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DIGITAL MANAGEMENT OF IRRIGATION REGIMES

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Abstract: Summary article is devoted to digitalization of management of irrigation technologies applied in large farms and agro-parks of the Republic and Correction and development of irrigation regimes in the background of global climate changes, reduction of water losses to minimum level, efficient use of Water Resources at maximum level. The analysis shows that the use of modern digital technologies in the management of irrigation, the creation of a digital base (mapping, digitization, satellite data), the development of digital instruments (Geoinformation portal, sensors, mobile applications), production automation (robotization of irrigation, application of artificial intelligence elements and telemetry systems), as well as the implementation of a decision-making support system allow Calculating rational water use norms by conducting the differentiation of coefficients, parameters and constants included in the mathematical dependence in the field of mathematical models and the use of computer technology, which, in turn, depending on hydrometriological factors, determines the water requirements of plants.

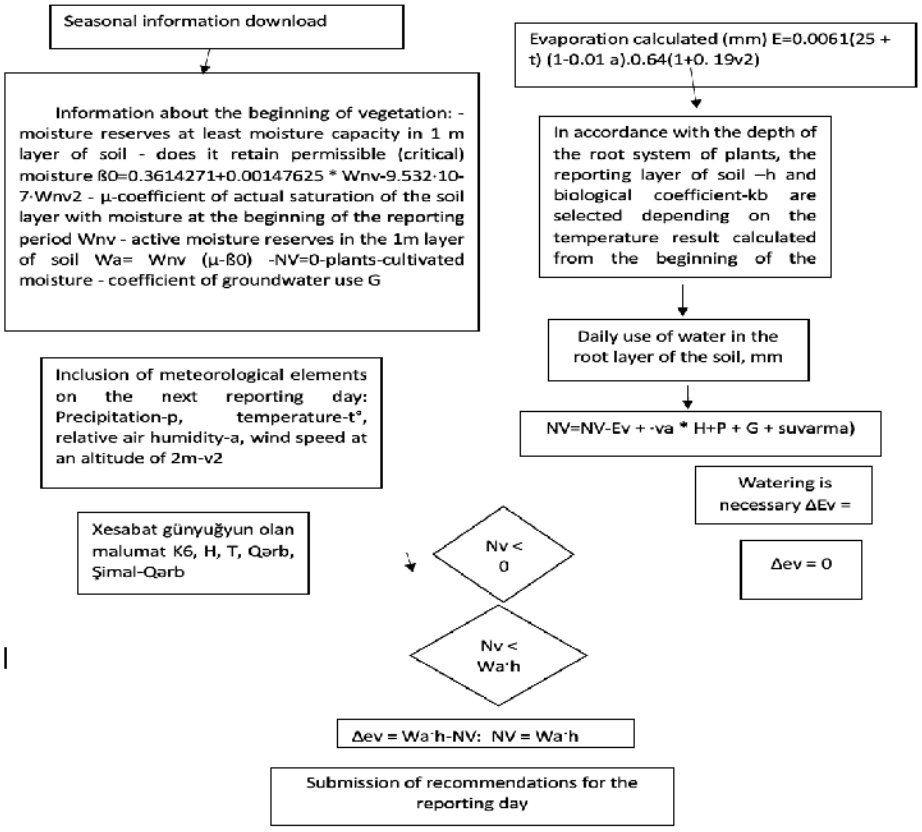
Keywords: Digital agriculture, Geoinformation portal, sensors, mobi, robotization of irrigation, Geoinformation systems, natural moisture potential, wind energy

