

The Third Place Research & Development

Scientific Committee: Water Management, Agriculture and Natural Resources

Research Work Title

Design and Implementation of an Intelligent Water Management System in Agriculture



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Abstract:

The intelligent irrigation management technology, branded as Baba Heider, is an online web application developed using AI, remote sensing, and crop modeling. It takes into account the farm's geographic and climatic conditions, as well as the physical and chemical properties of soil and water, technical specifications of the irrigation system, emitter flow rates and pressures, planting dates, crop patterns, and plant varieties. By calculating real-time water requirements of plants during their growth period or analyzing data from soil moisture sensors, Baba Heider provides a smart irrigation schedule tailored to the specific crop, either automatically or upon request. The system allows farmers to input their preferences regarding water quantity and timing constraints, generating an interactive and tailored irrigation plan for each plot of land, ranging from 1,000 square meters to 100 hectares. Additionally, it offers frost warnings and forecasts on weather conditions, soil moisture, and evapotranspiration rates. At an advanced and customized level, it can optimize irrigation and nitrogen fertilizer management, as well as planting dates, for entire villages, agro-industrial complexes, or rural cooperative organizations within a specific region. This optimization is based on climate conditions, the hydraulic characteristics of the irrigation network, water and soil quantity and quality, and crop types and varieties. Ultimately, Baba Heider enables smart farming and irrigation practices at the field level, improving water productivity, crop yields, and farmer profits while minimizing equipment damage. The system is a management tool that operates on the farmer's existing infrastructure without requiring additional investment. It is a timeless product that improves over time as its data bank grows, and passive defense measures have been incorporated into its processes and system development. Considering the effectiveness of intelligent irrigation management in increasing production, enhancing water use efficiency, boosting farmer profitability, and, most importantly, reducing the cost of production, as well as the very low investment required for smart irrigation management compared to the infrastructure investments and economic costs associated with developing modern irrigation systems and current investments in seasonal cultivation, Baba Heider represents the best sustainable approach to increasing the self-sufficiency coefficient of agricultural products.

