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DIGITALIZATION OF ROMANIAN AGRICULTURE: THE AGRODATA PYLON PROJECT FOR ADAPTATION TO SUNFLOWER CLIMATE CHANGE

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INTRODUCTION

Agriculture is an increasingly dynamic field, a field based on the use of new technologies, totally different from existing ones. New technologies have brought a benefit to farmers in their work in order to achieve high productivity of crops and a substantial profit. At the same time, these new technologies have the role of reducing the expenses per agricultural area, a better management of the entire farm but especially the maximization and randomization of the entire agricultural process and the farm management system. The transition from classical to modern agriculture has been made gradually by implementing technologies based on artificial intelligence, precu technologies: drones, smart sensors, weather stations, soil disinfection and disinfection devices, satellite stations and intelligent agricultural equipment, equipped with artificial intelligence, GPS, monitoring sensors, etc. The present paper aims to present such a project for the digitalization of Romanian agriculture, a project entitled AGRODATA. Agrotata is a project developed by the Research-Development Station for Agriculture Brăila together with the partner Livandi SRL.

This project represents a way of transition of Romanian agriculture to the digital environment, the project proposing systems and working approaches of the latest generation, totally different from those currently existing in agricultural farms. The implementation of artificial intelligence systems and the Internet of Things (IoT) on farms will create a "dashboard" of the farm, an overview through which any farmer can see in real time, the state of each crop, throughout the vegetation period, in each phenophase. AGRODATA involves the implementation of a crop surveillance system (by using state-of-the-art drones, equipped with artificial intelligence), the implementation of sensors to monitor the factors that act on crops (temperature, humidity, pH, diseases and pests, etc.). Farmers' accession to this project will allow farmers in the North Bărăgan area (and not only!) Access to real-time information on the status of their crops (humidity, evapotranspiration, soil water supply, degree of disease and pest attack, the amount of chlorophyll in plants, etc.), giving each farmer an overview of the crops so that he knows how to manage each resource, in a way that is as economical and maximized as possible.

MATERIALS AND METHODS

The main objective of the AGRODATA project is the implementation and research of new technologies and systems that use digital technologies equipped with artificial intelligence, in order to relaunch new processes to maximize agricultural production. experimental fields of the Research-Development Station for Agriculture Brăila. The research was carried out with the equipment from SCDA Brăila. The following were used as working materials: two drones equipped with artificial intelligence systems (in order to identify the degree of attack of diseases and pests, the amount of mineral elements in the soil, the amount of chlorophyll in plants, etc.), humidity and pH sensors , weather station and devices for detecting temperature fluctuations, precipitation and wind. As methods, in order to carry out this research the following were used: empirical research methods (research based on the surrounding realization, in this case the experimental fields of SCDA Braila), cross-sectional research methods), observational methods (observations made on cultures in experimental fields), qualitative methods (description and analysis of the activity of the process itself, emphasizing more the process and the importance of research).

RESULTS AND DISCUSSIONS

The impact of the AGRODATA project on Romanian agriculture and research was very large, the researchers from SCDA Brăila being the first to use a series of state-of-the-art technologies. Why is this project important for Romanian agriculture? With the help of the technologies used, each farmer who joins this project can monitor each crop in real time so that, for each crop, a dashboard is created that has the role of providing the farmer with all the information in order to make a decision in time. real. Through this project, a series of analyzes were carried out on the soil and agricultural crops, analyzes on the agrochemical mapping of the soil (content of moving elements in the soil), scanning the soil with a precision drone, and the degree of disease attack and pests in crops overflown by drones. Following the soil and plant scanning processes, after downloading and processing the data, the researchers from SCDA Brăila came up with a picture on the corn sunflower. Following these scans, in the maize crop, at certain plots (P1, P2 and P6- the red spots identified with the red color in the orthophotoplan) a low nitrogen content (in the soil structure) was identified, a "ragged" aspect of sunflower, the appearance of the burning phenomenon on the leaves of sunflower plants (*Setosphaerie turcica*) and the appearance of embers (*Shacelotheca reiliana*).

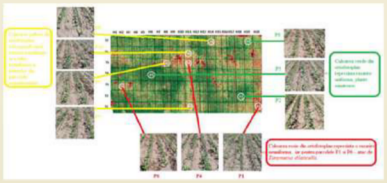

Figure 1. Orthophotoplan made by UV drone interpreting sunflower culture data

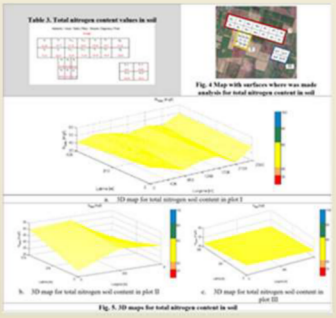

Figure 2. The standard photocolorimetric method from the aqueous extract soil

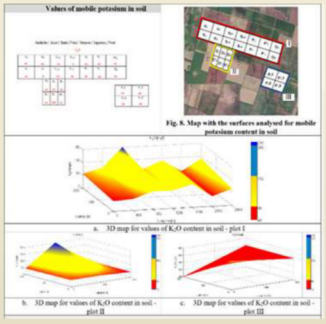

Figure 3. The state of supply of mobile potassium

After collecting the data, an online database was created (in the Blue Monitor system), a system that has the role of storing the pedo-climatic data provided by the weather station and ground sensors, the data obtained on each flight with UAV drones (disease detection and pests) as well as the elaboration of reports on the typology of pests, the typology of diseases and the elaboration of recommendations for their non-invasive control. The AGRODATA online platform can also provide reports on the evolution over time of the registered pedo-climatic indices, warnings for the attack of diseases and pests, weather forecasts with recommendations for the application of phytosanitary treatments, the exchange of prices for agricultural products. Drones technology is being used more and more often in the application and spraying of nutrients and pesticides on plant crops. The fact that these technologies are used at lower costs will allow farmers to reduce costs with human resources (workers) and technical resources (agricultural equipment). Spraying fertilizers and plant protection products in agricultural crops by air with the help of drones is a much cheaper option for farmers. These processes are much cheaper and much more environmentally friendly for humans, animals and the environment (Veroustraete, F., 2015). The use of these technologies represents many strengths for farmers because drones present to farmers in a timely state a frequent control of plants, their growth rate, early detection of health problems in crops (diseases, pests, etc.), limiting the effect pollutants of chemical fertilizers in agricultural crops, planning of sowing campaigns, fertilization and harvesting, distribution of fertilizers and plant protection products, etc. (Puri et.al., 2017).

CONCLUSIONS

The applications of the AGRODATA project aim at the transition of agriculture from a traditional environment to a digital environment, easy for all farmers who access this project. The continuous development of the AGRODATA project and their successful implementation on farms will lead to an increase in agricultural productivity, an increase in the performance of the technologies used and a much better quality of agricultural products. The fact that these new technologies have the role of facilitating the work of farmers will also increase the protection of the environment by conserving and regenerating the resources of agricultural agroecosystems. AGRODATA in the agricultural area in the north of Bărăgan will lead to the development of an online platform, to a much faster dissemination of the results obtained in agricultural crops, as well as to a database that will provide farmers with information about pedo-climatic conditions. of their own agricultural crops, plant health, the degree of attack of diseases and pests and a series of recommendations of the specialists from the Research-Development Station for Agriculture Brăila.

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