

# INTRODUCTION TO SMARTGARDEN

AN IOT-ENABLED SUSTAINABLE  
GARDENING SYSTEM

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# OUTLINE

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3. Hardware Components
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# INTRODUCTION & MOTIVATION



## Urbanization Challenges

Rapid city growth is shrinking at-home green spaces and driving up water costs—making casual gardening harder than ever.

## Trial-and-Error Gardening

Nearly half of first-time plant keepers kill their new houseplants by misjudging watering frequency and volume (Nat'l Gardening Assoc., 2020).

## Our SmartGarden Solution

A fully offline, DIY IoT 'watering coach' that measures soil moisture and delivers precise doses—so you never over- or under-water again.



# BACKGROUND & RELATED WORK



## Commercial Smart-Garden Kits

- PlantLink Pro (~\$70 USD): wireless soil-moisture sensor + cloud dashboard, 6–12 hr sampling, subscription for alerts
- Garduino DIY kit (\$50–\$80): Arduino-based moisture monitor; requires manual coding & no mobile UI

## Enabling Open-Source Tech

- Sensors: Capacitive soil-moisture (VH400), Atlas Scientific pH probe, DHT22 temp/humidity
- Controllers: Arduino Pro Mini (3.3 V), ESP-01 (Wi-Fi), MT3608 boost regulator
- Protocols: MQTT pub/sub for telemetry, REST API for control, local-only operation

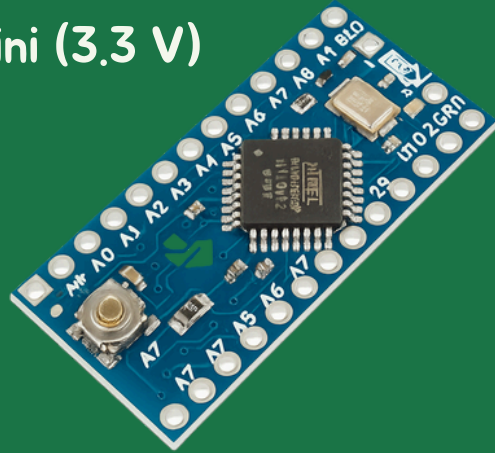
## The Gap We Fill

- No end-to-end DIY kit that's offline, no cloud lock-in, live-demo ready, and mobile-friendly out of the box

# HARDWARE COMPONENTS

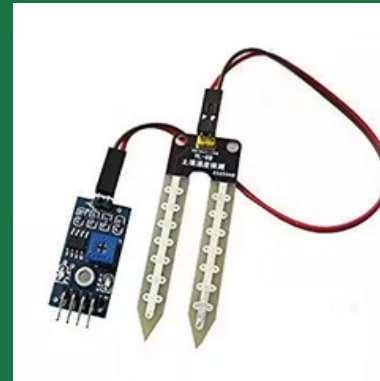
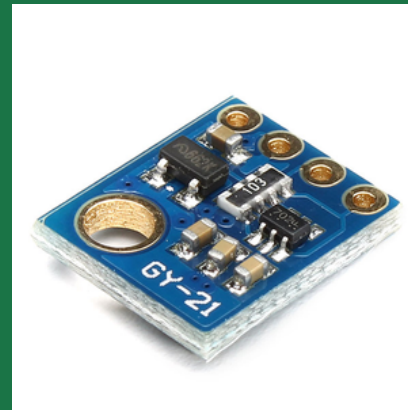
## Brain

Arduino Pro Mini (3.3 V)



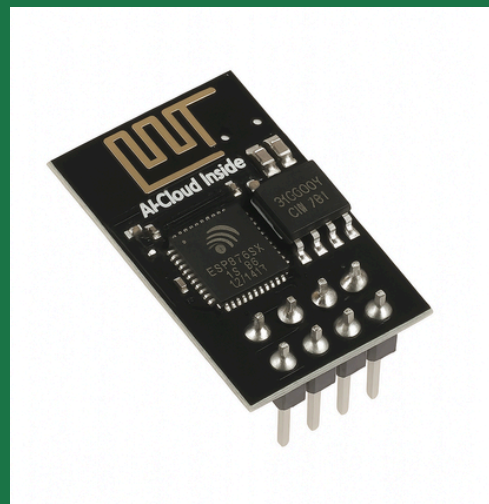
## Sensors

- SHT21 (temp & RH via I<sup>2</sup>C)
- Resistive soil-moisture probe (analog)



