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Harvest: A Mobile Platform for Direct Farmer to Buyer Transactions

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ABSTRACT

This study presents HARVEST, a mobile-based platform designed to facilitate direct farmer-to-buyer transactions and address inefficiencies in agricultural trading in Mabini, Pangasinan. Farmers in the area face challenges such as dependence on intermediaries, limited market access, and unstable pricing, which reduce income and increase costs for consumers. To address these issues, the system provides key features including product listing, direct messaging, order processing, and transaction monitoring, enabling more transparent and efficient trading. The platform was developed using a three-tier architecture and the Agile development methodology, incorporating continuous feedback from farmers, cooperatives, and the Municipal Agricultural Office to ensure usability and contextual relevance. System evaluation was conducted using the ISO/IEC 25010 Software Quality Model, with fourteen (14) respondents participating in the assessment. Results indicated an overall weighted mean of 4.27, interpreted as Excellent, reflecting high acceptability in terms of usability, performance efficiency, and reliability. The findings demonstrate that HARVEST improves market accessibility, enhances transaction efficiency, and reduces dependence on intermediaries. While the sample size is limited, the results provide initial evidence of the platform's potential to support more transparent and sustainable agricultural trade. The study contributes to digital agriculture by presenting a localized and user-centered mobile solution tailored to rural farming communities.

Keywords: mobile agriculture, direct market access, digital marketplace

INTRODUCTION

Agriculture plays a critical role in the Philippine economy, particularly in rural communities where farming serves as a primary source of livelihood. It contributes to food security, employment, and local economic development [4], [13]. Despite its importance, many small-scale farmers continue to face challenges in achieving stable income due to limited market access, unstable pricing, and low bargaining power [10]. These constraints restrict their participation in more profitable segments of the agricultural value chain and contribute to income instability.

Traditional agricultural trading practices remain dominant, with farmers relying heavily on intermediaries to distribute their products. While middlemen provide convenience and immediate market access, they often control pricing and distribution, resulting in lower farm-gate prices for farmers and higher costs for consumers [4], [12]. This system reduces transparency and limits farmers' control over their products, creating inefficiencies within the supply chain [9].

Farmers also face additional challenges such as unstable pricing, lack of up-to-date market information, and post-harvest losses, which reduce overall profitability [6], [3]. Poor infrastructure, limited transportation options, and inefficient logistics systems further affect farmers' ability to deliver products to wider markets on time [2]. These challenges prevent farmers from participating in more profitable market opportunities and contribute to income instability [3], [10].

Recent advancements in digital technology offer opportunities to improve agricultural trading systems. Digital platforms and mobile marketplaces enable direct interaction between producers and buyers, enhancing transparency, expanding market reach, and reducing transaction costs [7], [11], [13]. However, the adoption of

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digital platforms in agriculture still faces challenges such as limited digital skills, connectivity issues, and concerns related to system usability and reliability [5].

Existing digital agricultural platforms, such as AGROCART, demonstrate the potential of mobile applications in connecting farmers directly with consumers [7]. However, many of these systems are designed for broader market environments and do not fully address the localized needs of rural farming communities. In contrast, HARVEST focuses on community-level implementation, integrating cooperative support while allowing farmers to maintain control over pricing and transactions.

In Mabini, Pangasinan, farming remains a primary economic activity, yet farmers continue to depend on traditional selling methods due to the absence of accessible digital trading platforms. Although cooperatives and local government units provide support, there is still no centralized mobile system that enables direct and transparent farmer-to-buyer transactions [2], [4].

To ensure that digital agricultural systems are effective and acceptable to users, evaluation using recognized quality standards is necessary [8]. In response to these challenges, this study introduces HARVEST, a mobile-based platform designed to facilitate direct farmer-to-buyer transactions. The system aims to improve market access, promote fair pricing, and reduce reliance on intermediaries while maintaining cooperative support.

METHODOLOGY

This study utilized a descriptive and developmental research design to examine existing agricultural trading practices and to develop a mobile-based solution tailored to local farmers and buyers. The descriptive component identified current trading conditions and challenges, while the developmental component guided the design and implementation of the HARVEST platform.

The system was developed using the Agile methodology, which supports iterative development and continuous feedback. Features were implemented in phases and refined based on input from farmers, cooperatives, and the Municipal Agricultural Office to ensure usability and relevance.

