

SMART INDIA HACKATHON 2024

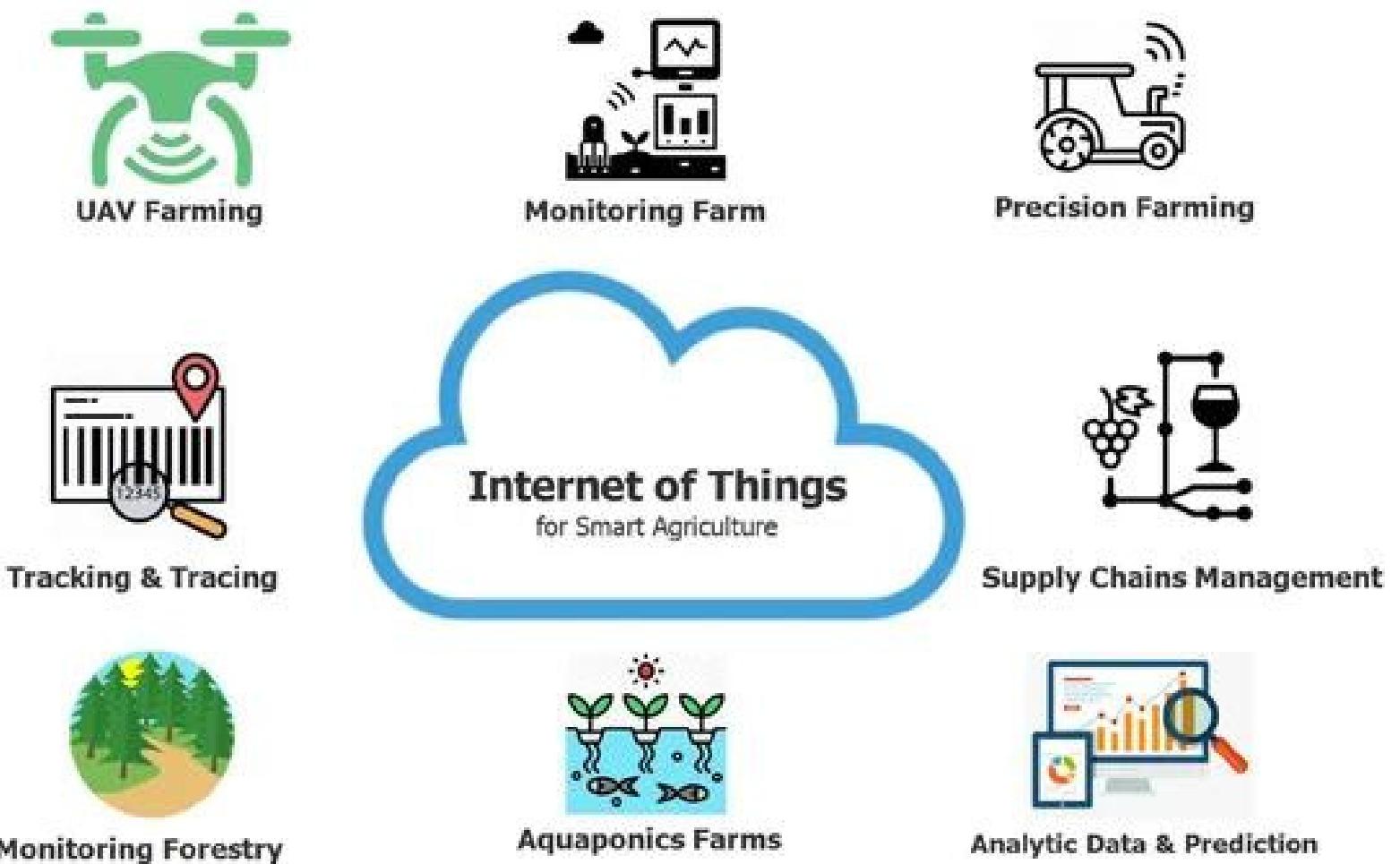
AGRI-FLOW

- Problem Statement ID : **1554**
- Problem Statement Title :-
Auto Irrigation System for Precision Farming
- Theme :-
Agriculture, FoodTech, Rural Development
- PS Category :-
Hardware
- Team ID :
- Team Name (Registered on Portal):
Team InnovateX



AGRI-FLOW

- It is a Smart Automatic Irrigation System that utilizes Sensors and IOT Technology to monitor Temperature, Humidity, Soil Moisture and Motion Sensors. This System will provide Real-Time Data to Farmers on their Mobile using the Blynk App, enabling them to make informed decisions on Irrigation Scheduling, thus optimizing water usage and enhancing crop yield. The System will automatically provide water to Crops when Soil Moisture Level decreases below a certain Level.



