

Agricultural Extension Workers' Awareness of E-Extension Platforms and Support Needs in Butuan City

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ABSTRACT

Digitalizing agricultural extension services is a crucial technique for improving their dissemination, however there is limited data on AEWs' awareness of these technologies and the institutional support they need to use them effectively. This study assessed Agricultural Extension Workers (AEWs) awareness of current e-extension platforms, applications, and programs and identified the support needed to prepare them for implementation. The descriptive mixed methods study used a convergent-parallel methodology based on Diffusion of Innovation Theory. Agricultural Extension Workers from Butuan City's Agriculture and Veterinary Department were surveyed. Text mining was used to analyze qualitative responses, while descriptive statistics were used for quantitative data. The Registry System for Basic Sectors in Agriculture (RSBSA) Finder showed the highest awareness and utilization among Agricultural Extension Workers (AEWs), however, a gap was observed between awareness and practice. Most institutional support needs involve ICT training and capacity-building, improved internet connectivity, and ICT equipment suggesting that awareness alone is insufficient to secure e-extension technology use without organizational support and facilitating infrastructure.

The report suggests improving institutional capacity, incorporating digital platforms into extension activities, and investing in professional development to advance digital agricultural extension. The results provide empirical data to inform policy and capacity-building efforts to digitalize Philippine agricultural extension services.

Keywords: E-Extension, Agricultural Extension Workers, Awareness, Digital Agriculture

INTRODUCTION

The rapid advancement of digital technologies has profoundly influenced governance systems worldwide, particularly in the delivery of public services, commonly referred to as e-government. It is a systematic implementation of innovative technology to enhance transparency, accountability, and citizen engagement in diverse governmental processes (United Nations, 2022). In 2021, the Philippines established the Department of Information and Communication Technologies to facilitate this rising trend (Alampay, 2021), with Local Government Units significantly contributing to the mobilization of these services. More recently, the enactment of the E-Governance Act of 2025 (Republic Act No. 12254) further strengthened the country's commitment to digital transformation by institutionalizing interoperable government information systems and encouraging the adoption of digital technologies in public service delivery, including the agriculture sector. Agriculture was prioritized as a fundamental component of the Philippine economy and development, consequently, agricultural extension services were enhanced to disseminate knowledge, technologies, and innovations among farmers, ultimately aimed at improving productivity, sustainability, and food security (NEDA, 2023).

Agricultural Extension Workers (AEWs) are essential in facilitating the transfer of these advances, acting as a link between research institutes and the community (Adesina and Eforu, 2023). Their primary objective is to expedite knowledge transfer, enhance crop yields, and promote sustainable development at the community level (Gumban & Baladjay, 2025). Consequently, these individuals must cultivate awareness, as it serves as the essential groundwork for agricultural modernization, such awareness must precede any significant technological advancements, enabling them to comprehend the long-term advantages of an innovation (Murkherjee et al., 2024). Evidence from several developing countries indicates that although awareness of digital agricultural technologies has increased substantially, actual adoption among extension personnel remains inconsistent because of inadequate ICT infrastructure, limited institutional support, insufficient training opportunities, and organizational resistance to technological change (Lupiyoadi et al., 2025; Gumbi et al., 2023; Dimo et al., 2022). Similar challenges have been reported in Southeast Asia and Sub-Saharan Africa, where extension workers frequently acknowledge the usefulness of digital platforms but encounter practical barriers that limit sustained utilization (FAO, 2023a; World Bank, 2024). These findings suggest that technology adoption extends beyond individual awareness and is strongly influenced by facilitating conditions, organizational commitment, and continuous capacity-building. A heightened level of awareness provides insight into the requirements for enhancing technology adoption, as digital tools cannot thrive in isolation. The awareness and attitudes of extension workers cannot resolve all issues that hinder its adoption (Ugpat et al., 2025).

Previous studies have predominantly focused on the adoption, efficacy, and challenges of digital agriculture and e-extension technologies, however, there has been insufficient examination of Agricultural Extension Workers' awareness of existing e-extension platforms and the particular institutional support necessary for the effective utilization of these technologies (Briones et al., 2023; FAO, 2023). Researchers have not thoroughly examined the disparity between advanced technological supply and existing grassroots infrastructure, which hinders extension workers from shifting to official public platforms. Analyzing the interaction between user awareness and institutional support is essential for developing targeted capacity-building initiatives and policy frameworks that transform underutilized digital networks into efficient extension systems.

