

LoRA Wireless Sensor Solution for Smart Agriculture

Problem: According to the recent studies, countries around the world will be unable to provide crop yield and food to their people using the traditional farming methods. To address this issue, a new strategy should be introduced into farming practices to increase production and save resources. Internet of Things (IoT) technology can enable smart farming to increase the production efficiency, save water resources and lower the cost. LoRa technology, a popular IoT communication technology, is one of the enablers that can be integrated in the modern agriculture industry to realize smart/digital agriculture.

There are many factors that can impact plant's growth, including light, water, carbon dioxide, temperature, moisture, soil salinity, pH, nutrients, pest, and diseases. It is important to learn the crop's living environment to maximize the plant growth. However, there are difficulties to monitor the environmental conditions of crops in the practice of farming:

1. Traditional time-based and volume-based farming strategy cannot precisely and timely respond to subtle environmental change and plant's need. This may cause waste of water resources and insufficiency.
2. A wire monitoring system can solve this problem but also has defects, such as complicated wiring installation, inflexible sensor installation and difficult troubleshooting.
3. Devices and sensors from different companies may not be compatible with each other and make the integration difficult.

Project Objective:

Design and implementation of a LoRaWAN based smart agriculture solution to resolve some of the above issues. The solution features wireless data transmission, real-time alerts, remote management, compatibility, and scalability.

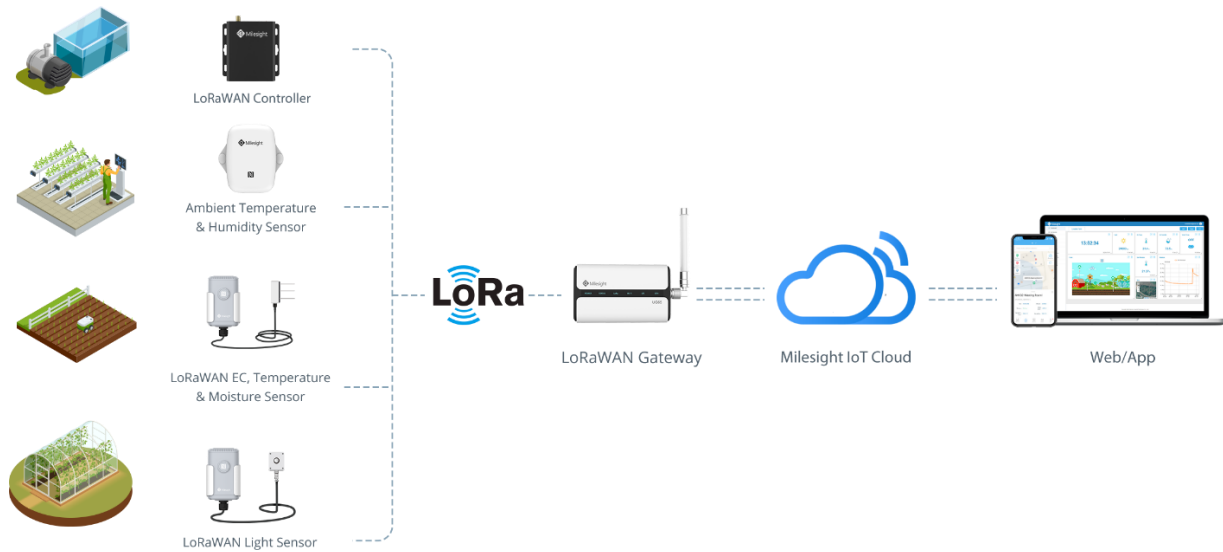


Figure: LoRaWAN Agriculture Solution from Misesight

There are companies that are working on a similar product such [Misesight](#) to accomplish these objectives. Feel free to explore the companies such as this and their technologies for your reference.

Project Scope:

- Designing a sensor pack for measuring soil moisture, temperature, electrical conductivity and light intensity with LoRaWAN wireless connectivity
- Designing a LoRaWAN Controller that can communicate with LoRaWAN Nodes on the field and relays the information to the cloud or a local server through WiFi or a Cellular network.

System Advantages:

- The proposed system does not need a SIM card for each node in the field unlike a cellular based 5G solution (NB-IoT).
- LoRaWAN node consume low power, and therefore they are suitable for battery-powered devices; LoRa do not require a wire power supply and frequent battery recharging or replacement.
- Smart farming practice does not require large volumes of data or low latency communication but requires large coverage. LoRa is a long-range technology and well-designed LoRaWAN gateway can cover up to 15 km due its frequency range and signal power in suburban areas and connect with hundreds of sensors.