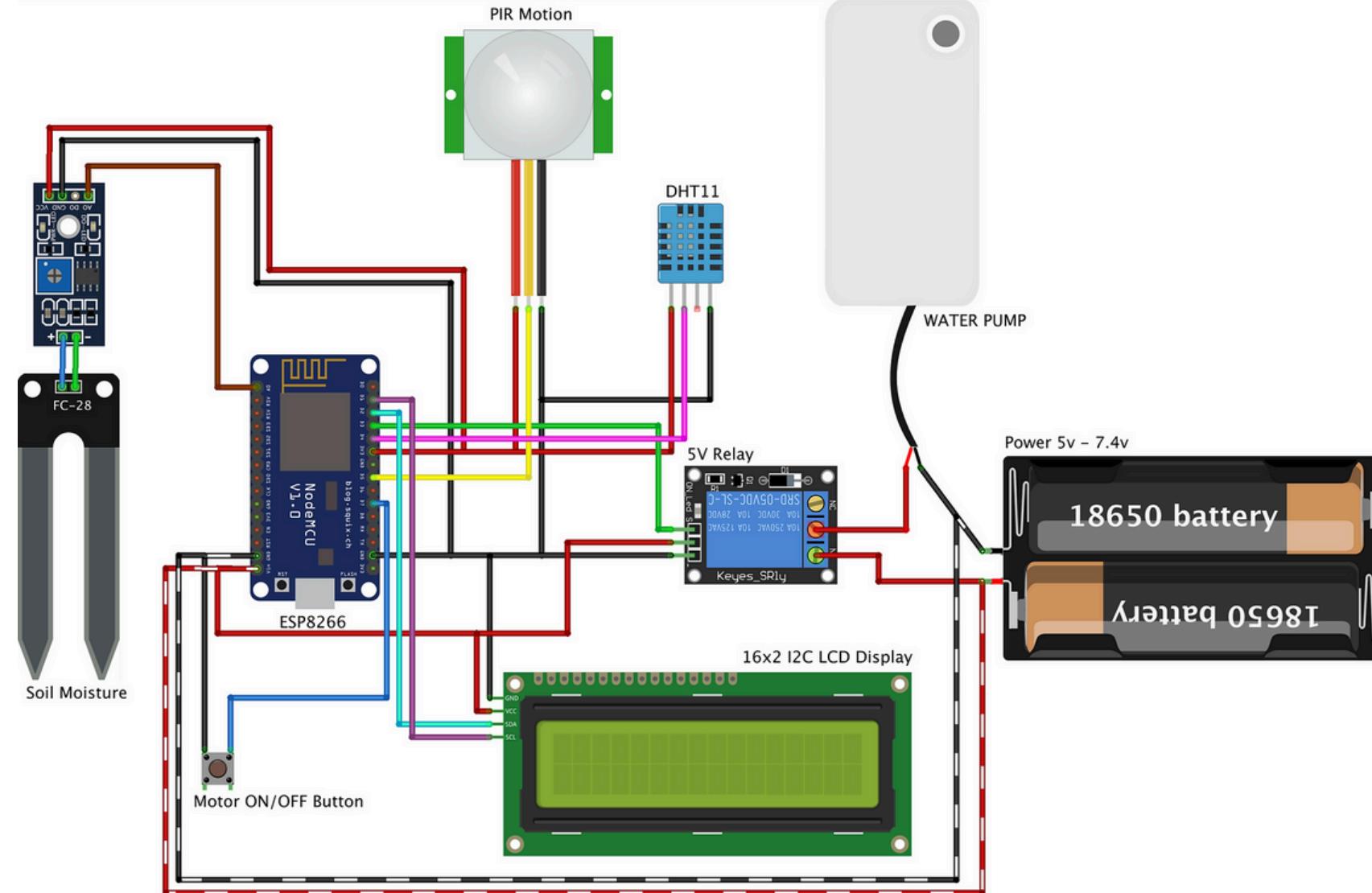
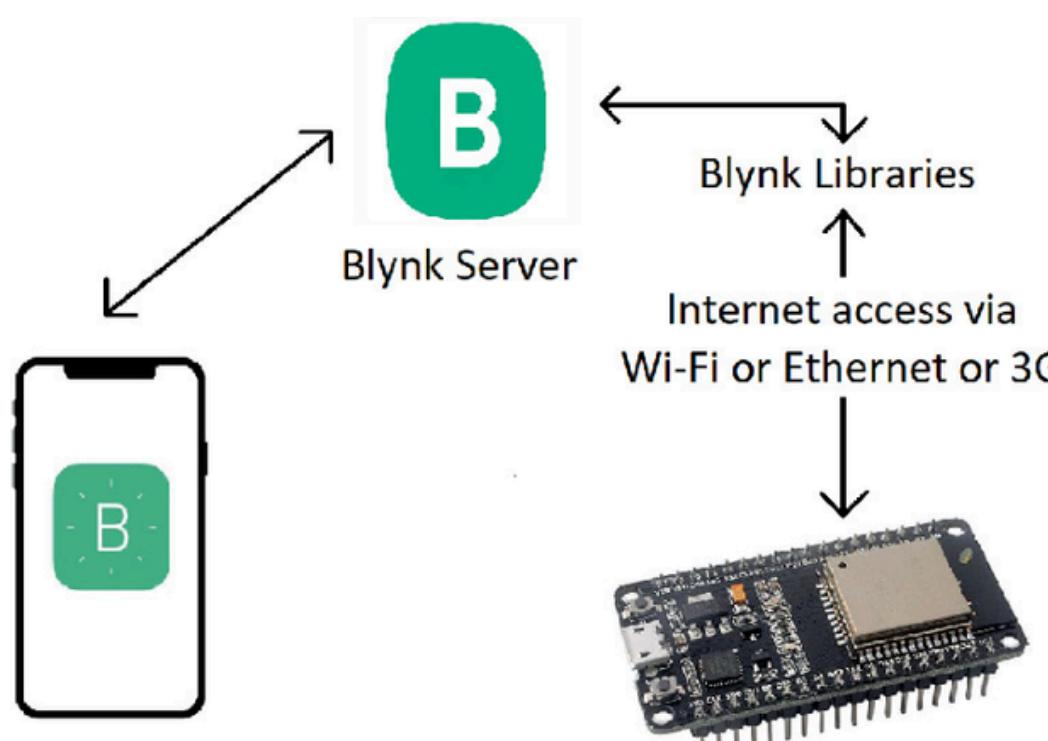