FRAMEWORK

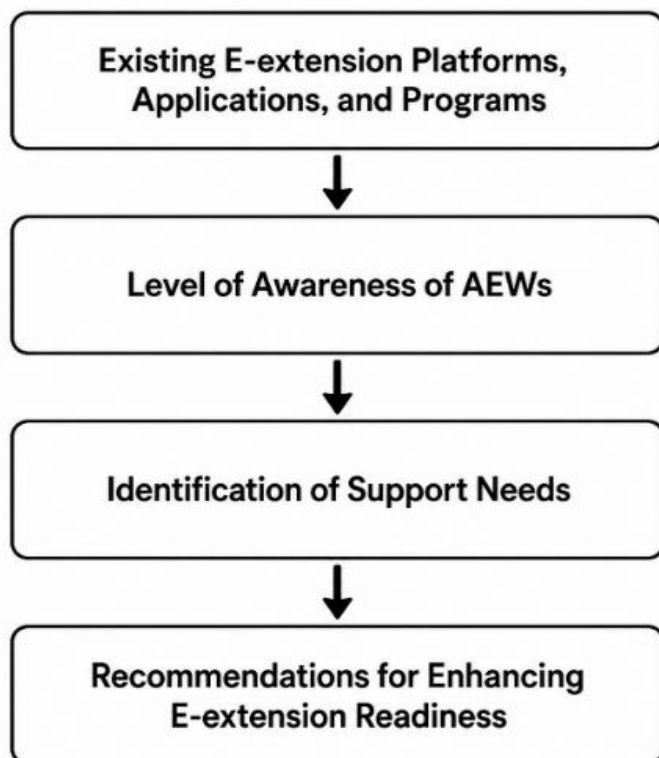


Figure 1. Level of awareness and support needs of AEWs

The conceptual framework of this study is grounded in the Diffusion of Innovation (DOI) Theory, developed by Everett M. Rogers (2003), which posits that awareness is the initial stage in the innovation-decision process. According to the theory, individuals must first become aware of an innovation before they can develop an interest in it, evaluate its usefulness, decide to adopt it, implement it, and ultimately confirm its continued use. In the context of agricultural extension, Agricultural Extension Workers (AEWs) who are familiar with existing e-extension platforms are more likely to recognize their value and consider integrating them into their extension activities.

As illustrated in Figure 1, the study examines two key constructs: the level of awareness of e-extension platforms and the support needs of AEWs. The level of awareness serves as the primary variable that reflects AEWs' familiarity with available digital agriculture and e-extension technologies. It is assumed that greater awareness increases the likelihood of technology adoption; however, awareness alone does not guarantee actual utilization.

To bridge the gap between awareness and adoption, the framework incorporates support needs as a complementary construct. These include the institutional, technical, infrastructural, and capacity-building interventions required by AEWs to effectively implement e-extension services. Identifying these support needs provides insight into the barriers that hinder the transition from awareness to actual adoption and sustained use of digital extension technologies. The interaction between these variables forms the basis for developing evidence-based recommendations aimed at strengthening digital extension services, enhancing the readiness and capability of AEWs, and improving the implementation of e-extension programs within the agricultural extension system.

METHODOLOGY

Respondents. Data was gathered via complete enumeration of Agricultural Extension Workers (AEWs) engaged at the Office of the City Agriculture and Veterinary Department (CAVD) in Barangay Tiniwisan, Butuan City, Agusan del Norte. Complete enumeration was deemed appropriate because the target population was relatively small and accessible, allowing the researchers to obtain data from nearly the entire population and minimizing sampling error.

Research Design. A convergent-parallel approach was employed to achieve a complete understanding of awareness regarding AEWs and the perceived support required to improve extension implementation. Quantitative and qualitative data will be collected concurrently by measuring awareness levels and investigating the perceived support required through open-ended questions.

Instrument. Data were collected using a self-structured questionnaire developed from established literature on digital readiness, e-extension, and technology adoption, particularly the Diffusion of Innovation Theory and related digital awareness frameworks. The instrument consisted of sections on the respondents' demographic and professional characteristics, familiarity with existing e-extension platforms, utilization of digital agricultural technologies, perceived challenges, and institutional support needs.

To establish content validity, the questionnaire was reviewed by experts in agricultural extension, research methodology, and digital agriculture. Their recommendations regarding the relevance, clarity, and organization of the items were incorporated before data collection. A pilot test was subsequently conducted among Agricultural Extension Workers (AEWs) from a neighboring local government unit who were not included in the actual study. The pilot test assessed the clarity and comprehensibility of the questionnaire and evaluated its internal consistency. Reliability was determined using Cronbach's alpha, which indicated acceptable internal consistency for the study instrument.

