

Educational Communication through Social and Traditional Media in Agricultural Extension: Evidence from the Gulayan sa Barangay Program in Tabuk City, Philippines

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Abstract

Agricultural extension increasingly relies on both traditional and digital communication platforms to support lifelong learning and knowledge dissemination among farming communities. However, limited empirical evidence explains how these media function as complementary educational resources within local government-led extension programs. This study examined farmers' utilization of social and traditional media in disseminating agricultural information through the Gulayan sa Barangay program implemented by the City Agriculture Office of Tabuk City, Philippines. Using explanatory sequential mixed-methods design, quantitative data were obtained from 200 farmer-beneficiaries selected through simple random sampling, followed by qualitative interviews with five key informants and five farmer-participants. Based on the findings, Facebook was the most frequently used platform for agricultural information, whereas radio received the highest perceived educational-impact rating. The findings suggest that traditional and digital media serve complementary educational functions and should be integrated according to farmers' diverse access conditions, learning needs, and communication preferences. The study contributes to agricultural extension education and educational communication by showing that frequency of media used and perceived educational value are not necessarily equivalent and that multimodal communication can support more inclusive community-based learning.

Keywords: Agricultural Extension, Educational Communication, Adult Learning, Social Media, Traditional Media

Introduction

The rapid advancement of digital communication technologies has transformed the ways agricultural information is created, disseminated, and utilized by farming communities. While traditional media such as radio continue to play a vital role in agricultural extension, the increasing accessibility of social media has expanded opportunities for interactive, timely, and learner-centered dissemination of agricultural knowledge. Rather than merely transmitting information, contemporary communication platforms have become important educational

environments where farmers continuously acquire knowledge, exchange experiences, and develop practical competencies that support sustainable agricultural production.

Agricultural extension has increasingly been recognized as a form of non-formal and lifelong education that enables farmers to improve their knowledge, skills, and decision-making capacities. Recent studies have shown that digital communication platforms facilitate collaborative learning among farmers by providing immediate access to agricultural technologies, weather forecasts, pest management strategies, and market information (Ayanwale et al., 2021; Chander et al., 2022). Social networking platforms, particularly Facebook, have become valuable educational spaces where extension agencies and farming communities exchange localized knowledge, while traditional media remain effective in reaching populations with limited digital access. Similarly, radio continues to provide accessible educational content, particularly in geographically isolated and underserved communities where internet connectivity remains unreliable.

Recent scholarship emphasizes that the effectiveness of agricultural communication depends not merely on access to media but also on the extent to which communication strategies correspond to the learning needs, technological capabilities, and socio-demographic characteristics of intended learners. Recent studies indicate that farmers' media utilization varies according to age, educational attainment, income, digital access, perceived usefulness, and trust in information sources and opportunities for social interaction through communication platforms. These findings highlight the importance of designing extension communication strategies that are responsive to diverse learner characteristics rather than relying exclusively on a single communication medium.

In the Philippines, government agencies have increasingly integrated digital media into agricultural extension programs to strengthen food security, promote climate-resilient farming practices, and improve community participation. The *Gulayan sa Barangay* program implemented by the City Agriculture Office (CAO) of Tabuk City represents one such initiative that combines traditional radio broadcasting and social media to disseminate agricultural information and encourage household and community vegetable production. While the program has become an important local extension initiative, limited empirical evidence exists regarding how different media platforms function as educational tools that facilitate farmers' learning and influence their utilization of agricultural information.

Existing studies on agricultural communication have predominantly examined media accessibility, technology adoption, or information dissemination. Comparatively fewer investigations have examined how traditional and digital media operate together as educational resources within local government-led extension programs, particularly in the Philippine context. This gap is important because farmers differ in age, educational attainment, livelihood conditions, technological access, and preferred ways of receiving practical information.

Addressing this gap, the present study investigates the utilization of social media and traditional radio in promoting agricultural information through the *Gulayan sa Barangay* program in Tabuk City, Kalinga. It examines farmers' media-utilization patterns, perceived educational impact of communication platforms, factors affecting media use, and

associations between respondents' demographic and socio-economic characteristics and media-platform utilization.

The study is informed by an integrated conceptual perspective drawing on Uses and Gratifications Theory, Adult Learning Theory (Andragogy), and Diffusion of Innovations Theory. Uses and Gratifications directs attention to farmers' active selection of media according to informational and practical needs. Adult Learning Theory emphasizes relevance, experience, and immediate applicability in adult learners' engagement with educational content. Diffusion of Innovations highlights the role of communication channels in introducing, reinforcing, and socially circulating agricultural practices. Together, these perspectives provide a basis for interpreting media choice, educational engagement, and the circulation of agricultural knowledge.

