

ABSTRACT

Cyber-Physical System is a key system in the implementation of the 4th generation industrial revolution. This system combines automation, electronics, internet networks, and machine learning. The application of the Cyber-Physical System in agriculture is one of the most awaited applications because it is the foundation of a sustainable Agriculture system. With the precision farming system and pervasive computing in agriculture, it can help stakeholders in the field of Agriculture to enjoy various benefits optimally. Smart farming is directed to produce measurable and optimal crop yields without having to damage soil quality because it is well monitored according to weather conditions.

The application of Cyber-Physical System in the context of Smart Farming does require a reliable communication infrastructure to connect various monitoring nodes with the internet gateway, especially if the distance is far enough. so that a monitoring device can be formed for weather conditions and soil quality in a smart farming environment. This design is realized by using Arduino and several sensors such as soil moisture and temperature sensors, NPK, Electrical Conductivity, pH, temperature and humidity sensors, air pressure, light sensors, rainfall sensors, wind direction sensors, and wind speed, and using batteries as a source of power supply. In this system, data transmission access uses wireless LoRa RFM95 as a Transceiver module to LoRa Receiver.

In this case, it can help agribusiness actors to achieve optimal results and production related to information on weather conditions and soil quality automatically. This Automatic Weather Station (AWS) and Agriculture device is able to read the value of each sensor and can retrieve data from each sensor properly. From the test / calibration of the temperature sensor, the accuracy value gets 90.8%, the temperature and humidity sensor is 83.45% and 61.7%, the indoor light sensor gets 100.0% outdoors 87.7%, the air pressure sensor is 99.8%, the rainfall sensor is 100.0%, the wind direction sensor used can run well above the speed of 1.9m / s while for speeds below 1.9m / s it does not run well, the wind speed sensor is 84.2%, The soil moisture and temperature sensor, NPK, Electrical Conductivity, and pH demonstrate satisfactory performance when tested on soil samples.

Keywords : *Smart Farming, Automatic Weather Station, Agriculture, Node Sensor*