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From Data to Decisions: Assessing the Role of the Philippine Rice Information System (PRiSM) in Evidence-Based Decision-Making in Davao del Sur

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RESEARCH ARTICLE INFORMATION

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ABSTRACT

The Philippine Rice Information System (PRiSM) is a comprehensive web-based platform developed by the Department of Agriculture and the Philippine Rice Research Institute (PhilRice) to support rice sector monitoring, analysis, and evidence-based decision-making. This study employed a mixed-methods research design to evaluate PRiSM implementation in Davao del Sur through the perspectives of 12 users from nine municipalities, one city, and the provincial agriculture office. Quantitative data were collected using structured Likert-scale questionnaires, while qualitative insights were obtained through interviews and system observations. Results revealed several implementation challenges, including sustainability concerns, inadequate capacity-building initiatives, data quality and utilization issues, coordination gaps, limited data accessibility, and weak feedback integration mechanisms. Quantitative findings showed that overall system acceptability was below average user satisfaction with system performance was low (M = 2.42), and sustainability beyond the current administration received a very low rating (M = 2.08). Despite these limitations, respondents demonstrated a moderate intention to continue using the system (M = 3.17), recognizing its potential value for rice sector monitoring and planning. The findings suggest that PRiSM's limitations are primarily associated with implementation and institutional support issues rather than deficiencies in its conceptual design. The study contributes empirical evidence on the

operational challenges of agricultural information systems at the local government level and proposes institutional, technical, and capacity-building interventions to enhance the sustainability, usability, and decision-support value of PRiSM. Given the relatively small number of participants, findings should be interpreted within the context of the study area and participant group.

Keywords: *PRiSM, Philippine Rice Information System, rice sector monitoring, Agricultural Information Systems, data quality*

Introduction

Rice serves as the staple food of the Philippines and remains central to national food security, rural livelihoods, and agricultural development. The rice sector supports millions of farmers and contributes significantly to the country's agricultural economy (PhilRice, 2020). Effective rice sector planning requires timely, accurate, and accessible information on production, cultivated area, yield, prices, weather conditions, and market dynamics. Without reliable information systems, policymakers and local government units (LGUs) operate with incomplete or outdated information, resulting in inefficient resource allocation, delayed interventions, and reduced effectiveness of agricultural programs.

Globally, agricultural information systems have become increasingly important in supporting evidence-based decision-making, climate-resilient agriculture, and food security initiatives. Digital agriculture platforms, remote sensing technologies, geographic information systems (GIS), and mobile-based data collection tools are now widely utilized to improve agricultural monitoring and planning (Klerkx et al., 2019; Food and Agriculture Organization, 2024). Countries such as India, Thailand, Vietnam, and Indonesia have adopted digital agricultural information systems that integrate satellite imagery, field observations, and decision-support tools to improve crop monitoring, disaster preparedness, and policy formulation (FAO, 2022; Fuglie et al., 2021). These developments demonstrate the growing role of data-driven governance in agricultural development and highlight the need for sustainable, user-centered information systems. Furthermore, agricultural information systems play critical roles in supporting food security through timely data collection, production forecasting, and early warning mechanisms (Aker, 2011; Tiwari et al., 2024). Remote sensing technologies have transformed crop monitoring by enabling large-scale and cost-effective estimation of cultivated areas and crop conditions (Mulla, 2013; Karthikeyan et al., 2020). However, the effectiveness of these systems depends not only on technological sophistication but also on institutional commitment, adequate funding, technical capacity, stakeholder engagement, leadership continuity, and user acceptance (Heeks & Bailur, 2007; Kimaro & Nhampossa, 2005; Klerkx et al., 2019).

Moreover, recent advances in digital agriculture have significantly transformed how governments, research institutions, and agricultural organizations collect, analyze, and use agricultural data for planning and decision-making. Digital agriculture integrates information and communication technologies (ICTs), artificial intelligence, remote sensing, cloud computing, and decision-support systems to improve agricultural productivity, sustainability, and resilience (Birner et al., 2023). Recent studies also emphasized that digital platforms enable near real-time monitoring of agricultural conditions, facilitate data-driven policy formulation, and support evidence-based interventions for food security and climate adaptation (Naim

& Boukhizzou, 2026). In developing countries, digital agriculture initiatives have increasingly focused on integrating spatial information, mobile applications, and web-based dashboards to strengthen agricultural governance and extension services (Zheng et al., 2024; Nxumalo & Chauke, 2025). Despite these technological advancements, successful implementation remains dependent on institutional readiness, stakeholder participation, technical capacity, and sustained organizational support.

Geospatial visualization and web-based dashboard technologies have emerged as critical components of modern agricultural information systems. Interactive geospatial dashboards provide users with intuitive access to spatially referenced agricultural information, enabling visualization of crop conditions, production trends, environmental risks, and resource distribution (John & James, 2025; Barons et al., 2024). These systems enhance situational awareness and facilitate more efficient decision-making by transforming complex datasets into accessible visual formats. Similarly, recent studies have also demonstrated that web-GIS dashboards improved agricultural planning, disaster response, and resource allocation by integrating spatial analytics with real-time data streams (Raihan, 2024; Das et al., 2025). However, researchers also noted that the effectiveness of geospatial dashboards depends on usability, user training, data accessibility, and organizations' ability to integrate dashboard outputs into routine planning processes (Komarkova et al., 2017). Consequently, evaluating user experiences with geospatial platforms remains essential for understanding their practical value in local governance contexts.

Additionally, remote sensing technologies have likewise become indispensable tools for rice monitoring and agricultural assessment. Advances in satellite platforms such as Sentinel-1, Sentinel-2, Landsat, and radar-based monitoring systems have improved the accuracy of rice area estimation, crop classification, yield forecasting, and disaster assessment (Mosleh et al., 2015). Machine learning algorithms combined with remote sensing imagery have enabled more precise identification of crop growth stages and production conditions across large geographic areas (Pokharel et al., 2024). Likewise, studies in Southeast Asia have shown that remote sensing-based rice monitoring systems provide timely and cost-effective alternatives to traditional field surveys, improving the reliability of agricultural statistics and supporting evidence-based policy interventions (Tiwari et al., 2024). Nevertheless, the benefits of remote sensing technologies can only be fully realized when end users possess sufficient technical competencies to interpret and apply geospatial outputs in operational decision-making.

Essentially, the adoption and sustained utilization of digital agriculture systems are strongly influenced by user capabilities, organizational support mechanisms, and capacity-building initiatives. Studies conducted between 2022 and 2025 indicate that continuous training programs, technical mentoring, and accessible learning resources significantly improve user competence, confidence, and technology acceptance (Mwamkinga & Barongo, 2025). Agricultural extension personnel and local government staff often require ongoing capacity development to effectively utilize advanced digital tools, particularly those involving geospatial analysis and remote sensing applications (Sen et al., 2025). Furthermore, digital literacy and perceived ease of use remain important determinants of system adoption, especially among users operating in resource-constrained environments (Aranguri et al., 2025). However, the absence of regular refresher training and responsive technical support has been consistently associated with lower system utilization and reduced organizational benefits from digital investments.

