A Solar Powered Internet of Things (IoT) Based Real-Time Weather Monitoring System for Precision Agriculture and Farming

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To meet the growing demand for food in the Middle East and North Africa (MENA) region, many countries are investing in new technologies and digitization of agricultural services. Precision agriculture is a crucial part of this effort, but traditional weather monitoring stations are highly expensive and positioned far from the fields, resulting in inaccurate data that fails to capture the microclimate of the farm. Furthermore, the delay in transmitting data in real-time renders the information irrelevant for immediate decision-making by farmers. To solve this problem, a solar-powered weather monitoring system has been developed using Internet of Things (IoT) and low-cost sensors that provide farmers with real-time, localized weather information and alerts on their smartphones. A network of these weather stations can be conveniently deployed throughout the MENA region to facilitate precision farming and agriculture. These low-cost IoT-based weather stations can also be designed and developed by high school students, encouraging a new generation of scientists and engineers. Farmers can share local weather data to gain insight into the distribution of water and energy stocks and fluxes, resulting in improved irrigation and agricultural resource management. This project has the potential to make a significant contribution to the future of agriculture in the MENA region and beyond. With precision agriculture and localized weather data, farmers can optimize their crop production, reduce costs, and minimize environmental impact, resulting in sustainable agriculture and food security.