ABSTRACT

The issue of global warming has highlighted the need for an accurate and efficient carbon stock calculation system. However, current carbon stock calculations are still done manually, which increases the risk of errors and delays. Therefore, a web-based CarbonStock application has been developed to assist in the monitoring of carbon stock calculations in accordance with SNI 7724:2019. This application covers the calculation and monitoring of data from various biomass sources such as seedlings, understory plants, litter, soil, stakes, posts, trees, and necromass. The web application was developed using the Laravel framework, Supabase as a cloud-based backend service, and integration with an Android-based mobile application. The system is designed with a client-server architecture that supports real-time data synchronisation. The method used follows the Waterfall model, starting from needs analysis, database and interface design using Figma, code implementation, to system testing. Key features include login, team management, data input and validation, automatic calculation of carbon and CO_2 content, and report generation in PDF format. Testing results show that the system successfully improves data input process efficiency, where manual input takes 10 minutes due to being done in two stages, while the CarbonStock application only takes 5 minutes per zone, resulting in a 50% time efficiency improvement. Additionally, based on questionnaire results, 75.71% of respondents stated that the application effectively addresses the challenges they faced during the carbon reserve recording process. The application also simplifies monitoring and reporting processes for administrators. As such, the CarbonStock application is expected to serve as a valuable digital solution in supporting environmental conservation through more standardised and modern real-time carbon monitoring processes for each region.

Keywords: Biomass, CarbonStock, SNI 7724:2019, Real Time, web application