Ethical Considerations. Permission to conduct the study was obtained from the Office of the City Agriculturist and Veterinary Department. Participation in the study was entirely voluntary. Each respondent was informed of the study's objectives, procedures, potential benefits, and their right to decline or withdraw from participation at any time without penalty. Informed consent was obtained before administering the questionnaire. To protect

respondents' privacy, no personally identifying information was collected, and all responses were treated with strict confidentiality.

Statistical Treatment. The awareness level of Agricultural Extension Workers was measured and examined using descriptive statistics, while qualitative responses were interpreted through text mining techniques, which included preprocessing the textual data, conducting word frequency analysis, extracting keywords, and visualizing results via word clouds or co-occurrence networks. The quantitative and text mining findings were subsequently merged to generate evidence-based recommendations for enhancing e-extension preparedness among Agricultural Extension Workers.

RESULTS AND DISCUSSION

The e-Extension Program for Agriculture and Fisheries and the RSBSA Finder had the most noteworthy familiarity, however, actual usage was predominantly observed in the RSBSA Finder, Rice Crop Manager (RCM) Advisory Service, and RCEF (Table 1), suggesting that familiarity does not necessarily lead to actual utilization. This distinction is significant as exposure to a platform may signify awareness, but actual usage denotes operational integration into extension activities. This data coincides with the findings of Shehrawat et al. (2024), wherein they stated that adoption rate of technologies was low despite high level of awareness due to several reasons such as cost, lack of training, and complexity. Similarly, Lupiyoadi et al. (2025) discussed that awareness and familiarity do not naturally transition into actual use if facilitating conditions are absent, hence, technical infrastructure and continuous training are imperative. The disparity between familiarity and actual utilization aligns with the wider digital agricultural literature. Digital agriculture enhances access to information, advisory services, and market-related services; yet, its adoption is hindered by infrastructure limitations, cost, digital literacy, and the maturity of the institutional ecosystem (Briones et al., 2023; Gumbi et al., 2023). For AEWs, this may indicate that platform marketing must be supplemented with practical training, field access, technical assistance, and incorporation into standard extension processes.

Table 1. Platform Familiarity and Actual Use among AEWs

Platforms	Familiarity (n)	Familiarity (%)	Actual Use (n)	Actual Use (%)
A. e-Extension Program for Agriculture and Fisheries	26	66.67	9	23.08
B. Rice Crop Manager (RCM) Advisory Service	26	66.67	16	41.03
C. Farmers' Contact Center (FCC)	6	15.38	1	2.56
D. Digital Farmers Program (DFP)	13	33.33	4	10.26
E. e-KADIWA	8	20.51	0	0
F. RSBSA Finder	35	89.74	31	79.49
G. RCEF	23	58.97	12	30.77
H. Others	0	0	0	0
I. None of the above	0	0	6	15.38

Note. Multiple responses were allowed; therefore, percentages do not sum to 100%.

Platforms such as the e-Extension Program for Agriculture and Fisheries show relatively high familiarity, but actual use is lower, confirming the implementation gap between awareness and use (Figure 2). In contrast, operationally embedded tools such as RSBSA Finder appear to have stronger actual use, suggesting that AEWs may be more likely to use digital tools when such tools are directly linked to routine administrative, registry, or advisory functions. This agrees with Schon et al (2025) discussing that when digital tools are tied to mandatory administrative reporting, utilization skyrockets because it becomes a core metric of the individual's job performance. This supports the policy recommendation that digital agriculture systems should be harmonized and embedded into a single data and advisory ecosystem rather than promoted as isolated applications (Briones et al., 2023; FAO, 2023b). However, in decentralized agricultural systems, extension workers may abandon use of digital platforms if the institutional infrastructure fails to support the daily routine, hence, the need for strengthen technical support (Gumban & Baladjay, 2025).

