

HARMONY IN PROGRESS:

**INTEGRATING SCIENCE, TECHNOLOGY,
AND
SOCIAL INNOVATION
FOR SUSTAINABLE DEVELOPMENT GOALS**



**e-Book of Extended Abstract
Negeri Sembilan International (NSIEx) & Research Symposium
2025**

YST015 - HARVESTPRO: INTELLIGENT PRODUCE MANAGEMENT SYSTEM

Ummi Umairah Ramli¹, Rashidah Mokhtar^{2*}, and Nooradilla Abu Hasan³

¹UiTM Cawangan Terengganu, Kampus Kuala Terengganu, Malaysia

²UiTM Cawangan Johor, Kampus Segamat

³UiTM Cawangan Negeri Sembilan, Kampus Seremban 3

*Corresponding author: rashi271@uitm.edu.my

ABSTRACT

The HarvestPro: Intelligent Produce Management System for PELADANG is an innovative web-based platform that transforms the management of vegetable crop operations from a fragmented, manual approach into an integrated, automated solution. Previously, tasks such as crop data entry, communication with wholesalers, and invoice processing were conducted informally through phone calls and messaging applications. This traditional approach led to miscommunication, delays, and challenges in accurately tracking crop sales and payments. The new system introduces a centralized platform for four major user roles: administrator, staff, crop handlers (internal farmers), and wholesalers. Staff can record crop grades and seasonal availability, update inventories, and instantly notify wholesalers. Wholesalers receive real-time crop listings, place orders, review past transactions, and access instant invoices. Administrators oversee user roles and system functions, while staff generate automated monthly sales reports for tracking trends and payment statuses. Development of the system adapted from the Waterfall Model, covering planning, analysis, design, implementation, testing, and documentation. It also adopted the principles of User-Centered Design (UCD), the system ensures ease of use for individuals with limited technical proficiency. Usability testing with experts and end-users demonstrated significant improvements in efficiency, accuracy, and stakeholder communication. Real-time access to operational data improved transparency, enabled proactive stock management, and supported data-driven decision making. Key innovations include real-time crop visibility, invoice automation, role-based access control, and automated trend reporting, collectively reducing paperwork, eliminating redundancies, and improving payment tracking. This system contributes to PELADANG's broader digital transformation goals by fostering structured workflows, enhancing productivity, and supporting sustainable growth. The project proves that even small-scale agricultural organizations can benefit from custom digital solutions tailored to their workflow needs and compete in the evolving digital economy.

Keywords – crop management, agriculture system, farmer management system, invoice tracking

INTRODUCTION

In recent years, the integration of digital solutions in agriculture has become increasingly important to improve operational efficiency, transparency, and market accessibility (Malallah et al., 2023). Traditional methods of crop management, particularly those relying

heavily on manual communication and paperwork, are no longer sufficient to meet the growing demands of modern agricultural operations (Antle et al., 2015). This is especially evident in organizations such as PELADANG, which plays a crucial role in supporting local agricultural activities in Malaysia.

Despite its significance, PELADANG's existing crop management process has been largely dependent on informal channels such as phone calls and messaging apps to coordinate between internal crop handlers (staff farmers), wholesalers, and office personnel. This manual approach has led to several recurring challenges, including delays in communication, lack of real-time crop visibility, disorganized record-keeping, and inefficiencies in sales tracking and payment verification (Antonopoulou et al., 2022).

Furthermore, staff members have been required to manually create invoices and trace payment histories, a process that is not only time-consuming but also prone to human error. The absence of a centralized system hinders PELADANG's ability to monitor sales performance, identify crop demand trends, and make data-driven decisions for crop planning and resource allocation. Figure 1, illustrates the manual process of the existing PELADANG's crop management. To address these issues, a web based HarvestPro: Intelligent Produce Management has been developed.

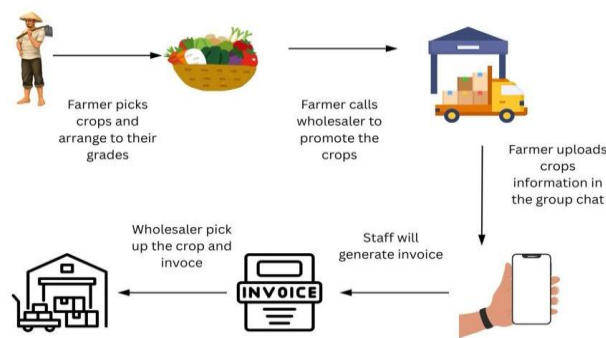


Figure 1: Manual process of crop management

OBJECTIVE

This innovation aims to address PELADANG's operational challenges through three key objectives within a cohesive framework. First, to identifies the current crop management process and its issues by examining the manual system, which relies on informal communication like phone calls and messaging apps, causing inefficiencies, delays, and errors in data management. Second, to design and develop a web-based vegetable crop management system tailored for PELADANG, using the Adapted Waterfall Model and User-Centered Design (UCD) principles. Finally, to evaluate the system's functionality and usability through rigorous system and user acceptance testing to ensure it effectively meets the needs of farmers, staff, wholesalers, and administrators while enhancing operational transparency and efficiency.