Figure 1. Agile Model

Source:https://medium.com/@chathmini96/agile-methodology-30ec4cdf3fc

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The system architecture followed a three-tier structure consisting of the user interface, application layer, and data layer. The platform was developed using Flutter and Firebase to support real-time data processing, scalability, and secure transactions. Firebase Authentication was used to manage secure user access, while cloud-based storage ensured protected handling of user and transaction data. Real-time database capabilities enabled instant synchronization of product listings, orders, and messages between users.

The study was conducted in Mabini, Pangasinan, involving farmers, cooperative members, and the Municipal Agricultural Officer. A purposive sampling technique was used, with fourteen (14) respondents participating in the evaluation. The sample size is appropriate for this localized study, as participants were directly involved in agricultural trading, ensuring relevant and experience-based feedback. While limited in size, the sample provides meaningful insights into system usability and acceptance.

Table 1. Respondents of the Study

Respondents	Number of Respondent
OIC of Agricultural Office	1
Cooperatives	3
Farmers	10
Total Respondents	14

Data were collected through interviews, observation, document analysis, and survey questionnaires. System evaluation was conducted using the ISO/IEC 25010 Software Quality Model, covering functionality, usability, performance efficiency, reliability, security, compatibility, maintainability, and portability. Responses were measured using a five-point Likert scale, and weighted mean was used for analysis.

Table 2. Scale of Measurement

Scale	Statistical Limits	Rating	Descriptive Interpretation
1	1.00 – 1.80	Poor	Needs improvement; not functioning properly
2	1.81 – 2.60	Fair	Functioning is fair; needs some changes
3	2.61 – 3.40	Good	Works as intended but has minor issues
4	3.41 – 4.20	Very Good	Functioning properly and effectively
5	4.21 – 5.00	Excellent	Functioning very well and fully accepted

RESULTS AND DISCUSSION

The findings indicate that farmers in Mabini primarily rely on traditional trading practices such as farm-gate selling, wet markets, and intermediary-based transactions. While these methods provide convenience, they significantly limit market reach and reduce income potential. The reliance on middlemen restricts farmers' control over pricing, leading to lower profitability and reduced bargaining power. These findings reflect persistent inefficiencies in agricultural supply chains.

Farmers also face challenges such as lack of up-to-date market information, logistical constraints, and post-harvest losses, which affect their ability to maximize income. Buyers experience inconsistent product availability and limited transparency, indicating an imbalanced trading system that affects both producers and consumers.

The HARVEST platform was developed to address these challenges by enabling direct interaction between farmers and buyers. Through features such as product listing, messaging, and order processing, the system reduces dependence on intermediaries and improves transaction transparency. The integration of cooperative support ensures coordination without interfering in pricing decisions.

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Figure 2. Three-Tier Architecture

Evaluation results based on the ISO/IEC 25010 Software Quality Model indicate high acceptability across all quality attributes. Usability and performance efficiency received the highest ratings, indicating that users found the system easy to use and responsive. Reliability and security ratings suggest user confidence in the system's ability to process transactions accurately and protect user data. These findings support the growing role of mobile-based platforms in improving agricultural supply chain efficiency.

The overall weighted mean of 4.27, interpreted as Excellent, confirms that the HARVEST platform meets user expectations in terms of functionality and performance. Compared to existing platforms, the system offers a localized and user-centered approach that better aligns with the needs of rural farming communities. However, the results should be interpreted within the context of the study's limited sample size. Future research may include larger populations and broader implementation to further validate system effectiveness.

CONCLUSION

This study demonstrates that traditional agricultural trading practices in Mabini, Pangasinan limit farmers' income and market access due to reliance on intermediaries and lack of pricing transparency. The HARVEST mobile platform addresses these challenges by enabling direct farmer-to-buyer transactions through a user-friendly and accessible digital system. Evaluation results indicate high system acceptability, highlighting its effectiveness in improving transaction efficiency, market accessibility, and transparency. Although limited by a small sample size, the findings suggest that HARVEST is a viable solution for enhancing agricultural trading in rural communities. The study contributes to the field of digital agriculture by presenting a localized, scalable, and user-centered platform that supports more efficient and sustainable agricultural trade.

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