHNOLOGIES IN AGRIBUSINESS

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**Abstract:**

Digitalization has covered all areas of the social and economic life of society. This trend is a key factor in the development of the agricultural industry, since digitalization is today the main driver that increases the productivity and efficiency of the production process in the agricultural sector. Achieving growth in agribusiness profitability requires full use of innovative technologies. In this paper, we want to consider the concept of introducing new technologies and their effectiveness in agriculture, in particular in crop production.

**Keywords:** agribusiness, accounting, digital technologies, new technology, advanced technologies, economic efficiency.

In recent years, the introduction of innovative technologies in agriculture has led to adjustments in the way farmers cultivate crops and cultivate fields. It doesn't take an expert to see how technology has changed the way farming is done, making it more profitable, efficient, safer and easier. The five best modern information technologies in agriculture, recognized by farmers:

- GIS technologies in agriculture and GPS agriculture
- satellite imagery
- Drone and other aerial photographs
- Information technology in agriculture and online data
- Combining Datasets

As a result, modern farms are benefiting greatly from digital farming technologies that are constantly evolving. These benefits include reduced water, nutrient and fertilizer consumption, lower environmental impacts, reduced chemical runoff to local groundwater and rivers, increased efficiency, reduced costs and more. Thus, the business becomes profitable, smart and sustainable. Let's discuss some of these innovative technologies in agriculture.

*GIS Technologies In Agriculture*

Since fields are location dependent, GIS technology becomes an incredibly useful tool in terms of precision agriculture. Using geo-information technologies in agriculture, farmers can display current and future changes in rainfall, temperature, yields, plant health, etc. It also allows the use of GPS-based applications along with smart technologies to optimize fertilizer and pesticide application; given that farmers do not need to cultivate the entire field, but only certain areas, they can achieve savings in money, effort and time.

Another big benefit of GIS technology used in agriculture is the use of satellites and drones to collect valuable data about vegetation, soil conditions, weather and terrain from a bird's eye view. Such data greatly improves the accuracy of decision making.

*Satellite Data*

Yield forecasting and near real-time satellite monitoring of fields to detect a variety of threats using

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satellite data has never been easier than with the introduction of innovative technologies in agriculture.

The sensors can provide images in a variety of spectra, allowing multiple spectral indices such as the Normalized Vegetation Difference Index (NDVI) to be applied. NDVI allows you to determine the composition of the vegetation, the number of withered plants and the general condition of the plants. Next comes the Plant Chlorophyll Content Index (CCCI), which helps with nutrient input. The Normalized Differential Red Edge Index (NDRE) then determines the nitrogen content. Finally, the Modified Soil Adjusted Vegetation Index (MSAVI) is designed to minimize the effects of background soil in the earliest stages of plant development; the list goes on.

*Drones: Technology Data From the Sky*

With the help of unmanned technologies in agriculture (drones), farmers have the ability to accurately determine the biomass of crops, plant height, weeds and water saturation in certain areas of the field. They provide better and more accurate data with higher resolution than satellites. When they are on the ground, they provide valuable information even faster than scouts. Drones are also considered unsurpassed assistants in the fight against insects; Insect infestation is prevented by applying insecticide to dangerous areas using unmanned technology (drones), while reducing the likelihood of direct exposure leading to chemical poisoning.

Although drones are easy to use and capable of collecting large amounts of data in a short time, there are still challenges in their continued use as the technology is not cheap. Drones are almost helpless where mapping or monitoring of large areas is required and it is better to complement this technology with satellite monitoring of already mapped areas where specific areas need to be rechecked.

*Online Data: The Key To Precision Agriculture*

To make it easier to monitor agricultural fields, EOS has developed EOSDA Crop Monitoring, a digital platform that uses satellite monitoring to speed up farmer decision making so that he does not miss an important moment in the field. Here are some of the features available on the platform:

Crop monitoring allows you to use the Normalized Vegetation Index (NDVI) to track the health of crops in agriculture. This index keeps track of the amount of chlorophyll in plants, which allows you to get information about their condition. If you have higher NDVI values, you have healthier vegetation, because the more chlorophyll available to the plant, the healthier it is.

