

# IoT-Based Seed Sowing and Spraying Machine

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**Abstract:** *This paper presents an IoT-based automated system for seed sowing and pesticide spraying, aimed at addressing key challenges faced in modern agriculture, including labour shortages, inefficient resource usage, and excessive reliance on chemicals. The proposed system integrates various components such as soil moisture sensors, temperature and humidity sensors, ultrasonic obstacle detectors, actuators, and a microcontroller (ESP32) with Wi-Fi connectivity. These components work together to assess environmental conditions in real time, enabling precise seed placement and timely pesticide application only when necessary.*

*By using real-time data and automation, the system significantly reduces human effort while increasing operational efficiency and accuracy. It ensures optimal use of agricultural inputs, helping to minimize waste and environmental impact. The machine also features cloud connectivity, allowing farmers to monitor and control operations remotely through a mobile application or web interface.*

*Powered by solar energy, the system is energy-efficient and well-suited for remote or off-grid farming locations. The design promotes sustainable and smart farming practices, making it especially valuable for small and medium-scale farmers. Overall, the implementation of this IoT-based agricultural solution can play a vital role in enhancing crop productivity, conserving resources, and supporting the transition toward precision agriculture.*

**Keywords:** Internet of Things (IoT), Precision Agriculture, Smart Farming, Automated Seed Sowing, Wireless Monitoring System