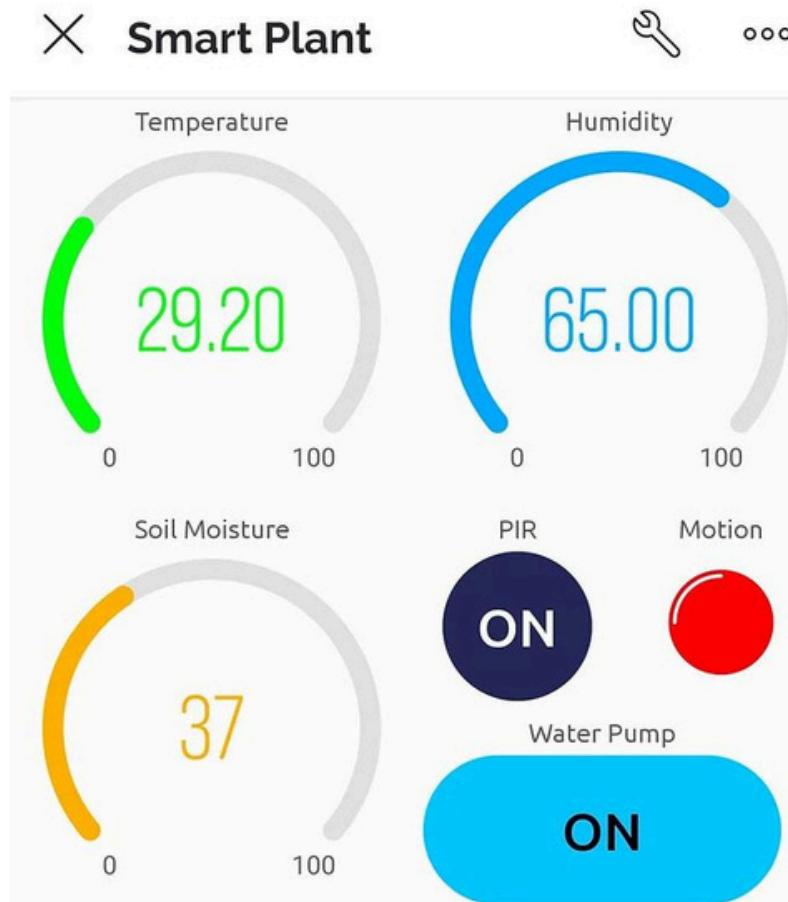
- Solutions Provided By the System :-**