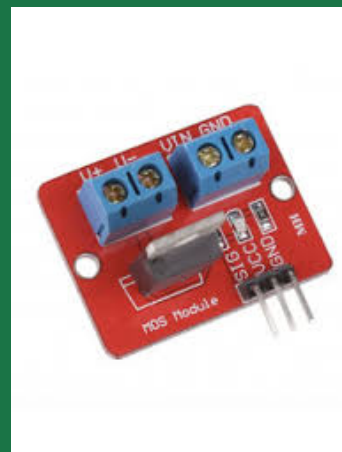
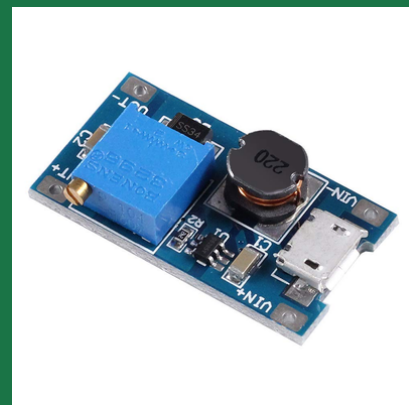
## Communication

ESP-01 (ESP8266 Wi-Fi module)



## Power & Actuation

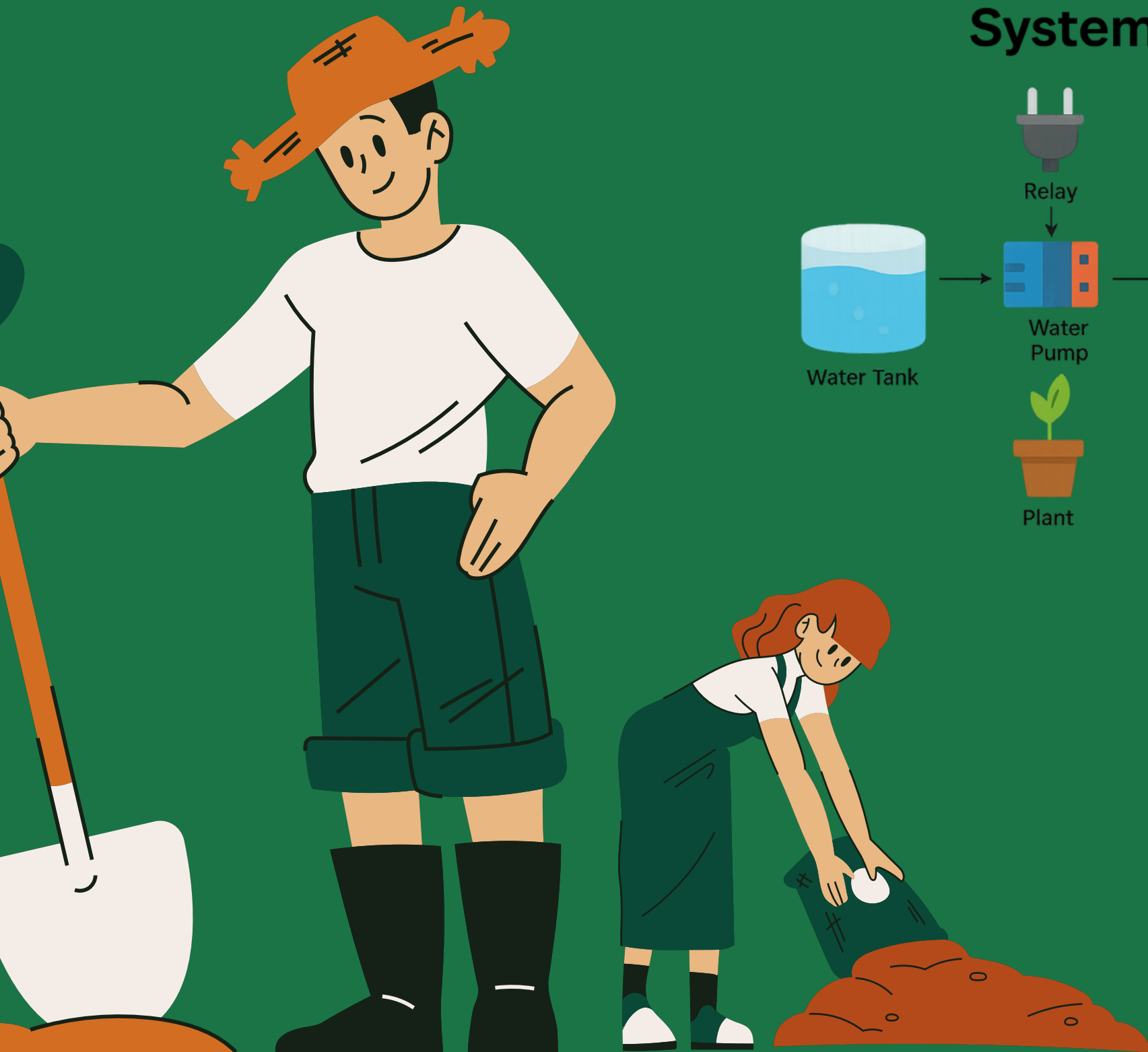
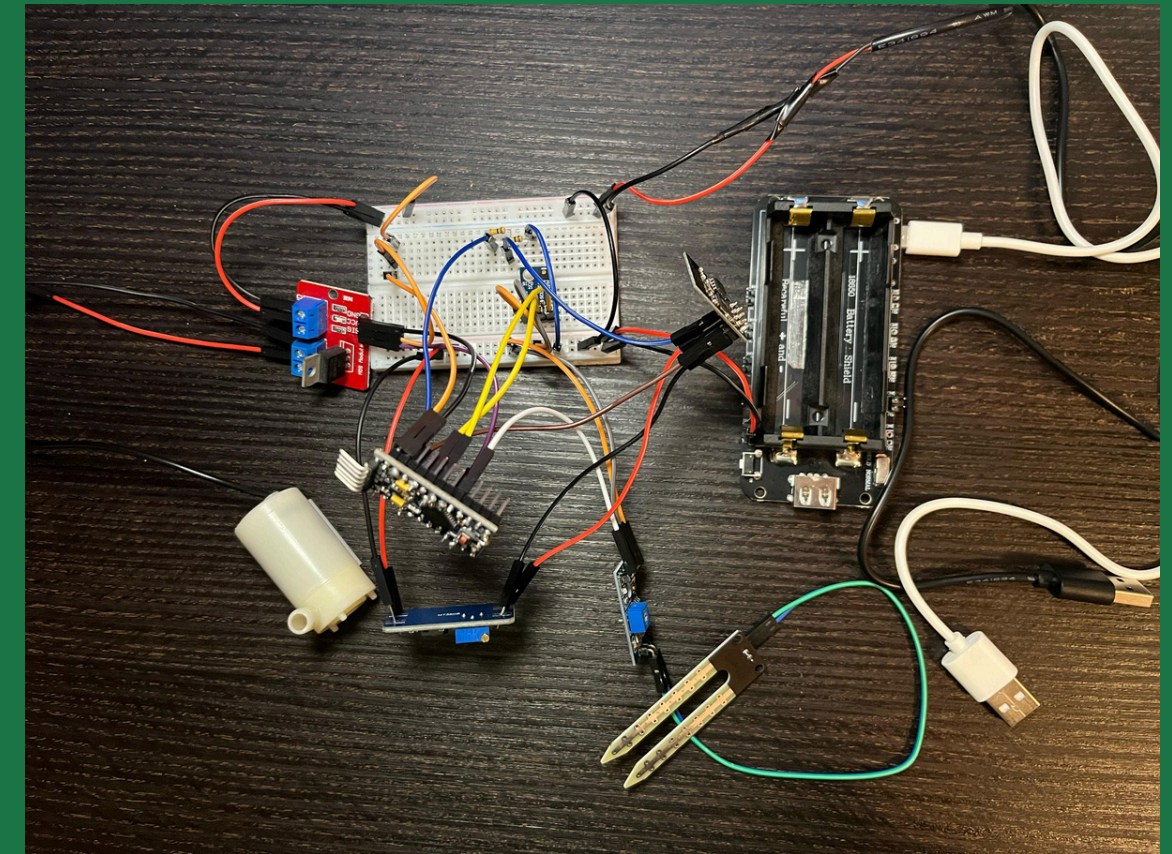