DESCRIPTION OF THE PROJECT

Figure 2 presents the system architecture that summarizes the roles and key functionalities of each user in the HarvestPro: Intelligent Produce Management. There are

four main user groups, Farmers, Wholesalers, Staff, and Admin, who can interact with the system through the business layer, which handles their specific tasks. Farmers can input crop details (such as name, grade, quantity, and price), manage wholesaler orders, and view crop availability. Wholesalers are able to browse available crops, place orders, view invoices for each successful purchase, and check their order history. Staff members can view wholesaler invoices and generate monthly reports, while Admins manage user accounts and oversee overall system operations. All these activities are processed through the web server, which communicates with the database to store, retrieve, and manage the necessary data, ensuring smooth operations across all user roles. Figure 3 illustrates the system dashboard for sales tracking.

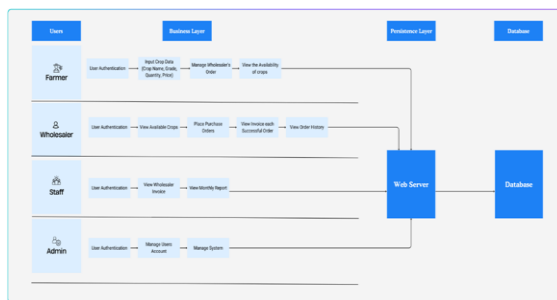


Figure 2: System architecture

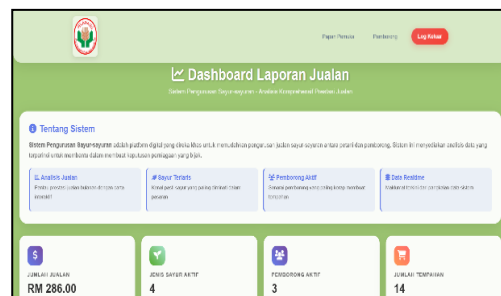


Figure 3: Interface of sales tracking dashboard

NOVELTY

The PELADANG HarvestPro: Intelligent Produce Management distinguishes itself from existing agricultural record-keeping tools through its targeted emphasis on post-harvest processes and alignment with the needs of small-scale vegetable farmers, offering a lightweight, accessible alternative to complex large-scale platforms. Its primary innovation integrates Management Information System (MIS) principles for organized, retrievable, and actionable data to support decision-making, with a UCD approach that incorporates farmer feedback for an intuitive interface suitable for users with limited technical skills. The system's streamlined features focus on essential tasks such as harvest data recording, invoice generation, and sales tracking, enhancing efficiency and adoption rates during the shift from manual to digital methods, while its scalable architecture allows for future expansions to other produce types and integrations like mobile applications, cloud storage, or payment gateways, ensuring adaptability to evolving user requirements.

CONCLUSION

The HarvestPro transforms traditional crop management by automating critical processes such as sales, invoicing, and payment tracking, significantly improving operational efficiency, reducing errors, and enhancing coordination between staff and wholesalers. Its real-time data sharing promotes transparency, enabling stakeholders to make informed decisions swiftly, while role-based access ensures clear task delegation and accountability. Designed with usability in mind, the system accommodates users of varying technical skills, facilitating quick adoption and minimizing the learning curve. By streamlining workflows and reducing reliance on informal communication, it aligns with PELADANG's modernization and digital transformation objectives, setting a foundation for

future enhancements like mobile access and data analytics to further optimize planning, forecasting, and sustainable agricultural productivity.

REFERENCES

- Antle, J. M., Capalbo, S. M., & Houston, L. L. (2015). NextGen agricultural system models and decision support: Improving the usability of crop management platforms. *Agricultural Systems*, 138, 49–58. <https://doi.org/10.1016/j.agsy.2015.05.003>
- Antonopoulou, K., Nandhakumar, J., & Henfridsson, O. (2022). The role of data platforms in agricultural value chain transformation: The case of MyCrop. *Information Systems Journal*, 32(1), 102–127. <https://doi.org/10.1111/isj.12345>
- Malallah, H. S., Abdulrazzaq, M. B. (2023). Web-based agricultural management products for marketing system: Survey. *Academic Journal of Nawroz University (AJNU)*, 12(2), 47–48.