1. Precision Watering
2. Soil Moisture Sensors
3. Weather Integration
4. Remote Control and Automation
5. Scheduled Irrigation & Fertilisation
6. Water Recycling and Conservation
7. Integration with Other Technologies
8. Customizable Settings

TECHNICAL APPROACH

- The Entire System is based on the NodeMCU ESP 8266 Wifi Based Chip which controls the entire System and sends the Data to the IOT Cloud of Blynk Server. The Data then can be viewed through the Blynk App in Mobile by Farmers/Users. The Data will also be viewable in the Field through a small LCD Display.
- The System also consists of Temperature & Humidity Sensors (DHT11), Soil Moisture Sensor, Motion Sensor (PIR).

BLYNK APP TEMPLATE



- Blynk is an IOT platform that enables remote control and monitoring of devices through a mobile app. In an irrigation system, Blynk allows users to automate watering schedules, monitor soil moisture levels, and control valves from anywhere, optimizing water usage and enhancing efficiency. It will be provided with Indian Regional Languages Support for Farmers' Convenience.

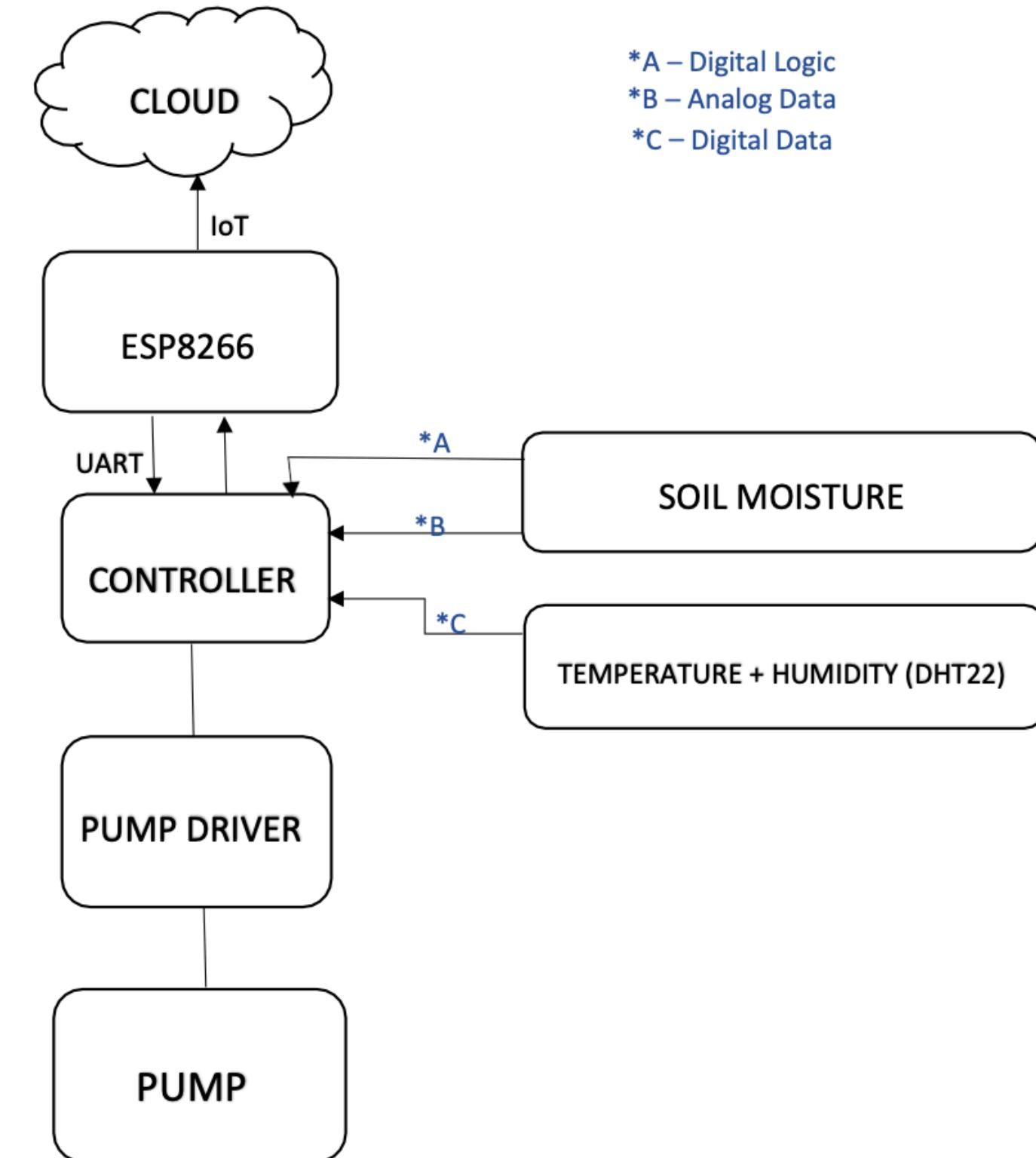
FEASIBILITY AND VIABILITY

- **The Idea is definitely Feasible but with certain Challenges:**

1. The Entire System needs a Well Equiped Wifi System/Internet Service. Since many Villages in India is not yet Equiped with proper Internet Service.
2. The System is not Programmed for Multiple Watering Patterns especially when Different Varieties of Crops are planted in the Same Plot.
3. The System runs on Constant Power Supply i.e Entire System will go Offline in case of Power Cut which is common in Indian Villages.

- **Strategies for overcoming these Challenges:**

1. The Villages where this System is Used Majorly, the Administration Organisation should request Government for Installation of Internet Service.
2. The Multiple Watering Patterns can be introduced in the System with further Developments using AI or Deep Learning.
3. The Constant Power Supply Need can be met by Installing Solar Panels, thus having Reserve Power Source in case of Power Cut.



IMPACT AND BENEFITS

- Increased Efficiency:**