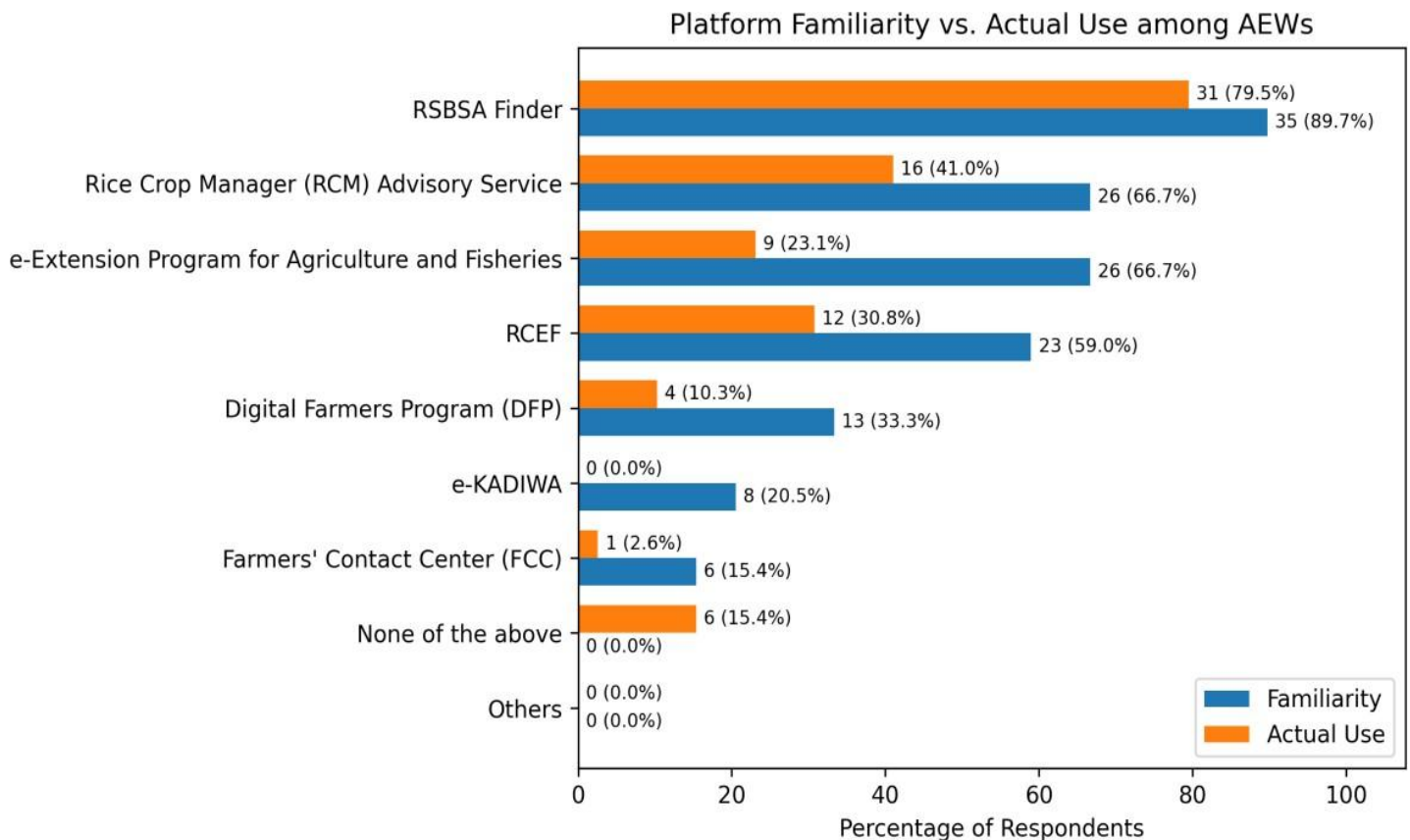


Figure 2. Platform familiarity vs. actual use among AEWs

The most frequently requested supports included enhanced ICT-related training and capacity-building initiatives, improved internet access and network infrastructure, and supplementary ICT equipment (Figure 3). Empirical studies indicate that ICT training significantly correlates with actual adoption; however, the lack of adequate capacity building from institutions undermines the effectiveness of formal extension delivery, reducing it to mere personal communication (Nyarko and Kozari, 2021; Dimo et al., 2022). This corresponds with FAO suggestions that digital agricultural extension and consulting services necessitate capacity-building, enhancement of digital literacy, and fortification of institutions to augment adoption and usability within smallholder-focused systems (FAO, 2023a, 2023b). Although numerous studies indicate that extension workers may depend on consumer-facing channels for communication in the lack of specialized institutional training, underscoring their resilience in achieving objectives (Bhat et al., 2024). Regardless, the findings from Butuan City suggest that e-extension implementation should be regarded as a systemic intervention rather than a singular training event.