Another critical factor affecting the long-term success of agricultural information systems is sustainability. Information system sustainability extends beyond technical functionality and encompasses institutionalization, governance

structures, financial support, stakeholder engagement, and organizational commitment (Saleem, 2025). Recent studies on e-government and agricultural information systems emphasized that sustainable implementation requires dedicated funding, leadership continuity, user participation, and clearly defined maintenance strategies (Nurdin et al., 2012). Systems that rely heavily on project-based funding or individual champions often face challenges in maintaining operations once external support diminishes. Moreover, participatory governance approaches that actively incorporate user feedback into system improvements have been shown to enhance user ownership, satisfaction, and long-term adoption (Issa & Isaias, 2022). These findings suggest that evaluating institutional support structures and sustainability mechanisms is essential when assessing the effectiveness of agricultural information systems such as PRiSM.

In the Philippines, the Department of Agriculture and the Philippine Rice Research Institute (PhilRice) developed the Philippine Rice Information System (PRiSM), a web-based platform that integrates satellite imagery, field surveys, weather information, and market data through remote sensing, predictive analytics, and mobile-based applications (PhilRice, 2021; DA-PhilRice, 2022). PRiSM was designed to provide timely and accurate information to support rice production monitoring, disaster assessment, yield estimation, and policy decision-making at national and local levels. As one of the country's flagship agricultural information systems, PRiSM has significant potential to improve planning efficiency, resource allocation, and governance within the rice sector. Despite its technological capabilities and substantial public investment, practical implementation challenges continue to affect the utilization and sustainability of PRiSM. Reports from local implementers in Davao del Sur suggest concerns related to system sustainability, limited capacity-building opportunities, data quality issues, inadequate coordination among stakeholders, restricted data accessibility, and weak integration of user feedback. These challenges may reduce the system's effectiveness in supporting local agricultural planning and decision-making. Similar implementation barriers have been reported in digital agriculture initiatives where inadequate training, poor usability, insufficient institutional support, and limited stakeholder participation contribute to system underutilization and reduced long-term sustainability (ISO 9241-11, 2018).

Basically, Davao del Sur provides a relevant setting for evaluating PRiSM implementation because rice production remains an important agricultural activity in the province, while local agricultural offices face operational challenges associated with data collection, validation, reporting, internet connectivity, and intergovernmental coordination. In many municipalities, planning decisions continue to rely heavily on conventional reporting mechanisms despite the availability of digital information systems. Consequently, the extent to which PRiSM-generated information is incorporated into local planning and decision-making remains uncertain. Understanding these implementation realities is essential for maximizing the value of digital agriculture investments at the local government level.

Although previous studies have described PRiSM's technological architecture, remote sensing capabilities, and operational functions (Mabalay et al., 2022; PhilRice, 2021), limited research has examined how municipal and provincial users experience its implementation in actual field settings. Furthermore, little empirical evidence exists regarding the challenges users encounter, the factors influencing system utilization, and the extent to which PRiSM outputs are translated into planning and policy decisions. This gap is particularly important because the success of agricultural information systems depends not only on technical functionality but also on effective adoption, institutional support, and integration into governance processes.

The novelty of this study lies in its focus on the implementation experiences of PRiSM users at the municipal, city, and provincial levels in Davao del Sur. While previous literature has primarily emphasized the technical and operational features of PRiSM, this study evaluated the system from the perspective of actual users responsible for data collection, validation, reporting, and decision support. By examining sustainability, capacity building, data quality, coordination mechanisms, accessibility, feedback integration, and user acceptability, the study provides empirical evidence on the factors affecting the successful implementation of agricultural information systems in local government contexts.

Specifically, this study (1) assessed the implementation of PRiSM in terms of system sustainability, capacity building, data quality and utilization, coordination mechanisms, data accessibility, and feedback integration; (2) evaluated user acceptability of PRiSM; (3) identified implementation challenges experienced by municipal, city, and provincial users; and (4) proposed evidence-based recommendations to improve the sustainability, usability, and decision-support value of PRiSM in Davao del Sur.

Methods

Research Design

This study employed a convergent mixed-methods research design (Creswell & Plano Clark, 2018) to comprehensively evaluate the implementation of the Philippine Rice Information System (PRiSM) in Davao del Sur. The design combined quantitative and qualitative approaches to capture both measurable indicators of system implementation and the experiences of actual users. Quantitative data were collected through structured questionnaires assessing key implementation dimensions, while qualitative data were gathered through semi-structured interviews and direct system observations. The mixed-methods approach was selected to enable triangulation of findings and provide a more comprehensive understanding of implementation challenges than could be achieved through a single method. Quantitative and qualitative data were collected during the same period, analyzed separately, and integrated during interpretation to identify areas of convergence, complementarity, and divergence.

Population of the Study

The study involved twelve (12) authorized PRiSM users representing nine municipalities, one city, and the Provincial Agriculture Office of Davao del Sur. Participants were selected through purposive sampling because they possessed direct experience in operating PRiSM and were actively involved in rice sector monitoring, data collection, validation, reporting, and planning activities. The inclusion criteria were: (a) must be an authorized PRiSM user; (b) must have actively used PRiSM or Bantay Palay for at least one cropping season; (c) must be involved in municipal, city, or provincial agricultural operations; and (d) must be willing to participate in interviews and system assessment activities. Given the limited number of officially designated PRiSM users in the province, the sample represented the accessible population of active users. Therefore, the study should be interpreted as an exploratory case-based evaluation of PRiSM implementation in Davao del Sur rather than a statistically generalizable assessment of all PRiSM users in the Philippines.

Table 1. Profile of Respondents

Respondent Category	Frequency
Municipal Agriculture Office Personnel	4
City Agriculture Office Personnel	4

Provincial Agriculture Office Personnel	4
Total	**12**

Data Collection Instruments

A researcher-developed questionnaire was used to assess six dimensions of PRiSM implementation, such as system sustainability, capacity building effectiveness, data quality and utilization, coordination mechanisms, data accessibility, and feedback integration. Responses were measured using a five-point Likert scale ranging from 1 (Very Low) to 5 (Very High). Furthermore, the questionnaire was subjected to content validation by the poll of experts in agricultural information systems, agricultural extension, and research methodology. Based on their recommendations, revisions were made to improve item clarity, relevance, and alignment with study objectives. Moreover, a pilot test was conducted among 25 agricultural extension personnel who were not included in the final sample. Cronbach's alpha coefficients ranged from .76 to .85 across the six dimensions, while the overall instrument yielded an alpha coefficient of .83, indicating acceptable to good internal consistency.