INTRODUCTION

Introduction taking into account the limited water resources in the Republic, the uneven distribution of fresh water resources in various agro-climatic regions and the fact that 80-90% of the country's production is taken from irrigated lands, the rational use of Water Resources during the growing season is of strategic importance. The digitalization of the digital economy and agriculture is one of the most pressing issues of the era in order to make more efficient use of existing water resources in conditions of water incontinence, which may occur against the background of global climate changes, as well as to ensure sustainable food demand of the population. In this regard, large-scale research works were carried out in the direction of digitalization of the economy in European countries and positive results were obtained. In 2017, the government of the Russian Federation approved a program called “digital economy of the Russian Federation”, within the framework of which the Ministry of Agriculture of Russia developed a field program called “digital agriculture hazırlanmışdır.ki,in which its objective consists of comparing and interpreting analytical information, technological and other digital applications used to optimize irrigation management. My research discussion thanks to the introduction of digital technologies, it is possible to carry out “economical irrigation”, which, in turn, allows to significantly increase the effectiveness of agricultural production. Satellite data, sensor networks, data analysis, unmanned aerial vehicles (UAVs) increase the effectiveness of irrigation. The following basic elements of digital irrigation can be embossed: - Digital base: mapping, digitization, satellite data; - Digital tools:

Geoinformation portal, sensors, mobile applications; - Automation of production; robotization of equipment, application of artificial intelligence elements, telemetry systems; As part of the joint project, the SMAP satellite was launched by the joint efforts of NASA's Jet Propulsion Laboratory and the USA ASR remote sensing and Hydrology laboratory. The satellite collects data on soil moisture around the world without using data from ground-based devices and other field measurements. Using this information, the state and agricultural producers can obtain information about when, where and in what quantities irrigation water should be used. Specialized analysis elements (e.g. GPS com) include hydrological analysis, relief analysis, distance sensing and mapping of slopes and flow areas. It allows you to get a pixel image about the terrain with a resolution of 5cm and conduct various types of hydrological analysis on the basis of a digital model: drawing maps of water flows, determining areas without flows, drawing slope and profile maps of certain areas. Sensor networks allow you to control the water balance of plants, their evapotranspiration and the volumetric mass of water in the soil. Data analysis allows you to use data on energy consumption, environmental conditions in real time. Then it is possible to use this information to automate the irrigation system and in this way adjust the amount and frequency of water supplied on the basis of the collected actual material, which, in turn, makes it possible to make an optimal decision. Information received from Regional meteorological networks and stationary weather stations makes it possible to track the course of evapotsanspiration. By combining this information with information on precipitation and soil moisture, an accurate graph of irrigation can be drawn up. Geoinformation systems (GIS) are automated systems, the main tasks of which are the collection, integration, analysis of information about the presented objects, their graphical visualization in the form of maps or space-time schemes. In a word, the analytical tools of GIS allow solving many issues related to the stable rise in K/T production and cost reduction. The most famous foreign GIS include ArcGIS, AutoCAD (Autodesk, Inc. They belong to the USA) and so on. The inventions of foreign GISS have long been represented on the Russian market, but due to their high cost, as well as the small number of specialists working with them, certain difficulties arise during their use. They belong to the famous local GIS works GIS “Panorama agro, IAS, GEO-Agro”. Automation of processes in general makes it possible to increase the effectiveness of k/t units, reduce material and time costs spent on organizing work Control, and provide less time for collecting, processing and analyzing information about the progress of technological processes. In the field of irrigation, such means can be cited as an example of remote control of irrigation. (Trimble® Irrigate IQTM Trimble company) with the help of this management system, it is possible to control and control the operation of the irrigation system using any smartphone, computer and tablet computer. The Irrigate-IR system can be installed on any models of sprinkler installations, allowing control and control of all irrigation systems from a single center. Control and control in this system allows you to control the speed of movement of rain-Rainers, connection-off state, battery charge, pressure indicator, remote control of rain-Rainers, water consumption and direction of movement, check the system status, change the irrigation regime and receive text information about the activity of rain-Rainers. Unmanned aerial vehicles can be used for aerial photography and data collection, and the information should then be combined with software supply so that it is possible to know the trends of irrigation construction. The UAV-Ri is equipped with a camera and sensors and is capable of exploring large K/t areas in a matter of hours. This data allows farmers to create electronic maps of fields in 3D format, calculate the normalized NDVI vegetation index, invertalize the work carried out, and preserve crops. Equipped with hyper, multispectral and thermal sensors, the drones were capable of identifying areas requiring irrigation replacement. For example, Microdrones’+t kit md Solutions uses a sensor that can operate in five spectral ranges, allowing farmers to more accurately assess the condition of crops and irrigation in a short time. The main advantages of the system include the following: - the water supply can be adjusted to the demand of the k/t plant; - adjusts the operating intensity of the system to the