Another important feature of modern information technology in agriculture EOSDA Crop Monitoring is the Scouting application.

It is a mobile and desktop application that uses digital field maps. Using this farming app, a farmer can assign multiple tasks to scouts with a few clicks. Add a field, put a pin, set a task. Once the task is assigned, the scout moves directly to the selected location and checks for problem areas on the site, checks for pest activity, performs weed control actions, etc., immediately making notes in the application. This allows you to inspect problem areas only when necessary, thereby saving time to take the necessary preventive measures.

Weather analytics as information technology in agriculture. By analyzing weather data according to satellite imagery plant health data, farmers can apply irrigation accurately and prevent frost or heat damage. For example, one of the best ways to avoid drought problems is drip irrigation technology with automatic or manual valve control, so the farmer can supply the required amount of water to dry areas.

The strongest advantage of EOSDA Crop Monitoring is that it is based on satellite imagery. It helps you analyze field conditions or the condition of specific areas of agriculture and quickly extract

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valuable information, thereby speeding up optimal reaction time, as well as making reliable decisions - what crops to plant, when to harvest, how to effectively plan for the next season, how much nutrients and apply fertilizer, and much more.


*Data Consolidation*

Sometimes in the EOSDA Crop Monitoring platform you have to mix different datasets in order to get valuable information about your fields. For starters, the user can compare the performance of their field with the average performance of all fields in the area. To deal with this problem, a technology is used to compare multiple sets of data from all fields in your area. So far, such comparisons are available only using the NDVI vegetation index, but in the near future we will expand the analytical capabilities of the Platform by adding new indices.

The next important function of modern information technology in agriculture, which uses numerous data sets, is the analysis of weather data. It consists of the following options:

Plant Freeze informs you about low temperatures that threaten your winter crops.

Frost Threat highlights days when temperatures dropped below -6°C to assess frost damage to early crops.

Drought Threat reflects days with temperatures above +30°C to assess damage from heat stress.

This feature of the new technology in agriculture also makes it possible to control rainfall and temperature.

*Results of Precision Agriculture.*

Promising high technologies in agriculture are moving into the future by leaps and bounds. They offer significant assistance to farmers in their efforts to optimize costs, simplify farming management and increase productivity. Increased yields as well as reduced maintenance costs help increase profitability. In the context of smart solutions, innovative technologies in agriculture offers a knife of agricultural technologies for precision farming for both today's and future farmers.

Modern technologies and techniques in agriculture are the basis for obtaining good yields in the crop industry and increasing performance in the livestock industry. Agriculture today should be profitable, that is, with minimal energy and material costs, obtaining high-quality agricultural products is the main thing.

Technology solves and greatly facilitates the work of the worker in the fields and farms. Given that new agricultural machinery is also an incentive for the work of machine operators, farm managers are trying to renew the machine and tractor fleet of agricultural enterprises.

Modern agricultural technologies are complexes technological operations for managing the production process in order to achieve high yields, productivity and product quality while ensuring environmental safety and a certain economic efficiency. In modern conditions, the effective development of agriculture is impossible without the transition to innovative technologies based on high-performance machinery and equipment based on scientific and practical methods, called "Smart Agriculture".

One of the most important conditions for the growth of agricultural production is the machine and technological provision of agricultural production.

World and domestic experience shows that the introduction of new highly efficient, resource-saving, high-precision technologies into agricultural production is possible only on the basis of high-performance machinery and equipment.

Agriculture is a specific sector of the economy, which is characterized by the constant and continuous appearance on the market of modern solutions and advanced technologies that improve and simplify the lives of farmers and farmers.

High-performance equipment, automatic systems, robotic platforms, ergonomic equipment, digital applications, as well as resource-saving technologies - all these areas are continuously improved from year to year, improving quality and improving their functionality.

Innovation for the agro-industrial complex is one of the key values. They can significantly optimize costs and improve the efficiency of a wide range of agricultural operations.

Innovation allows farmers and agricultural organizations to introduce truly new products, processes or ways of organizing to improve performance, competitiveness and resilience in order

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to solve a particular problem. Every year, new relevant developments appear on the agricultural technology market that can radically change the life of modern farmers and farmers for the better.

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