Accordingly, semi-structured interviews were conducted with all 12 participants to obtain deeper insights into user experiences, implementation challenges, institutional barriers, training adequacy, data utilization practices, and recommendations for system improvement. Each interview lasted approximately 20 to 30 minutes and followed an interview guide developed from the study objectives. Interviews were conducted face-to-face or through online platforms, depending on and subsequently transcribed verbatim for analysis.

Structured observation was conducted during actual user interaction with the PRiSM web platform and the Bantay Palay mobile application. Observation focused on navigation and interface usability, data encoding procedures, data validation processes, report generation, system responsiveness, and user difficulties encountered during routine tasks. Field notes were recorded using an observation checklist developed for the study. Observational findings were used to validate and enrich questionnaire and interview results.

Data Analysis

Quantitative data were analyzed using descriptive statistics, including frequency counts, means, standard deviations, and interpretive ratings. Statistical analyses were performed with the aid of the statistician. Qualitative data were analyzed using thematic analysis following Braun and Clarke's (2006) six-step framework: (a) familiarization with the data; (b) initial code generation; (c) theme identification; (d) theme review; (e) theme definition and naming; and (f) report preparation. Interview transcripts and observation notes were manually coded. To enhance trustworthiness, emerging themes were reviewed repeatedly and compared across data sources.

Moreover, integration occurred during interpretation through triangulation and joint comparison of quantitative, interview, and observational findings. Quantitative results identified implementation areas receiving low or moderate ratings, while qualitative findings explained the underlying reasons for these ratings. Observation data were used to verify reported user experiences and identify usability issues not captured through questionnaires. The integration process enabled a more comprehensive understanding of PRiSM implementation challenges and facilitated the development of evidence-based recommendations for system improvement.

Description of PRiSM System

System's Graphical User Interface (GUI) and Functionalities

The PRiSM platform presents several key modules designed to support rice sector monitoring and decision-making. This section presents the major GUI components with screenshots and discusses their design, layout, and functionalities in relation to system requirements and user experience.

Login and Main Dashboard

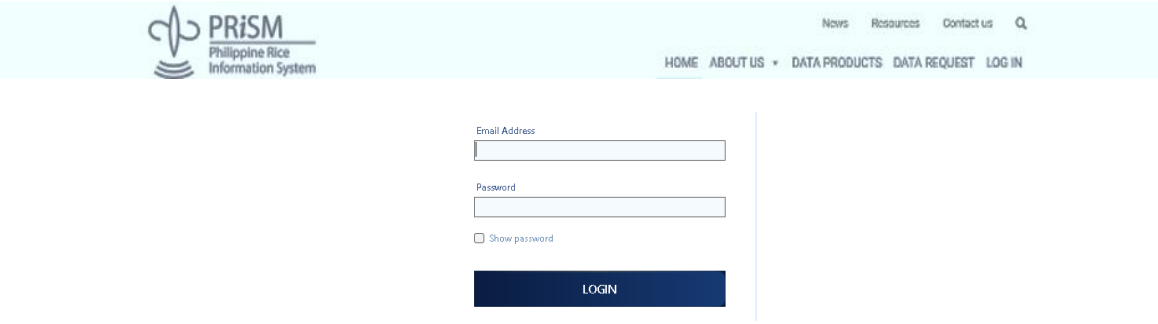

Figure 1. *PRiSM Login and Main Dashboard*

The login interface (Figure 1) provides secure authentication for authorized users across national, regional, provincial, and municipal levels. The design follows standard web security protocols with credential validation. However, users reported challenges with password recovery mechanisms and account management, particularly when staff turnover occurs at local government units. Similar authentication issues have been documented in agricultural information systems where inadequate user management affects system continuity (Mittal & Mehar, 2016).

PRiSM Main Dashboard

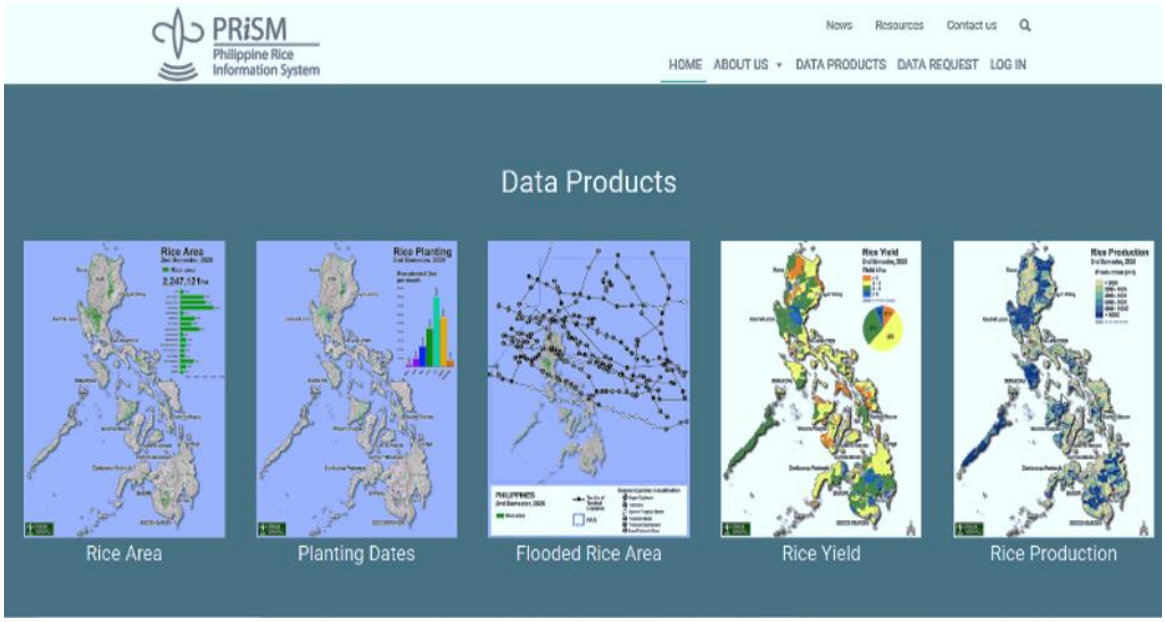

Figure 2. *PRiSM Main Dashboard*

The main dashboard (Figure 2) serves as the central hub displaying key rice sector indicators, including area planted, expected production, yield forecasts, and disaster impact assessments. The interface organizes information using summary

cards, interactive maps, and trend graphs. Navigation menus provide access to major system functions, including data encoding, report generation, and geospatial visualization.

