AGRIGENT: Enhancing Greenhouse Agriculture with IoT (Internet of Things)-Enabled Automated Irrigation and Rainwater Harvesting System for Improved Crop Growth and Water Efficiency

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In the Philippines, where one-third of employment is in the agricultural sector, low agricultural productivity has hindered economic growth. Thus, AGRIGENT was developed to improve greenhouse' regulated environment by utilizing Internet of Things (IoT) technology logging the collected data into the ThingSpeak server and featuring an Android widget to display this data. This system eliminates the need for ongoing human supervision by monitoring temperature, humidity, water level and soil moisture independently. Notably, the system integrates a provision for setting alarm thresholds, which enables the timely generation of alerts in response to crucial conditions, hence facilitating prompt and well-informed decision-making. In this paper, the researchers investigated an intelligent greenhouse monitoring system that works within reasonable bounds of IoT technology and includes devices that were programmed to control parameters in accordance with preset values. The controlled environment (AGRIGENT) demonstrates a significantly greater average growth rate of 40.82%, whereas the second group records a comparatively lower average of 31.67%. The observed disparity in the mean growth rates exhibits statistical significance, as evidenced by a computed t-statistic that exceeds the crucial t-value for a one-tailed hypothesis test. Furthermore, the calculated probability value (P(T<=t) of .013 is lower than the predetermined significance level, indicating statistical significance in the desired direction. Additionally with its rainwater harvesting system and design, it helps conserve water.

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