

# IoT Based Smart Irrigation Management System Using Rainfall

<https://www.youtube.com/watch?v=tD28L9X-8Xc>

Agricultural water management is crucial for sustainable farming, especially for water-intensive crops like corn. This project presents an IoT-based Smart Irrigation Management System utilizing Raspberry Pi Zero 2W, machine learning, and real-time weather and soil moisture data to optimize water usage efficiently. The system integrates soil moisture sensors, an LCD display, a relay module, and an AC motor-driven irrigation pump to automate irrigation based on real-time environmental conditions.

Machine learning models analyze historical and real-time weather data, including rainfall predictions, temperature, and humidity, to make intelligent irrigation decisions. The Raspberry Pi Zero 2W acts as the central controller, processing sensor data and triggering the irrigation system accordingly.

The proposed system significantly enhances irrigation efficiency, reduces water wastage, and improves corn crop yield. By leveraging machine learning, this system contributes to sustainable agriculture and resource conservation, ensuring a cost-effective and eco-friendly irrigation solution.

## Features:

- **Automatic Watering** – The system waters the corn crop only when needed using sensors and a water pump.
- **Smart Weather Prediction** – Uses machine learning to check rainfall, temperature, and humidity before irrigating.
- **Soil Moisture Check** – Sensors detect soil dryness and trigger irrigation only if necessary.
- **Live Updates on LCD** – A display shows real-time moisture, weather, and system status.

- **Energy Efficient** – Saves electricity by running the pump only when required.
- **Designed for Corn Crops** – Optimized specifically for corn but can be adjusted for other crops.
- **Water Conservation** – Uses only the necessary amount of water, preventing wastage.

**The main blocks of this project are:**

1. Power supply.
2. Raspberry pi zero 2W.
3. AC water Motor with relay driver.
4. Soil moisture sensor.
5. LCD display.
6. SD card.

**Software used:**

1. Embedded Linux programming.
2. Express SCH for Circuit design.
3. Python Language.
4. Machine learning.

**Block Diagram:**  
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