While the dashboard effectively presents aggregate statistics at provincial and regional levels, users indicated that the information density overwhelms municipal-level users who lack familiarity with complex dashboards. The absence of customizable views prevents users from focusing on locally relevant indicators. Modern agricultural information systems incorporate role-based dashboards that present information appropriate to user responsibilities and decision-making needs (Aker, 20112).

Geospatial Visualization and Mapping

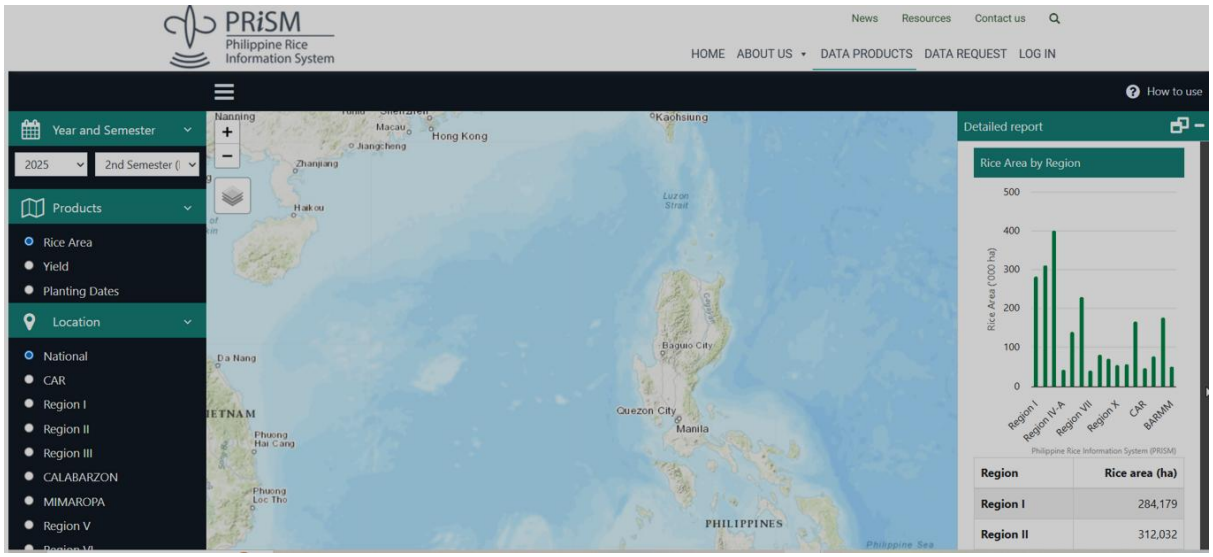

Figure 3. *Geospatial Visualization and Mapping*

The geospatial visualization module (Figure 3) represents PRiSM's core technological innovation, integrating satellite imagery with ground-validated rice area data. Users can visualize rice cultivation patterns across municipalities, track seasonal planting trends, and identify areas affected by disasters such as typhoons, floods, or droughts. The map interface supports multiple layers, including administrative boundaries, irrigation systems, and production zones.

The module employed remote sensing technology to automatically detect rice areas, significantly reducing manual survey workload (Mulla, 2013). However, users reported challenges with map navigation, layer management, and interpretation of satellite-derived data. Many municipal agriculture officers lack training in geospatial concepts, making it difficult to validate automated classifications or identify classification errors. This technical competency gap limited the system's potential for evidence-based planning at local levels.

Additionally, the geospatial module requires stable internet connectivity for map rendering and data synchronization. In rural areas with poor connectivity, users experience significant delays or a complete inability to access mapping functions, creating operational frustrations and reducing system adoption.

Data Encoding and Validation

Figure 4. *Data Encoding and Validation*

The web-based data encoding module (Figure 4) allows provincial and municipal users to manually input rice sector data when mobile collection is not feasible. The interface presents structured forms for entering production data, area measurements, farmer demographics, and market information. Data validation rules were used to check for logical inconsistencies and flag suspicious entries for review.

Despite validation mechanisms, users reported significant challenges with data entry workflows. The form structure was not well aligned with the existing paper-based reporting formats used by municipalities, requiring users to mentally translate information between formats and thereby increasing the likelihood of reporting errors. Additionally, the system lacked bulk data import capabilities, forcing users to manually enter large datasets—a time-consuming process that reduces adoption among busy agricultural staff. Moreover, the absence of real-time feedback during data entry also creates problems. Users only discover validation errors after attempting to submit complete forms, requiring extensive rework. Modern form design principles emphasize immediate validation feedback to guide users toward correct data entry (Shneiderman, 2010).

Results and Discussion

The findings were organized based on the specific objectives of the study, with quantitative data summarized in tables and interpreted within each subsection.

System Sustainability and Institutional Support

Assessment of PRiSM implementation revealed critical concerns regarding system sustainability and institutional support structures. Table 1 presents the respondents' evaluation of sustainability factors.

Table 1. System Sustainability Assessment

Sustainability Factor	Mean Score	SD	Interpretation
1. Adequacy of Funding for System Maintenance	2.17	0.72	Low
2. Continuity of Institutional Support	2.33	0.79	Low
3. Sustainability Beyond the Current Administration	2.08	0.79	Very Low
4. Clarity of the Long-term Sustainability Plan	2.25	0.74	Low
5. Leadership Commitment to System Continuity	2.50	0.77	Low

Note: Scale 1-5, where 1=Very Low, 5=Very High

Results indicate severe sustainability concerns across all indicators, with sustainability beyond the current administration receiving the lowest rating (2.08). Respondents expressed uncertainty about whether PRiSM would continue if key personnel change or if national priorities shift. This reflects common challenges in government information systems where political transitions and budget reallocations threaten system continuity (Heeks & Bailur, 2007).

Inadequate funding for maintenance (M = 2.17) particularly concerns users who observed declining system performance over time without corresponding technical support. Several respondents noted that mobile devices provided during initial implementation had degraded without replacement, forcing field staff to use personal phones with inconsistent specifications. The absence of clear long-term sustainability planning (M = 2.25) creates uncertainty about the system's future, reducing user motivation to invest time in learning and utilizing PRiSM effectively.

On the qualitative inquiry, an overarching theme was identified, which is the "Weak Institutionalization and Sustainability Planning of PRiSM," with three emerging themes: Uncertainty Regarding Long-Term Program Continuity, Inadequate Resource Allocation and Maintenance Support, and Absence of a Clear Sustainability Roadmap.

Theme 1: Uncertainty Regarding Long-Term Program Continuity

Participants expressed concerns regarding the sustainability of PRiSM beyond the current administration. Many users perceived the system as highly dependent on national leadership priorities and designated focal persons, creating uncertainty about its long-term viability. Respondents indicated that changes in leadership, personnel turnover, and shifting government priorities could negatively affect system continuity. As participants 6 stated, *"We are not sure if the system will still be supported in the coming years because it depends on who is managing the program".* This was also supported by Participant 9 who emphasized, *"When key personnel are reassigned or retire, knowledge about the system is often lost."*

These perceptions help explain the very low rating for sustainability beyond the current administration (M = 2.08, SD = 0.79). The findings are consistent with previous studies emphasizing that institutionalization and leadership commitment are critical determinants of information system sustainability in the public sector (Heeks & Bailur, 2005). Without long-term organizational commitment, information systems often struggle to survive beyond project or administration cycles.

