

ABSTRACT

Indonesia, as an archipelagic nation with extensive agricultural land, faces significant challenges in achieving food security. According to the Global Food Security Index (GFSI) 2022, Indonesia is ranked 63rd out of 113 countries, with a score of 60.2. This indicates relatively low food security compared to other countries in Southeast Asia. To address this challenge, the implementation of efficient agricultural monitoring technology is essential. One proposed solution is the use of Wi-Fi HaLow, an IEEE 802.11ah standard that operates at sub-1 GHz frequencies, providing wider coverage and low power consumption. This technology enables the installation of soil moisture sensors across large agricultural areas and allows for real-time data collection.

The study also assesses the quality of network services using the ITU-T G.1010 standard, which evaluates Packet Loss, Delay, and Jitter parameters. The average Packet Loss recorded is 0%, which is considered very good; the average Delay is 1.5132 milliseconds, also deemed very good; and the average Jitter is 1.514 milliseconds, rated as good.

Based on the measurements of network service quality, the system demonstrates that the Wi-Fi HaLow Extender effectively supports accurate and responsive data collection, all within the desired performance categories. This high quality of network service facilitates smooth data transmission from soil moisture sensors, promoting efficient land management. Therefore, this system is recommended for use in agricultural lands as a power-efficient and reliable remote monitoring solution.

Keywords: *Monitoring, Agricultural Land, Wi-Fi HaLow, Wi-Fi HaLow Extender.*