Automating irrigation helps in precise water application, reducing water wastage and ensuring that crops receive the optimal amount of moisture. Farmers save time on manual irrigation tasks, allowing them to focus on other agricultural activities.

- Economic Benefits:**

Higher yields and better quality crops can lead to increased income and profitability for farmers. Better management of water and other resources can reduce overall operational costs.

COUNTRY	AGRICULTURAL WATER WITHDRAWALS (billion m³)	TOTAL WATER WITHDRAWALS (billion m³)	AGRICULTURAL WATER WITHDRAWALS AS PERCENT OF TOTAL WATER WITHDRAWAL (%)	AREA EQUIPPED FOR IRRIGATION (m ha)	AREA EQUIPPED FOR IRRIGATION AS PERCENT OF AGRICULTURAL AREA (%)	AGRICULTURAL WATER WITHDRAWALS PER AREA EQUIPPED FOR IRRIGATION (m)
India	688	761	90	67	37	1.0
China	358	554	65	69	13	0.5
United States	175	486	40	26	6	0.7
Pakistan	172	184	94	20	75	0.9
Indonesia	93	113	82	7	12	1.3
Iran, Islamic Rep.	86	93	92	10	19	0.9
Vietnam	78	82	95	5	42	1.6
Philippines	67	82	82	2	13	3.4
Egypt, Arab Rep.	67	78	86	4	100	1.5
Mexico	62	80	77	7	6	0.9

Source: Scheierling and Tréguer 2016b, based on FAO 2016a, 2016b.

688 billion cubic metres: India's water withdrawals for agriculture is the highest in the world

Globally, irrigation accounts for an estimated 70 per cent of total freshwater withdrawal



- Enhanced Crop Yields:**

Consistent and precise watering improves plant growth and crop yields. Plants experience less stress from inconsistent water supply, leading to healthier crops.

- Labor Savings:**

Automates the irrigation process, reducing the need for manual labor and enabling farmers to allocate resources to other tasks.

RESEARCH AND REFERENCES

AGRICULTURAL WATER WITHDRAWALS IN INDIA :-

- <https://www.downtoearth.org.in/water/688-billion-cubic-metres-india-s-water-withdrawals-for-agriculture-is-the-highest-in-the-world-60967>



IRRIGATION WATER USE IN INDIA :-

- <https://science.thewire.in/environment/a-way-forward-to-reduce-irrigation-water-use-in-india/>



USE OF IOT TECHNOLOGY IN AGRICULTURE :-

- <https://www.cropin.com/iot-in-agriculture>

