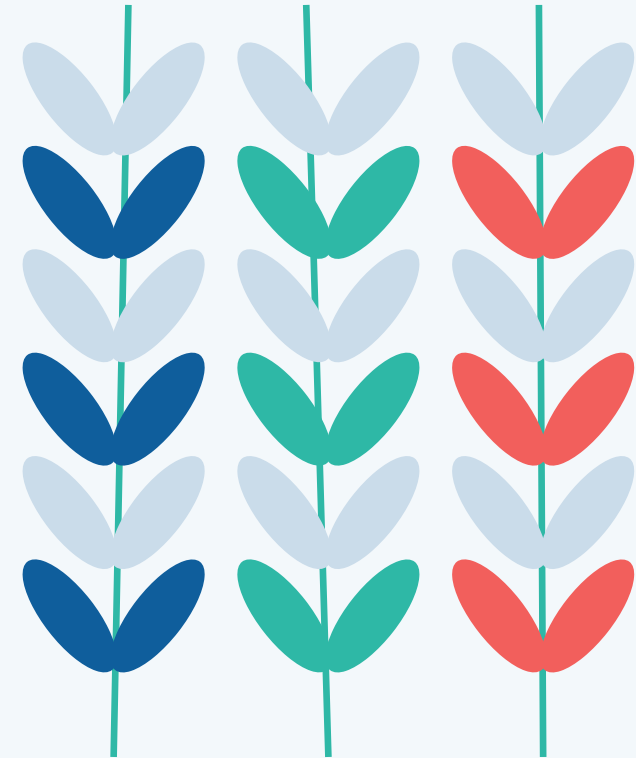


FINAL YEAR PROJECT · B.TECH ELECTRONICS & COMMUNICATION

Smart Irrigation System using IoT

Soil-moisture driven watering for small farms



PRESENTED BY
Aarav Sharma · Diya Patel

GUIDED BY
Prof. R. K. Mehta

DEPARTMENT
Electronics & Communication, 2025-26

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01

INTRODUCTION

**Up to half of irrigation
water on small farms is lost
to over-watering.**

Why this project matters

BACKGROUND

Introduction

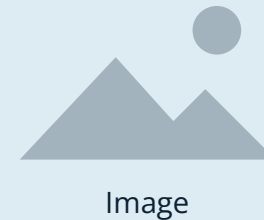
- Agriculture depends heavily on timely, measured irrigation
- Manual watering wastes water, power and labour
- Low-cost sensors and microcontrollers make automation affordable
- This project builds a sensor-driven pump controller with a phone dashboard

CONTEXT

Flood irrigation is still the most common method on small Indian farms.

Objectives

- Measure soil moisture, temperature and humidity in real time
- Switch the pump automatically using threshold logic
- Show live readings and alerts on a mobile dashboard
- Keep the total hardware cost under ₹2,500 per unit



02

LITERATURE & GAP

EXISTING WORK

Literature survey

Study	Approach	Limitation
Kumar et al.	GSM-based pump control	No sensor feedback
Rao & Singh	Timer-based drip system	Ignores weather and soil
Fernandes	Cloud dashboard prototype	Needs constant Wi-Fi

Representative summaries — replace with your own citations.

Existing vs proposed system

Existing system

- Fixed timers or manual switching
- No data on soil condition
- Water and power wasted

vs

Proposed system

- Sensor-based automatic switching
- Live dashboard with alerts
- Lower water and power use