Ranked Requested Institutional Support for E-extension

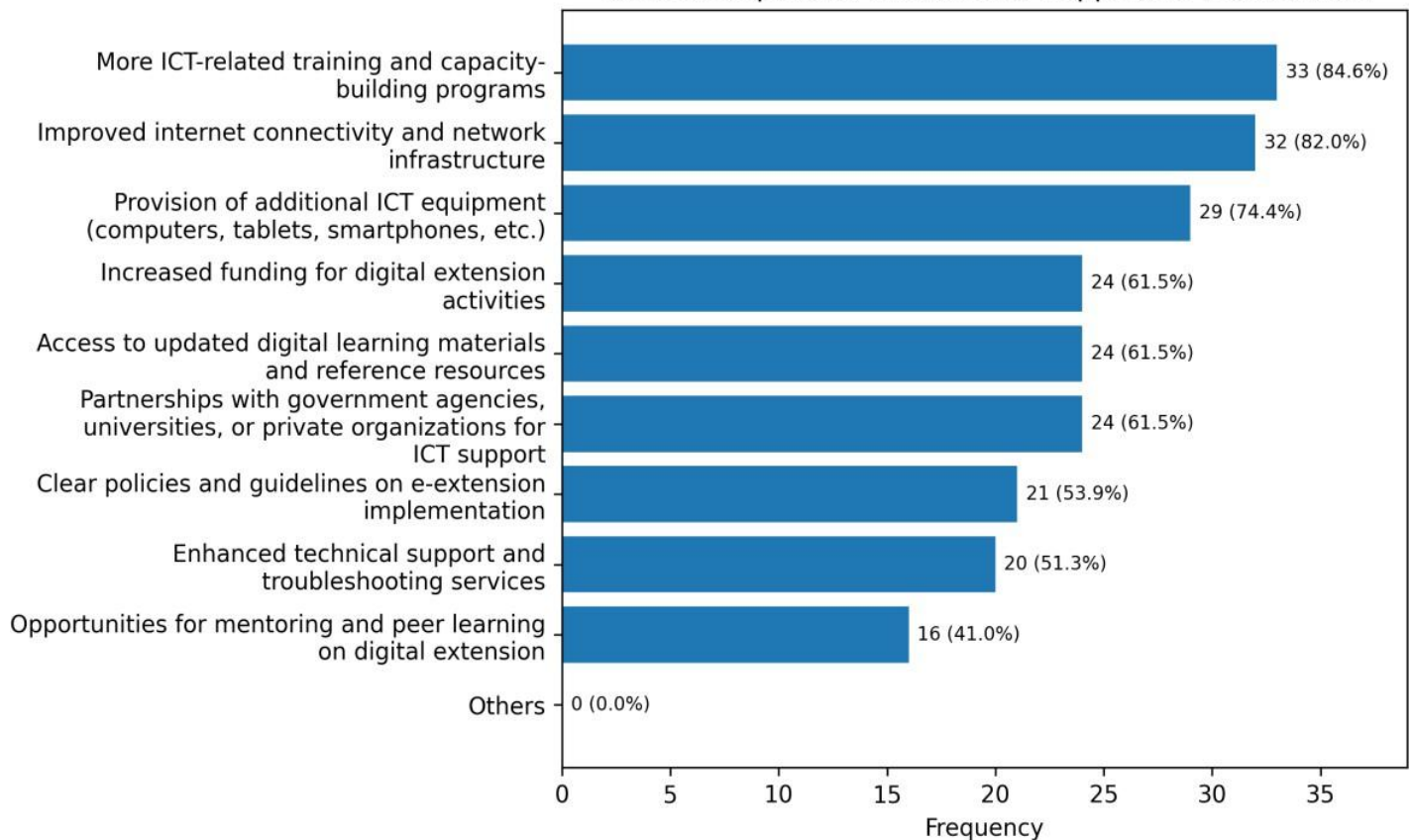


Figure 3. Ranked requested institutional support for e-extension implementation

CONCLUSION

The findings indicate that Agricultural Extension Workers (AEWs) in Butuan City exhibit varying levels of awareness with current e-extension platforms, however, this does not invariably translate into actual utilization. Although the e-Extension Program for Agriculture and Fisheries and the RSBSA Finder were notable platforms, real utilization was predominantly focused on the RSBSA Finder, Rice Crop Manager (RCM) Advisory Service, and RCEF. This signifies a distinct implementation gap between awareness and practical application, implying that knowledge of digital platforms is inadequate for their integration into extension practice. Moreover, Agricultural Extension Workers necessitate significant institutional backing to optimize the efficacy of e-extension programs. The most commonly recognized requirements encompassed ongoing ICT training and capacity-building initiatives, dependable internet connectivity, and sufficient ICT equipment. The findings suggest that successful e-extension implementation relies on both individual competencies and organizational preparedness.

The results of the study emphasize that enhancing awareness of extension workers would not immediately result in actual utilization, rather, incorporating e-extension platform into routine operations, enhancing professional development, upgrading digital infrastructure, and formalizing the utilization of e-extension platforms can improve preparedness of AEWs to provide effective, responsive, and technology-driven extension services.

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