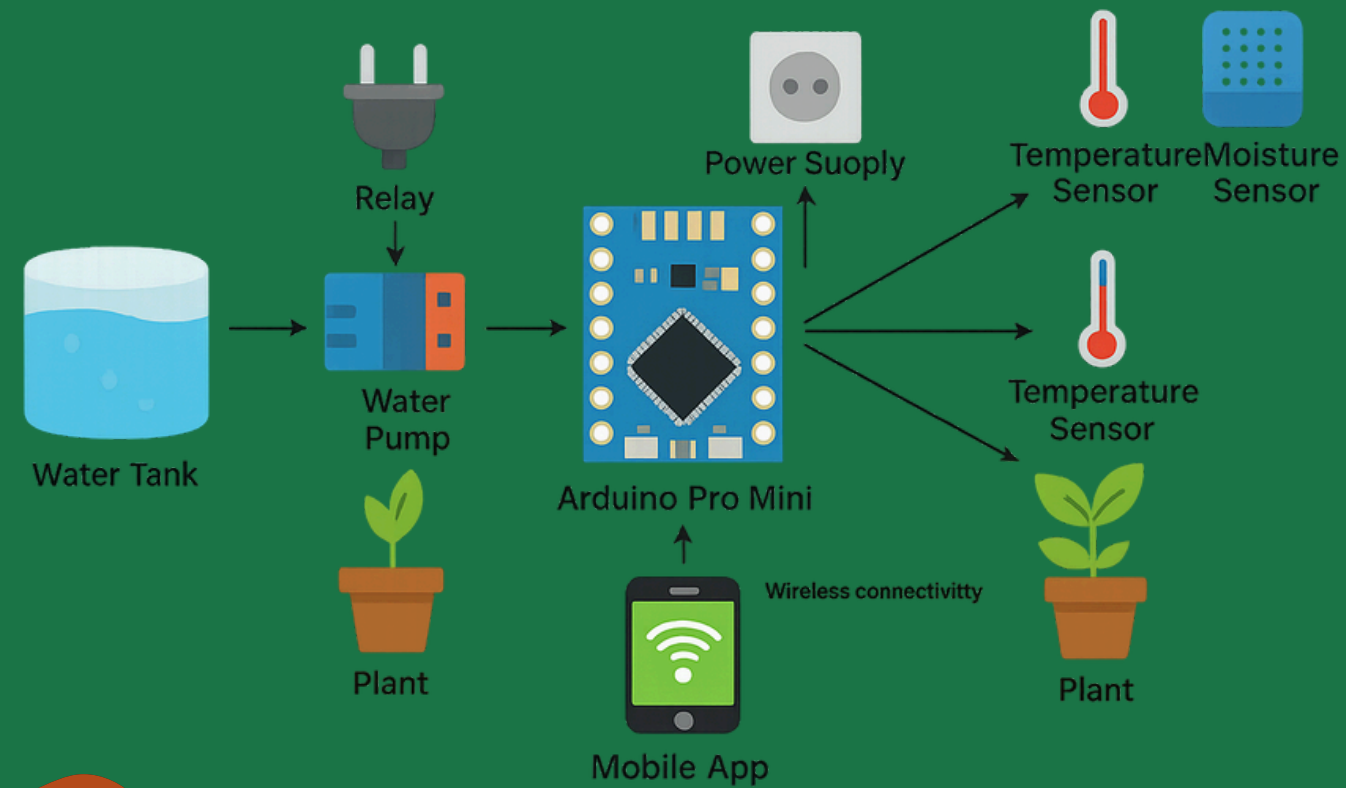
- MT3608 boost converter (to 5 V)
- IRF520 MOSFET relay + submersible pump





