

ABSTRACT

Onion plants (*Allium cepa* L. var. *aggregatum*) is one of the national horticultural crops and is a non-substituted spice vegetable group. With a variety of ingredients, onions are consumed as seasonings, traditional medicinal ingredients, and as spices in other foods. The need for onions will continue to increase along with the population of Indonesia.

In this study a monitoring system was designed on onion plants. The parameters included in this monitoring system are soil moisture content, soil pH levels, and levels of Nitrogen (N), Phosphorus (P), Potassium (K) in the soil. This system uses the concept of the Internet of Things (IoT) so that it is integrated with the internet so that it can be accessed in real time on the android application. LoRa (Long Range) connection is used as a transmission medium for data transmission because it has advantages in long distance communication and low power. This monitoring system consists of several stages. In the first stage, data were collected on soil moisture content, soil pH levels, and levels of Nitrogen (N), Phosphorus (P), Potassium (K) by sensors. The data retrieval process is controlled by the Antares LR-ESP201 Board. Then the data is sent to Antares database via LoRa connection. And the android application will retrieve data from Antares to be displayed on the smartphone in real time.

In this study, the designed tool has been calibrated with an accuracy rate above 95%. In the network testing phase, the 1st day got a parameter value that is worse than the other day's test with a delay of 0.041 s, SNR -10.94 dB, and RSSI -118.30 dBm. Then on the 2nd day the parameter values are better than the other days with a delay of 0.007 s, SNR -9.20 dB, and RSSI -117.97 dBm.

Keywords: Onion Plants, Soil Moisture, Soil PH, NPK, Monitoring, LoRa, Antares