ABSTRACT

Aquaculture, particularly shrimp farming, is one of the primary livelihoods in Indonesia. To achieve the target of 2 million tons of shrimp production annually by 2024, effective pond management, including water quality monitoring, is crucial. Poor water quality is a leading cause of crop failure. This study developed an Internet of Things (IoT)-based system integrated with a mobile application to monitor and manage pond water quality parameters.

The system utilizes sensors for temperature, pH, dissolved oxygen (DO), and total dissolved solids (TDS), connected to an ESP32 microcontroller. Data is transmitted to Firebase Database for storage and processing before being displayed in the mobile application. The application can display real-time data, store data history, filter data by time and device, download data in .csv format, provide early warning notifications, and control the aerator to enhance dissolved oxygen levels.

The implementation results indicate that the sensors achieved an average accuracy of over 89%. The system successfully increased dissolved oxygen levels to 6.202 mg/L, meeting the requirements for shrimp ponds. The mobile application demonstrated its capability to monitor water quality data in real-time and effectively perform its features.

Keywords: Internet of Things, Mobile Application, Real-Time Monitoring, Shrimp Aquaculture