

ABSTRACT

Paddy farming is an important sector in supporting food security and the economy of the community, especially in rural areas. Soil fertility, which is influenced by the content of nutrients such as NPK, is a major factor in agricultural success. However, it is often difficult to know the condition of the soil accurately and quickly, so that fertilizer application is not on target. This research designs an Internet of Things (IoT)-based NPK parameter measurement system to help monitor real-time soil nutrient content in rice plants. This system uses LoRa point-to-point communication, as well as WiFi for Telegram notifications. The system measurement results show that the soil NPK parameters can be compared with the results from PUTS to adjust the measurement accuracy. For Nitrogen, values below 31 are categorized as “low” with a light yellow color, values between 31 to 59 are considered “medium” with a dark yellow color. Nitrogen values, 60 to 84 are categorized as “high” and colored green, values above 84 are considered “very high” with a dark green color. Phosphorus parameter, 0 to 41 is categorized as “low” with a bluish white color, values between 42 to 90 are considered “medium” with a light blue color. Phosphorus values above 91 are categorized as “high” with a dark blue color. For Potassium, values below 80 are considered “low” with an orange color, values above 80 are categorized as “medium” with a yellow color. The signal test results show that at a distance of 0 to 250 meters, the average RSSI ranges from -29.8 dBm to -91.8 dBm, while the average SNR varies from 9.4 dB to -8 dB, which is important for determining signal quality and communication stability.

Keyword: *Paddy Farming, LoRa, Internet of Things, Node-RED, NPK*