Theme 2: Inadequate Resource Allocation and Maintenance Support

The participants consistently highlighted concerns regarding insufficient financial and technical resources to sustain PRiSM operations. Participants reported that some mobile devices provided during the initial implementation phase were no longer functioning optimally and had not been replaced. Consequently, several users relied on personal devices and internet subscriptions to perform field activities, as evident in the following interview extract from Participant 1: *"Some of the equipment given before is already outdated, so we use our own phones and internet connection when collecting data"*. This was also reinforced by Participant 11 who stated, "*Technical issues are difficult to address because there is no dedicated budget for maintenance at the local level".*

These observations support the low rating for adequacy of funding for system maintenance (M = 2.17, SD = 0.72). Similar challenges have been reported in digital agriculture initiatives where inadequate financial resources limit system maintenance, technology upgrades, and user support services (Aker, 2011; Tittonell et al., 2021).

Theme 3: Absence of a Clear Sustainability Roadmap

Participants also reported limited awareness of long-term plans regarding system enhancement, maintenance, and institutional integration. Many respondents indicated that while they recognized the value of PRiSM, they lacked information regarding future funding arrangements, capacity-building activities, and operational responsibilities. This is validated by Participant 10 who claimed, *"We know the system is useful, but we do not know what the long-term plan is for sustaining and improving it."* It is further supplemented by participant 12: "*There should be a clearer plan on who will support the system and how local offices can continue using it effectively."*

This finding corresponds with the low ratings for clarity of long-term sustainability plans (M = 2.25, SD = 0.74) and continuity of institutional support (M = 2.33, SD = 0.79). Based on the Information Systems Success Model, organizational support structures significantly influence the continued use and success of information systems (DeLone & McLean, 2003). The absence of a clearly communicated sustainability strategy may reduce user confidence and weaken long-term adoption.

Taken together, the qualitative findings suggest that sustainability concerns are driven not by the technological capabilities of PRiSM itself but by institutional, financial, and governance-related challenges. These results indicate that strengthening leadership commitment, establishing dedicated funding mechanisms, and developing a clear sustainability roadmap are essential to ensuring the long-term success of PRiSM in supporting evidence-based rice sector planning.

Capacity Building and Training Effectiveness

Evaluation revealed significant gaps in capacity building and training support provided to PRiSM users. Table 2 summarizes the assessment of training effectiveness.

Table 2. Capacity Building and Training Assessment

Training Factor	Mean Score	SD	Interpretation
1. Adequacy of Initial Training	2.75	0.79	Moderate
2. Availability of Training Materials	2.42	0.77	Low
3. Frequency of Refresher Training	2.08	0.79	Very Low
4. Technical Support Responsiveness	2.33	0.75	Low
5. Clarity of System Documentation	2.50	0.78	Low

Note: Scale 1-5, where 1=Very Low, 5=Very High

Initial training received moderate ratings (M = 2.75), suggesting that basic orientation was provided but was insufficient for comprehensive system mastery. However, the frequency of refresher training scored lowest (M = 2.08), indicating that users receive little ongoing support after initial deployment. This creates significant problems when staff turnover occurs, as new personnel must learn the system without structured training programs.

In addition, technical support responsiveness (M = 2.33) also scored poorly, with users reporting delays of several days or weeks when requesting assistance with technical problems. In some cases, reported issues remain unresolved, forcing users to develop workarounds or abandon certain system features. Modern information systems require responsive support mechanisms with clear escalation procedures and service level commitments (DeLone & McLean, 2003).

The lack of clear system documentation (M = 2.50) compounds training challenges. Users indicated that available manuals are overly technical, written for national-level users rather than municipal field staff. Video tutorials and step-by-step guides specific to local-level tasks are notably absent.

To further explain the quantitative findings, thematic analysis of interview and observation data identified three major themes related to capacity building and training effectiveness. An overarching theme was identified: "Insufficient and Non-Responsive Capacity Building Support System," with three emerging subthemes: Limited Opportunities for Continuous Learning and Skill Development, Delayed Technical Support and Problem Resolution, and Inaccessible and Highly Technical Learning Resources.

Theme 1: Limited Opportunities for Continuous Learning and Skill Development

Although respondents acknowledged receiving initial orientation on PRiSM, many expressed concerns regarding the lack of follow-up training and refresher courses. Participants indicated that the knowledge acquired during initial implementation gradually diminished due to infrequent use of some system functions and the absence of continuing capacity-building activities, as validated in the response of Participant 1 who shared, *"We attended the first training, but after that there were very few opportunities to update our knowledge or learn new features".* This was also supported by Participant 5 who stated, *"When the system is updated, we are expected to figure out the changes ourselves because no refresher training is provided."*

These experiences help explain the very low rating for refresher training frequency (M = 2.08, SD = 0.79). Continuous training is particularly important for information systems that undergo periodic enhancements and updates. Research suggests that regular training opportunities improve user competence, confidence, and long-term technology adoption (Venkatesh et al., 2003; Klerkx et al., 2019). Without ongoing learning support, users may struggle to maximize system capabilities, leading to reduced utilization and effectiveness.

Theme 2: Delayed Technical Support and Problem Resolution

Participants consistently reported challenges in obtaining timely technical assistance when encountering system-related issues. Users described situations where technical concerns remained unresolved for extended periods, forcing them to rely on colleagues, informal communication channels, or alternative manual processes. The participant shared, *"When we encounter technical problems, it sometimes takes several days before we receive a response"* (Participant 8). It is also validated by Participant 4, stating, *"There are times when we stop using certain features because no one can immediately help us solve the problem."*

These concerns correspond with the low rating for technical support responsiveness (M = 2.33, SD = 0.75). Based on the Information Systems Success Model, service quality, including the responsiveness and effectiveness of technical support, is a critical determinant of user satisfaction and continued system use (DeLone & McLean, 2003). Inadequate technical support can undermine user confidence and discourage adoption, even when the system itself possesses valuable functionalities.

