

ABSTRACT

The Agricultural Mechanization Development Center faces significant challenges in managing agricultural equipment loaned to farmer groups in West Java, particularly in monitoring their usage and condition. The absence of an effective monitoring system makes it difficult to track the location, operational status, and maintenance schedule of the equipment, potentially reducing its efficiency and lifespan. This issue calls for technological innovation capable of delivering real-time data to support decision-making and ensure the availability of agricultural tools in optimal condition.

To address this challenge, a monitoring system based on the Internet of Things (IoT) was developed, equipped with Global Positioning System (GPS) technology for location tracking and a GSM communication module for real-time data transmission. The system utilizes sensors to measure tractor battery voltage and GPS modules to report equipment positions, all integrated into a web platform for remote supervision. This approach is designed to provide accurate information on equipment usage, technical condition, and maintenance schedules, while enhancing security and improving the efficiency of equipment distribution.

Testing results indicate that the system operates reliably, with GPS accuracy showing an average detection distance of 17.07 meters despite significant environmental interference. Tractor battery voltage measurements revealed a difference of 0.13 V, and the GSM module consistently transmitted data every minute. The implementation of this system has proven to increase the efficiency of agricultural equipment usage, simplify periodic maintenance, and strengthen monitoring to ensure that tools remain in optimal working condition.

Keywords: Agricultural Tools, Agricultural Mechanization Development Center, Global Positioning System, Internet of Things (IoT), Monitoring System