# SYSTEM ARCHITECTURE & WIRING

## System Architecture

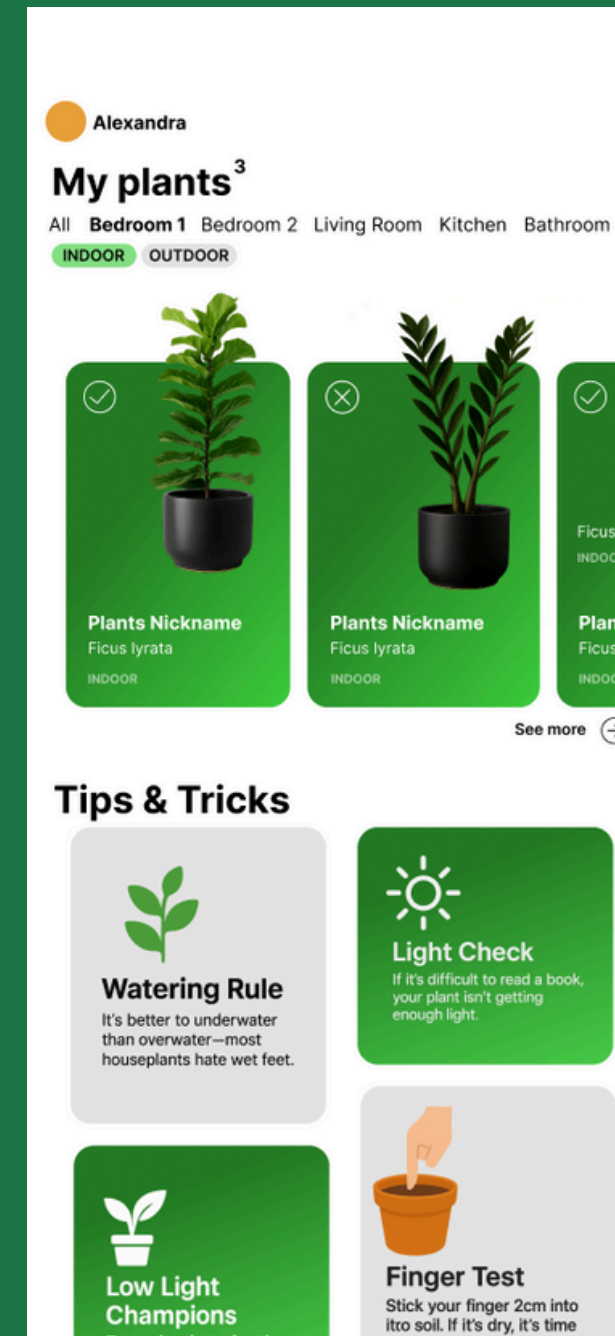


# SOFTWARE & MOBILE APP

## App Features

- Dashboard of all connected plants, with real-time graphs (moisture, temp, pH)-
- Manual & Auto-Watering toggle plus countdown to next irrigation
- Tips & Tricks cards for plant care best practices

## TECHNOLOGIES USED





# CONCLUSIONS & FUTURE WORK

SmartGarden proves that an offline DIY IoT system can save 30 % water while maintaining ideal soil conditions. Next, we'll add reservoir and light sensors, AI-driven watering predictions, and push-alert notifications for seamless plant care.







THANK YOU  
FOR YOUR  
ATTENTION!

