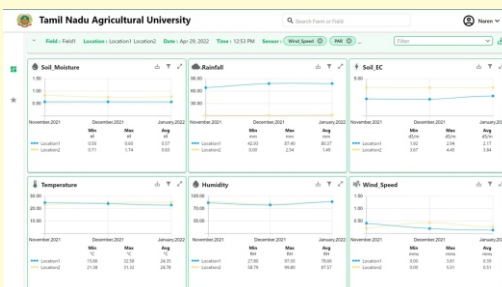
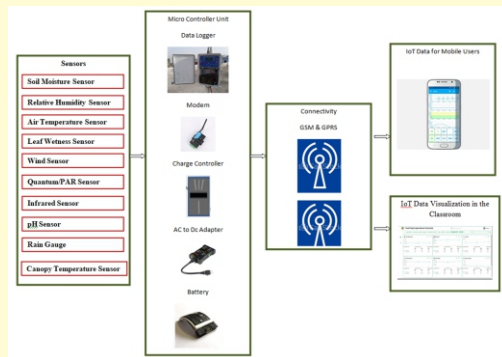


approach allows getting a cleaner and more organic final product compared to traditional agricultural methods.

- **Agility:** Real-time monitoring and prediction systems, farmers can quickly respond to any significant change in weather, humidity, air quality as well as the health of each crop or soil in the field. In the conditions of extreme weather changes, new capabilities help agriculture professionals save the crops.
- **Improved product quality:** Data-driven agriculture helps both grow more and better products. Using soil and crop sensors, aerial drone monitoring and farm mapping, farmers better understand detailed dependencies between the conditions and the quality of the crops. Using connected systems, they can recreate the best conditions and increase the nutritional value of the products.



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Agricultural-Internet of Things (Ag-IoT) : Smart Farming Solutions



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Internet of Things (IoT) for Agriculture: Smart Farming Solutions

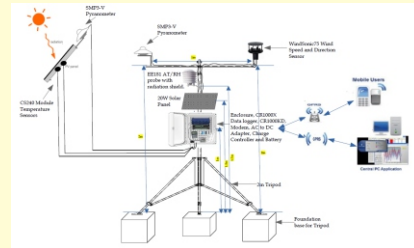
The world population is projected to be around 9.8 billion by 2050, and the global food production has to be significantly increased (about 60%) to meeting the demands for food, feed and fuel. Limited availability of resources is aggravating the food security problem. Moreover, the availability of agricultural labour is decelerating, as a result adoption of internet connectivity solutions in farming practices has been triggered, to reduce the need for manual labor.

Internet of Things (IoT) solutions are focused on helping farmers on decision making, close the supply demand gap, by ensuring high yields, profitability, and protection of the environment. IoT devices are 'smart' devices that can transfer data over a network.



The approach of using IoT technology to ensure optimum application of resources to achieve high crop yields and reduce operational costs. IoT in agriculture technologies comprise specialized equipment, wireless connectivity, software and information technology services. It is predicted that adoption of IoT technology in the agriculture industry will reach 75 million in 2020, growing 20% annually.

IoT smart farming solutions is a system that is built for monitoring the crop field with the help of sensors (light, humidity, temperature, soil moisture, crop health, etc.) and automating the irrigation system. The farmers can monitor the field conditions from anywhere.



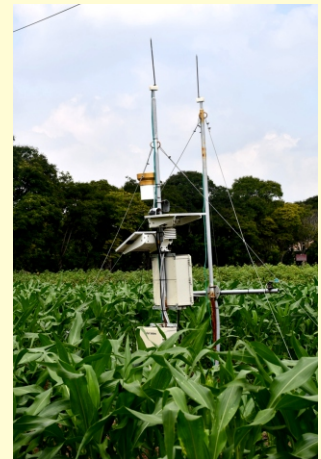
Key Features IoT

- **Connectivity:** Everything going on in IoT devices and hardware with sensors and other electronics and control systems there needs to be a connection between various levels.
- **Things:** Anything that can be tagged or connected as such as it's designed to be connected. Devices can contain sensors or sensing materials can be attached to devices and items.

- **Data:** Data is the glue of the Internet of Things, the first step towards action and intelligence.
- **Communication:** Devices get connected so they can communicate data and this data can be analyzed.
- **Intelligence:** The aspect of intelligence as in the sensing capabilities in IoT devices and the intelligence gathered from big data analytics.
- **Action:** The consequence of intelligence. This can be manual action, action based upon debates regarding phenomena and automation, often the most important piece.
- **Ecosystem:** The place of the Internet of Things from a perspective of other technologies, communities, goals and the picture in which the Internet of Things fits.

Components of IoT based weather station

- Wind speed
- Air Temperature
- Relative Humidity Sensor
- Soil Moisture Sensors
- Quantum Sensor /PAR Sensor
- Rain gage
- Leaf Wetness Sensor
- GPRS network
- Data collection system
- Canopy temperature



Benefits of IoT in Agriculture

- **Excelled efficiency:** IoT enabled agriculture allows farmers to monitor their product and conditions in real-time. They get insights fast, can predict issues before they happen and make informed decisions on how to avoid them.
- **Expansion:** Smart closed-cycle agricultural systems allow growing food basically everywhere in supermarkets, on skyscrapers' walls and rooftops, in shipping containers and, of course, in the comfort of everyone's home.
- **Reduced resources:** Plenty of Agricultural IoT solutions are focused on optimizing the use of resources viz., water, energy, land. Precision farming using IoT relies on the data collected from diverse sensors in the field which helps farmers accurately allocate just enough resources to within one plant.
- **Cleaner process:** Not only do IoT-based systems for precision farming help producers save water and energy and, thus, make farming greener, but also significantly scale down on the use of pesticides and fertilizer. This