water-keeping capacity of the soil and prevents excessive water consumption; - 4 variants of auxiliary equipment allow to improve the performance of spraying nozzles, adjust the operation of chemical models and Fertilizers. - due to the possibilities of planning, the regulation of irrigation programs for several types of plants becomes lighter, partial crossing of the circle is facilitated in various soil structures and depressed areas. Decision-making support system FieldNET provides quick and convenient decisions on water supply, remote control of fertilizer and chemical distribution with circular and frontal systems, regulation of water cannons, injectors and pumps, monitoring and recording of all information from the use of water and energy to the measurement of temperature and amount of atmospheric precipitation. All this contributes to the shortening of the time spent in the field of cultivation, reduction of resource consumption and strengthening of control over the work carried out. FieldNET advizor-as 4 giant tools (irrigation, plants, air, precise irrigation) combined into one single solution, not only provides valuable tips on irrigation, but also easily integrates into the remote FieldNET monitoring and management system, allowing manufacturers to immediately apply their irrigation decisions and monitor their implementation. Let us cite as an example the classification of the functional. Irrigation block: - suggests the date and amount of watering; - information on daily and seasonal soil moisture deficiency for the entire area; - to predict the lack of water and the need for irrigation during the rest of the season; - warning about depletion of soil moisture; - warning about individual parameters of irrigation management and recommendations; - the automatic master installation of the starting field makes it possible to carry out several plant species, hybrids in different planting dates; - automated import of information about the land; - automated information on the conduct of irrigation (depth, location, date); - loading existing fields or land maps if necessary. Plants block: - information about the depth of the roots and the stage of painting the product allows manual adjustment; - recommendation for daily use of Water Resources; - conducts automated correction of crop-based irrigation recommendations. Air block: - informs about current weather conditions; - 15-day weather forecast for specific areas; - 15-day weather forecasts for specific regions; - warning about the amount of precipitation changing during the day and weather variability in field conditions; - information from desert meteorological station in addition to desert conditions. Accurate irrigation block: - automatic issuance of constantly updated plans of periodic irrigation of each sector; - automatic renewing complete plans of irrigation (this requires GPRS Grade Master Precision with individual control sprinklers); - the periodic irrigation plan of each sector is dynamically optimized, taking into account the stage of development of k/T plants, root vegetation, weather, irrigation uses, as well as soil variability throughout the territory.



CONCLUSİON

1. Within the framework of the program “Digital Economy”, the government of Azerbaijan should develop a field program “digitalization of Water Resources and agriculture” by the Ministry of Agriculture of Azerbaijan and the State Water Resources Agency. The adoption of the irrigation digitalization program will lead to the development of new innovative digital technical and technological programs in the management of irrigation. 2. The research has shown that the use of modern digital technologies in the management of irrigation, the creation of a digital base (mapping, digitization, satellite data), the development of digital instruments (Geoinformation portal, sensors, mobile applications), automation of production (robotization of irrigation, application of artificial intelligence elements and telemetry systems) will greatly enable the efficient use of Water Resources at the maximum level, 3.Studies carried out in large farms and agro-parks show that due to partial operational management of the area, water losses are 20-25%, and the land use coefficient is 0.95 due to the use of water and land resources at the maximum level..

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