Theme 3: Inaccessible and Highly Technical Learning Resources

The participants also identified challenges associated with system documentation and learning materials. While manuals were available, many participants perceived them as overly technical and difficult to apply to routine field operations. Users expressed a preference for simplified guides, localized examples,

and visual learning resources such as video tutorials and step-by-step demonstrations, as confirmed by Participant 5 who stated, *"The manuals contain too much technical information and are difficult for field staff to follow".* This was also supported by Participant 5 who shared, *"Short video tutorials would be more useful because we can easily review them whenever we encounter difficulties."*

These observations support the low ratings for training material availability (M = 2.42, SD = 0.77) and clarity of system documentation (M = 2.50, SD = 0.78). Effective learning resources are essential for supporting user competence and reducing technology-related anxiety. Studies on digital agriculture and information systems implementation emphasized that accessible documentation and user-friendly learning materials significantly contributed to successful system adoption and sustained use (Tittonell et al., 2021).

Collectively, the qualitative findings suggest that capacity-building challenges stem not from the absence of initial training but from insufficient continuing education, delayed technical support, and limited access to user-friendly learning resources. These issues may negatively affect user confidence, system proficiency, and long-term adoption of PRiSM. Strengthening refresher training programs, improving technical support responsiveness, and developing simplified instructional materials may enhance the effectiveness and sustainability of PRiSM implementation at the local government level.

Data Quality and System Utilization

Assessment revealed significant concerns about data quality and actual system utilization for decision-making. Table 3 presents the evaluation results.

Table 3. Data Quality and Utilization Assessment

Data Quality Factor	Mean Score	SD	Interpretation
1. Accuracy of Encoded Data	2.83	0.75	Moderate
2. Completeness of Data Submission	2.67	0.78	Moderate
3. Timeliness of Data Reporting	2.58	0.76	Low
4. Use of PRiSM Data for Planning Decisions	2.42	0.80	Low
5. Integration with Existing Planning Processes	2.33	0.79	Low

Note: Scale 1-5, where 1=Very Low, 5=Very High

Data accuracy received a moderate rating (M = 2.83), but completeness (M = 2.67) and timeliness (M = 2.58) scored lower, indicating that data gaps and delays compromised system effectiveness. Users reported that data validation challenges at the municipal level affected provincial and regional data quality. Lack of verification mechanisms allowed erroneous data to propagate through the system.

Most concerning is the low utilization of PRiSM data for actual planning decisions (M = 2.42). Despite substantial investment in data collection, users indicated that PRiSM outputs were not effectively integrated into planning processes (M = 2.33). Several factors contributed to this disconnection. First, data in PRiSM may not align temporally with planning cycles, arriving too late for incorporation into annual plans. Second, planning officials often prefer familiar paper-based reports over digital dashboards that they find difficult to interpret. Third, the absence of clear protocols for translating PRiSM insights into actionable recommendations created a gap between data availability and decision-making utility.

This finding reflects a fundamental challenge in agricultural information systems: technical capability to collect and display data does not automatically translate to improved decision-making unless accompanied by institutional

processes that embed system outputs into planning workflows (Mittal & Mehar, 2016).

To provide deeper insights into the quantitative findings, thematic analysis of interview and observation data revealed three major themes affecting data quality, utilization, and decision-making within PRiSM implementation. An overarching theme was identified: "Weak Data Utilization Culture and Ineffective Data-to-Decision Integration," with three emerging subthemes: Challenges in Ensuring Timely and Reliable Data Submission, Limited Translation of Data into Planning Decisions, and Persistence of Traditional Reporting and Planning Practices.

Theme 1: Challenges in Ensuring Timely and Reliable Data Submission

Participants acknowledged the importance of accurate agricultural data but reported difficulties in maintaining timely and complete submissions. Respondents explained that delays often occur due to limited personnel, competing field responsibilities, connectivity issues, and lengthy validation procedures. As a result, some reports are submitted beyond required timelines, reducing their usefulness for planning purposes. This is validated by participant 10 who shared, *"Data collection is manageable, but validation and submission sometimes take longer because we have other responsibilities in the office"*. This was also evident in the interview extract of Participant 11 who stated, *"There are instances when data cannot be uploaded immediately because of internet connectivity problems in the field."*

These observations help explain the moderate ratings for data accuracy (M = 2.83, SD = 0.75) and completeness (M = 2.67, SD = 0.78), as well as the lower rating for timeliness of reporting (M = 2.58, SD = 0.76). Similar challenges have been reported in agricultural information systems where delays in data transmission and validation reduce the value of information for timely decision-making (FAO, 2022). Effective agricultural information systems require not only accurate data collection but also timely reporting mechanisms to support responsive governance and planning.

Theme 2: Limited Translation of Data into Planning Decisions

A recurring theme from the interviews was the limited use of PRiSM-generated information in actual planning and policy formulation. While respondents recognized the value of the system as a repository of agricultural data, many indicated that its outputs were not consistently utilized in preparing development plans, resource allocation decisions, or agricultural interventions. This is evident in the response of Participants 1, stating that "*The information is available in the system, but it is not always discussed during planning activities".* This was also reinforced by Participant 11 as he shared, *"Most planning decisions are still based on the reports that offices have traditionally used."*

These perceptions support the low rating for the use of PRiSM data in planning decisions (M = 2.42, SD = 0.80). Based on the Information Systems Success Model, information quality contributes to organizational benefits only when users actively incorporate system outputs into decision-making processes (DeLone & McLean, 2003). The findings suggest that although PRiSM generates valuable information, organizational mechanisms for translating data into actionable planning decisions remain weak.

Theme 3: Persistence of Traditional Reporting and Planning Practices

Participants further revealed that many local government offices continue to rely on established paper-based reporting systems and conventional planning procedures. Observation data showed that some users maintained parallel manual records even after encoding information into PRiSM. This duplication of effort reduced efficiency and discouraged regular use of the system. The participants also

explained that *"We still prepare the reports that management is used to seeing, so PRiSM becomes an additional task rather than the primary source of information"* (Participant 9). This argument was also strengthened by Participant 12 who shared, *"Decision-makers are more familiar with printed reports than digital dashboards"*.

These findings correspond with the low rating for integration with existing planning processes (M = 2.33, SD = 0.79). Research on digital transformation in agriculture suggests that technology adoption is often constrained when new systems are not fully embedded within existing organizational workflows and governance structures (Tittonell et al., 2021). The continued reliance on traditional reporting mechanisms may limit the realization of PRiSM's full potential as a decision-support tool.

Taken together, the qualitative findings indicate that challenges in data quality and utilization are not solely technological in nature. Rather, they stem from operational constraints, limited integration into planning processes, and organizational preferences for traditional reporting systems. These results suggest that strengthening data validation mechanisms, aligning reporting schedules with planning cycles, and institutionalizing the use of PRiSM outputs in local planning activities are essential for maximizing the system's contribution to evidence-based agricultural governance.

Coordination and Feedback Mechanisms

Evaluation identified critical gaps in coordination between system levels and feedback integration mechanisms. Table 4 presents assessment results.

