

PAPER TITLE: From Tradition to Innovation: IoT-Enabled Precision Farming Strategies for Optimal Resource Use Efficiency in Tomato Crop Management

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PROBLEM MENTIONED/SOLUTION OBTAINED:

The paper addresses the challenge of inefficient water and fertilizer usage in traditional tomato crop management practices. It proposes the adoption of IoT-enabled precision farming strategies to optimize resource utilization and enhance crop productivity while minimizing environmental impact. By integrating wireless sensor networks and automated irrigation systems, the study aims to improve water and nutrient management in tomato cultivation.

TOOLS USED/IMPLEMENTED:

- Wireless Sensor Networks (WSN)
- Automated Irrigation System
- IoT Nodes for soil moisture and temperature monitoring
- Digite AgWise mobile application for real-time monitoring and control

RESULTS AND DISCUSSION:

1. Growth Parameters: Both Sahoo and SVTD8323 varieties exhibited significant increases in plant height and number of branches with optimized fertilizer treatments (F1 and F2). This indicates enhanced vegetative growth and branching, contributing to overall crop development.
2. Fruit Production: Fertilizer treatments led to increased fruit yield and weight in both varieties. The number of fruits per plant and fruit weight showed notable improvements with the F1 and F2 treatments compared to the control, indicating the positive impact of optimized nutrient management.
3. Water Usage: The implementation of sensor-based irrigation systems resulted in reduced water consumption, ranging from 29% to 39% compared to traditional irrigation practices. This demonstrates the efficiency of IoT-enabled precision irrigation in conserving water resources while maintaining crop productivity.
4. Profitability: Economic analysis revealed that the F2 treatment, combining 75% RDF and a soil water potential of -50 kPa, yielded the highest benefit-to-cost ratio. This suggests that precision farming practices not only enhance crop yield but also improve profitability for farmers.

IMPORTANT REFERENCE:

Zhang et al. (2016): Demonstrated the potential of optimized irrigation practices in achieving significant water savings and maximizing crop yield.

Wang & Xing (2017), Tesfay et al. (2019), Zhuo & Hoekstra (2017), Monte et al. (2013), Amala & Syriac (2016): Studies supporting the benefits of moderate irrigation in tomato cultivation for higher yield and water use efficiency.