System architecture

1

Sense

Moisture, DHT11 and rain sensors read field data

2

Process

ESP32 compares readings with crop thresholds

3

Act

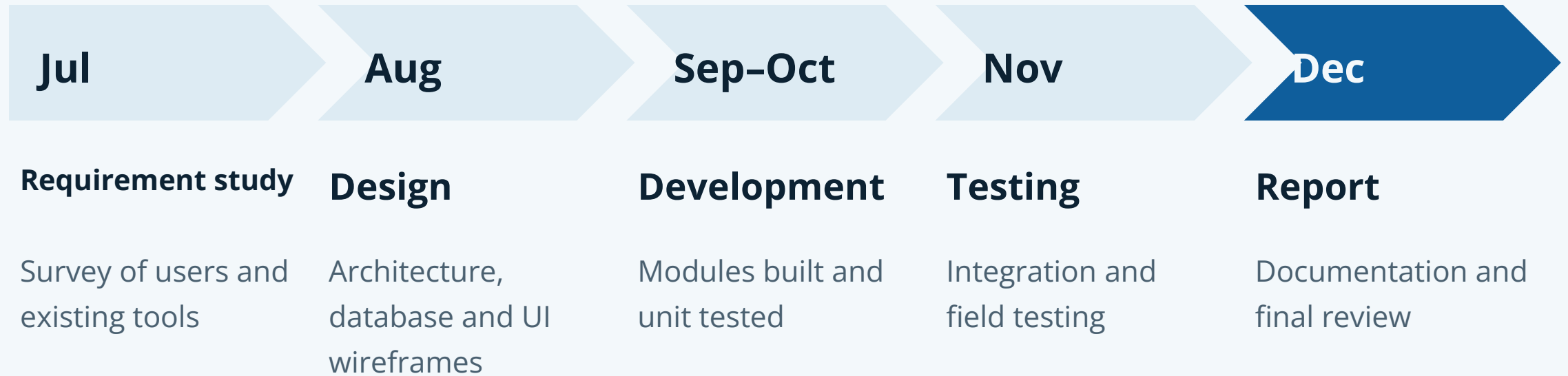
Relay switches the pump on or off

4

Notify

Readings and alerts sync to the app

Project timeline

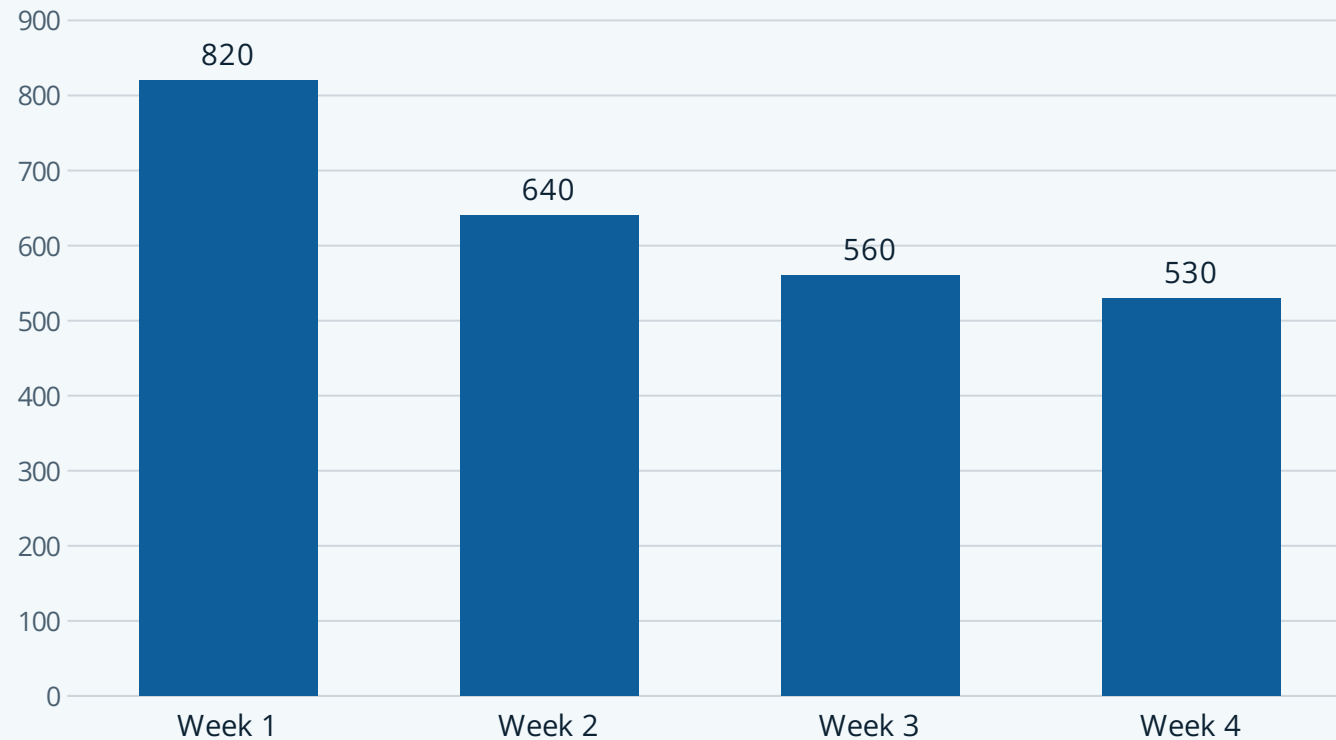


03

RESULTS

EVALUATION

Results



Sample data for illustration — replace with your own figures.

35%

**less water than the manual
baseline**

Automatic switching cut water use steadily as thresholds were tuned for the crop.

AT A GLANCE

Key outcomes

35%

less water used in the
test plot

₹2,300

hardware cost per unit

< 2 s

pump response time

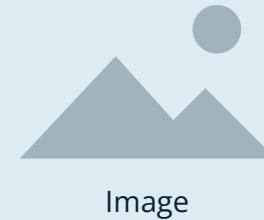
Figures from our test setup (sample data).

04

CONCLUSION

Conclusion

- A low-cost controller can automate irrigation reliably
- Sensor feedback avoids over-watering and saves power
- The dashboard gives farmers visibility without field visits



Future scope

1

Weather forecast

Skip watering when rain is expected

2

Solar power

Run the unit fully off-grid

3

Multi-zone

Control several valves per farm

Thank you

Questions and suggestions are welcome.

Aarav Sharma · Diya Patel

Dept. of Electronics & Communication