Table 4. Coordination and Feedback Assessment

Coordination Factor	Mean Score	SD	Interpretation
1. Coordination between National and Regional Offices	2.58	0.75	Low
2. Communication between Provincial and Municipal Users	2.75	0.78	Moderate
3. Integration of Field Feedback into System Improvements	2.17	0.78	Low
4. Responsiveness to User-Reported Issues	2.25	0.76	Low
5. Stakeholder Engagement in System Development	2.08	0.77	Very Low

Note: Scale 1-5, where 1=Very Low, 5=Very High

Coordination between national and regional offices scored low (M = 2.58), with users reporting that directives and updates from the national level often arrive without adequate context or advance notice. Municipal users particularly struggle when system changes occur without corresponding training or documentation updates.

Most problematic is the very low stakeholder engagement in system development (M = 2.08) and poor integration of field feedback (M = 2.17). Users consistently reported that their suggestions for system improvements, bug reports, and feature requests received little acknowledgment or action. This created the perception that PRiSM development is top-down rather than user-centered, reducing user ownership and engagement.

Moreover, responsiveness to user-reported issues (M = 2.25) also scored poorly, with users indicating that technical problems persist for extended periods without resolution. The absence of transparent issue tracking systems prevents

users from knowing whether their concerns are being addressed, further eroding confidence in system management.

In order to complement the quantitative findings, thematic analysis of interview and observation data revealed three major themes that explain the challenges in coordination and feedback integration within PRiSM implementation. An overarching theme was identified: "Ineffective Participatory Governance and Fragmented Communication in PRiSM Implementation," with three emerging subthemes, such as Top-Down Communication and Limited Context for System Updates, Weak Feedback Loops and Limited Responsiveness to User Concerns, and Limited Stakeholder Participation in System Development.

Theme 1: Top-Down Communication and Limited Context for System Updates

Participants reported that information regarding system updates, policy changes, and new operational requirements often originates from the national level with limited consultation or contextualization at the regional and local levels. While users acknowledged the importance of standardizing system procedures, many felt that updates were sometimes communicated without adequate explanation, preparation, or supporting training. This was corroborated by Participant 1 who stated, *"Sometimes changes in the system are introduced without sufficient orientation, so we have to learn the new processes while already doing our regular work."* It was further supported by Participant 5 who shared, *"We receive instructions from higher offices, but there is not always enough information on why the changes are necessary or how they will affect our tasks."*

These experiences help explain the low rating for coordination between national and regional offices (M = 2.58, SD = 0.75). Effective coordination requires not only information dissemination but also shared understanding among stakeholders. Studies have shown that communication gaps between central and local levels can hinder the successful implementation of digital government and agricultural information systems (Klerkx et al., 2019). Improved communication channels and advanced consultation may help strengthen stakeholder understanding and readiness for system changes.

Theme 2: Weak Feedback Loops and Limited Responsiveness to User Concerns

A recurring concern among respondents was the perceived lack of response to issues raised by field users. Participants indicated that bug reports, operational concerns, and suggestions for improvement were often submitted but rarely followed by updates regarding their status or resolution. This was corroborated by Participant 8 who remarked, *"We submit reports and suggestions, but we rarely receive feedback on whether they were reviewed or acted upon"*. This argument was further strengthened by Participant 11 who explained, "*There are times when technical issues remain unresolved for a long period, and we do not know the progress of our requests."*

These observations correspond with the low ratings for responsiveness to user-reported issues (M = 2.25, SD = 0.76) and integration of field feedback into system improvements (M = 2.17, SD = 0.78). Considering DeLone and McLean Information Systems Success Model, service quality and user support are critical determinants of system satisfaction and continued use (DeLone & McLean, 2003). When users perceive that their concerns are ignored or receive limited attention, confidence in the system and its management may decline.

Theme 3: Limited Stakeholder Participation in System Development

Participants also expressed a desire for greater involvement in the design and enhancement of PRiSM. Many users believed that local experiences and operational realities could provide valuable insights for improving system functionality, yet opportunities to contribute to development decisions appeared limited. The same

view was confirmed by Participant 10 who shared "*Field users encounter challenges every day, so our experiences could help improve the system if we were consulted more often"*. This was also supported by Participant 3 who explicated, *"Many improvements could be identified through regular consultations with municipal users because we understand the practical difficulties in implementation."*

These perceptions support the very low rating for stakeholder engagement in system development (M = 2.08, SD = 0.77). User-centered design literature emphasized that involving end users throughout system development and improvement processes increases usability, acceptance, and long-term sustainability (Norman, 2013; ISO 9241-210, 2019). Similarly, digital agriculture studies have demonstrated that stakeholder participation enhances system relevance and encourages stronger ownership among users (Tittonell et al., 2021).

Generally, the qualitative findings suggest that coordination and feedback challenges stemmed from limited two-way communication, weak feedback mechanisms, and insufficient stakeholder participation in system development. While PRiSM provides an important platform for rice sector monitoring, its long-term success may depend on strengthening communication channels, establishing transparent issue-tracking systems, and creating formal mechanisms that allow field users to participate actively in system improvement initiatives. These measures can promote greater user ownership, responsiveness, and institutional trust in the system.

Result of User Acceptability

In order to comprehensively evaluate user acceptance of PRiSM, the study assessed multiple dimensions based on established technology acceptance models.

Table 5. Overall User Acceptability Evaluation

Acceptability Dimension	Mean Score	SD	Interpretation
1. Perceived Usefulness for Rice Sector Monitoring	3.58	0.84	Acceptable
2. Perceived Ease of Use	2.67	0.79	Below Average
3. User Satisfaction with System Performance	2.42	0.80	Low
4. Behavioral Intention to Continue Use	3.17	0.76	Moderate
5. Overall System Acceptability	2.96	0.77	Below Average

Note: Scale 1-5, where 5 = Highly Acceptable

Results reveal that while users acknowledge PRiSM's potential usefulness for rice sector monitoring (M = 3.58), significant barriers exist in ease of use (M = 2.67) and user satisfaction (M = 2.42). This pattern aligns with technology acceptance research demonstrating that perceived usefulness alone is insufficient for successful adoption when ease of use is compromised (Venkatesh et al., 2003). On the other hand, the moderate behavioral intention to continue use (M = 3.17), despite low satisfaction, suggests users to recognize PRiSM's strategic importance and remain committed to rice sector development. However, the below-average overall acceptability (M = 2.96) indicates that the current implementation significantly constrains system effectiveness.

Additionally, qualitative feedback revealed that users appreciated PRiSM's geospatial visualization capabilities and potential for improved planning, but frustration with technical issues, inadequate training, and poor institutional support undermined adoption. Many users expressed that with proper capacity building, responsive technical support, and sustained institutional commitment, PRiSM could become a valuable tool for rice sector development.

