ABSTRACT

Indonesia is an agrarian country where most of the population makes a living from agriculture and plantations. One of the biggest commodities is cayenne pepper. Cayenne pepper is a commodity with the highest level of production and demand every year. However, cayenne pepper is also a plant that is prone to crop failure. The biggest causes are climate problems that are volatile and a lack of knowledge about the parameters that affect the growth of cayenne pepper plants.

Chili plants are plants with a relatively long harvest age, which is approximately 90 days. In this final project, the system was tested when the germination phase was 9-13 days. The final project research on the realization of a chili plant growth monitoring system aims to assist household sector agricultural actors in remote monitoring of cayenne pepper plants based on a smart greenbox. The smart greenbox device measures several parameters that affect the growth of chili plants including air humidity, light intensity, soil moisture, and soil pH levels.

The greenbox is filled with 3 pots of chili plants that have gone through the seeding process. The smart greenbox system is designed using 3 microcontroller boards, each of which is connected to LoRa SX-1278 as a communication module between the boards. The first board uses ESP 32 as the system's main gateway to the database. Then, the second board uses Arduino Uno which is integrated with several sensors, namely DHT-22, BH-1750, 3 YL-69 sensors, and 3 pH probe sensors. Meanwhile, the 3rd board in the system functions to automate watering and fertilization. The data that has been read by the sensors on the 2nd board will be sent to the 1st board to be forwarded to the firebase database and sent to the 3rd board to carry out the automation function according to the read data.

Based on the test results of the device system, it is known that the device runs optimally for 24 hours and can send data to the firebase every 5 minutes. The process of transmitting data from the Arduino board to the firebase shows that the QoS on the system has a good average value with each parameter, namely delay of 46 ms, the throughput of 2,3084 Mbps, and packet loss of 4,84%.

Keywords **:** Internet of Things, Chili, Arduino Uno, LoRa SX-1278, DHT-22, BH-1750, YL-69, pH Probe, Firebase, Smart Greenbox.