

ABSTRACT

Agriculture is the main occupation that contributes to meeting the needs of food and agricultural products have an impact on developing countries. Soybean is one of the most widely consumed agricultural foodstuffs by Indonesians. The high consumption and declining soybean commodity need good and sustainable handling. Increasing soybean yields can be done by providing macronutrients, namely nitrogen (N), phosphorus (P), and potassium (K). So that making effective provision of macronutrients nitrogen (N), phosphorus (P), and potassium (K) is something that must be done.

In this study, a prototype of an automatic fertilization system for soybean was designed based on nitrogen (N), phosphorus (P), and potassium (K) values. The system design will be integrated with the internet and can be accessed in real time through the Android application on the user side which is the concept of the Internet of Things (IoT). To transmit data in this system using radio modulation technology LoRa (Long Range) due to the wide range and low power consumption. This system uses the Antares LR-ESP201 Board as a microcontroller and sends data to Antares as a database.

In this study, the calibration of an analog NPK sensor was carried out with a digital NPK sensor. The accuracy rate was above 95%. For LoRa delivery parameters using a frequency of 922.4 Mhz, 125 kHz bandwidth, a spreading factor of 10, and a code rate of 5. To test the quality of the network I tested it with 4 tests, namely delay, packet loss, SNR, and RSSI in 8 different locations, 1 the location is 0 km, 4 locations are 1 km away, 1 location is 2.5 km, 1 location is 8.5 km away, and 1 location is 9 km away from BTS LoRa. From testing the LoRa network, the results obtained if sending data using LoRa in this study obtained the maximum transmission distance at 8.5 km.

Keywords: NPK, Soybean, Automatic Fertilization, LoRa, Internet of Things, Antares LR-ESP201 Board, Antares, Android