To provide deeper insights into the quantitative findings, thematic analysis of interview and observation data yielded three major themes influencing user acceptability of PRiSM. An overarching theme was identified: "Conditional Acceptance Driven by Perceived Strategic Value Amid Usability Constraints," with three emerging subthemes, such as Recognition of PRiSM's Strategic Value for Rice Sector Monitoring, Usability Challenges Limit Effective System Adoption, and Commitment to Continued Use Despite Dissatisfaction.

Theme 1: Recognition of PRiSM's Strategic Value for Rice Sector Monitoring

Despite implementation challenges, participants generally recognized the potential value of PRiSM in supporting rice sector monitoring, agricultural planning, and evidence-based decision-making. Users appreciated the system's ability to consolidate agricultural information, visualize production areas, and generate reports that could support policy formulation and resource allocation, as validated in the interview response of Participant 10 who shared, "*The system has great potential because it provides information that can help us monitor rice production and identify areas needing intervention"*. The same view was stated by Participant 12 who stated, *"The mapping and visualization features are useful because they give a clearer picture of what is happening in the field."*

These perceptions help explain the acceptable rating for perceived usefulness (M = 3.58, SD = 0.84), the highest-rated dimension of user acceptability. Taking into account the Technology Acceptance Model, perceived usefulness is a primary determinant of technology adoption because users are more likely to embrace systems that improve job performance and decision-making effectiveness (Davis, 1989). Similar findings have been reported in digital agriculture studies where users value technologies that provide actionable information for planning and resource management (Klerkx et al., 2019).

Theme 2: Usability Challenges Limit Effective System Adoption

While respondents recognized the benefits of PRiSM, many reported difficulties navigating the system and performing routine tasks. Observation data indicated that users often required multiple steps to complete data-entry activities and occasionally experienced difficulties locating specific functions or reports. Participants also noted that system updates sometimes introduced changes without sufficient guidance, increasing the learning curve for users. This research proposition was supported by the response of Participant 1 who remarked, *"The system is useful, but it is not always easy to use, especially for users who are not very familiar with digital platforms."* The same is true with Participant 6 who stated, *"Sometimes we spend a lot of time figuring out where to find information or how to complete certain tasks."*

These experiences support the below-average rating for perceived ease of use (M = 2.67, SD = 0.79). The findings are consistent with the Technology Acceptance Model, which suggests that systems perceived as difficult to use are less likely to achieve widespread acceptance even when users acknowledge their usefulness (Davis, 1989). Similar studies on agricultural information systems have shown that interface complexity and inadequate user support significantly reduced adoption and sustained utilization (Tittonell et al., 2021; Venkatesh et al., 2003).

Theme 3: Commitment to Continued Use Despite Dissatisfaction

A notable finding was the contrast between low user satisfaction (M = 2.42, SD = 0.80) and moderate behavioral intention to continue using the system (M = 3.17, SD = 0.76). Interviews revealed that many users remained willing to utilize PRiSM because they viewed it as an important government initiative and recognized its potential contribution to rice sector development. However, dissatisfaction

stemmed from recurring technical issues, limited training opportunities, delayed technical support, and concerns regarding long-term sustainability. This was confirmed by Participant 7 who said, *"We will continue using the system because it is required and it can be helpful, but there are many things that need improvement."* This was also upheld by Participant 8 who accentuated, *"The concept is good, but users need more support to fully benefit from the system."*

These findings align with the Unified Theory of Acceptance and Use of Technology (UTAUT), which posits that users may continue using a technology when they perceive organizational expectations and performance benefits, even when facilitating conditions remain inadequate (Venkatesh et al., 2003). The moderate intention to continue use suggests that respondents recognized PRiSM's strategic importance but required greater institutional support to achieve higher levels of satisfaction and acceptance.

Thus, the qualitative findings indicate that user acceptability is influenced by the interaction between perceived usefulness, usability, and organizational support. While respondents acknowledged the value of PRiSM as a decision-support tool, challenges related to system navigation, technical assistance, training, and institutional commitment reduced overall satisfaction. These findings support previous research emphasizing that successful adoption of information systems depends not only on technological functionality but also on user experience, service quality, and organizational readiness (DeLone & McLean, 2003; Venkatesh et al., 2003). Strengthening user support mechanisms, simplifying system workflows, and expanding capacity-building initiatives may substantially improve the overall acceptability of PRiSM among local government users.

Conclusion and Future Works

This study assessed the Philippine Rice Information System (PRiSM) implementation in Davao del Sur using responses from twelve users across municipal, city, and provincial agricultural offices. Quantitative results indicate moderate acceptance (M = 2.96) and a relatively strong commitment to rice sector development (M = 3.17). However, key implementation dimensions received low to moderate ratings, including system sustainability (M = 2.08–2.50), capacity building (M = 2.08–2.75), data quality and utilization (M = 2.33–2.83), coordination and feedback mechanisms (M = 2.08–2.75), and technical support responsiveness (M = 2.08–2.75). These suggest that PRiSM's effectiveness was constrained by implementation and institutional gaps despite its perceived value as a decision-support tool.

Qualitative findings further explain these results through four overarching subthemes, such as Weak Institutionalization and Sustainability Planning, Insufficient and Non-Responsive Capacity-Building Support, Weak Data Utilization Culture and Limited Data-To-Decision Integration, and Ineffective Participatory Governance and Fragmented Communication. These reflect systemic issues in funding continuity, training access, data use practices, and stakeholder engagement, all of which limit optimal system utilization.

Despite these challenges, users demonstrate conditional acceptance driven by perceived strategic value, indicating that PRiSM remains relevant for agricultural planning, particularly due to its geospatial and analytical functions. However, usability and operational constraints continue to hinder full adoption. Overall, PRiSM is a strategically valuable system whose limitations lie largely in institutional and implementation mechanisms rather than in its core design.

Future research should focus on longitudinal and comparative studies to examine sustained adoption and contextual differences across provinces. Further work is needed to improve the data-to-decision pipeline, enhance integration of real-time market and climate data, and develop more adaptive decision-support features.

System improvements should also address mobile accessibility, offline functionality, and low-bandwidth operation to ensure equitable and sustained use in rural settings.

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Conflict of Interest

The author(s) declare that there is no conflict of interest regarding the publication of this study entitled “From Data to Decisions: Assessing the Role of the Philippine Rice Information System (PRiSM) in Evidence-Based Decision-Making.” The conduct of the study, data analysis, interpretation of results, and preparation of the manuscript were carried out independently and without influence from any commercial, financial, or personal interests.

Artificial Intelligence (AI) Declaration Statement

The authors declare that generative AI tools were used solely to assist in drafting and editing the manuscript, including grammar, style, and phrasing improvements. All intellectual content, research design, data analysis, interpretation of results, and conclusions were entirely developed and verified by the authors. The use of AI tools did not influence the study’s findings or the scientific integrity of the work.