

## ABSTRACT

Oil palm plantations are one of the industries that sustain the macro economy in Indonesia. The stability of the trench water level for oil palm plantations is one of the important things towards the sustainability of this industry. In order to produce good quality palm oil production, the irrigation system for oil palm plantations requires controlling the water level in the ditches to irrigate oil palm plants. However, from the aspect of measuring and controlling the water level it is still done manually by field officers with a measuring ruler. Based on this, the LoRa Technology based trench water level monitoring system is built, so that the ditch water level sensor can be monitored through data dashboard in real time.

In this Final Project, a remote ditch water level monitoring system, will be implemented in the form of prototype with Long Range (LoRa) technology. On making this system a microcontroller will be used as a data processor from ultrasonic sensor which is used to measure the water level of the ditch. The data that stored in microcontroller will be sent to the control center using LoRa from both the sender and receiver. The data that has been sent will be displayed on a dashboard the control center. In this system will be tested several parameters such as accuracy of successful request, sensor error and delay.

The test results for this system obtained an indoor delivery accuracy rate in Line of Sight (LOS) conditions with a proportion of 98.8% for the first sensor node and 99.7% for the second sensor node, and for outdoor testing with Non Line of Sight conditions ( NLOS) with a proportion of 87.6% for the first sensor node and 94.7% for the second sensor node. To test for sensor errors, this ultrasonic sensor has a reading accuracy of one centimeter. For the delay tester, the average delay on the master is 0.58 seconds, the delay between the master and the microcontroller is 0.21735 seconds, the delay between the master and the microcontroller for a distance of 0.2175 seconds and the delay on the microcontroller is 0.1194 seconds.

**Keywords:** Water level, LoRa , ultrasonic sensor, sensor error, delay