The study contributes empirical evidence for agricultural extension agencies, local government units, educators, and communication planners seeking to develop learner-centered communication strategies. Its central contribution is the distinction between frequency of media use and perceived educational value: Facebook was used most frequently, whereas radio was perceived as the strongest educational medium. This pattern suggests that extension communication should not evaluate a medium solely by reach or frequency but also by the type and quality of learning it supports.

Literature Review

Agricultural Extension as a Process of Lifelong Learning

Agricultural extension has evolved from a predominantly technology-transfer model into a learner-centered educational process that supports lifelong learning among farming communities. Contemporary extension systems recognize farmers not merely as recipients of information but as active learners who construct knowledge through continuous interaction with extension workers, communication technologies, fellow farmers, and local communities. This educational perspective emphasizes the development of competencies that enable farmers to make informed decisions, solve context-specific problems, and adapt to rapidly changing environmental and market conditions.

Recent international literature demonstrates that effective agricultural extension depends on integrating formal advisory services with informal and technology-mediated learning opportunities. Digital transformation has enabled extension systems to move beyond conventional face-to-face approaches by facilitating continuous learning through online communities, multimedia platforms, and mobile communication technologies. Such developments have expanded farmers' opportunities to access knowledge while encouraging collaborative learning and peer-to-peer knowledge exchange, particularly in geographically dispersed agricultural communities (Chander et al., 2022; FAO, 2022; Davis & Sulaiman, 2023). Despite these advances, scholars emphasize that technology alone does not guarantee meaningful learning. The educational effectiveness of extension communication depends largely on the relevance, accessibility, credibility, and contextualization of the information delivered to diverse learner populations. Consequently, agricultural extension is increasingly viewed as a multidimensional educational system in which communication catalyzes knowledge acquisition, behavioral change, and innovation adoption.

Digital and Traditional Media in Agricultural Education

The rapid expansion of digital communication has significantly transformed agricultural knowledge dissemination worldwide. Social networking platforms, messaging applications, online videos, and digital learning resources have become valuable channels for delivering extension services because they enable timely dissemination of information, facilitate interaction among stakeholders, and encourage collaborative problem-solving. Agricultural organizations have widely adopted Facebook, YouTube, WhatsApp, and similar platforms because they support rapid sharing of localized information while allowing farmers to communicate directly with extension personnel and fellow practitioners.

Recent empirical studies indicate that social media enhances farmers' access to weather forecasts, pest and disease management practices, crop production techniques, and market information, thereby improving knowledge acquisition and decision-making. Interactive digital environments also promote self-directed learning by allowing users to seek information according to their immediate needs and farming experiences. Consequently, digital media have become increasingly important educational resources within agricultural extension systems (Ayanwale et al., 2021; Klerkx et al., 2023; FAO, 2024).

Nevertheless, the growing prominence of digital media has not diminished the educational value of traditional communication channels. Radio remains one of the most accessible and trusted extension media, particularly in rural communities where internet connectivity, digital literacy, or technological infrastructure remain limited. Community radio programs continue to provide localized agricultural education in familiar languages, making complex farming concepts understandable to diverse audiences. Studies conducted in Africa and Southeast Asia consistently report that radio complements digital platforms by reaching marginalized populations and reinforcing extension messages delivered through other communication channels (World Bank, 2022; FAO, 2023).

Rather than viewing traditional and digital media as competing technologies, recent scholarship advocates an integrated communication approach in which multiple platforms reinforce one another. Such multimodal communication strategies improve information accessibility, accommodate diverse learning preferences, and increase opportunities for repeated exposure to educational content.

Factors Influencing Farmers' Media Utilization

Although communication technologies have become increasingly available, their educational effectiveness varies according to learners' individual and contextual characteristics. Recent international research consistently identifies age, educational attainment, income, farm size, digital literacy, technological accessibility, perceived usefulness, and trust in information sources as significant determinants of media utilization among farmers.

Older farmers often rely on traditional communication channels because of greater familiarity and established trust in conventional media, whereas younger farmers demonstrate higher levels of engagement with social networking platforms and other digital technologies. Educational attainment likewise influences farmers' capacity to interpret, evaluate, and apply agricultural information delivered through different communication channels. Economic resources determine access to smartphones, internet connectivity, and other technologies

necessary for digital learning, while geographical conditions continue to influence the accessibility of radio and internet-based services.

Beyond demographic factors, scholars increasingly emphasize the importance of communication quality. Farmers are more likely to engage with media that provide credible, locally relevant, practical, and immediately applicable information. Interactive communication environments further encourage sustained participation by allowing users to clarify uncertainties, exchange experiences, and receive feedback from experts and peers. These findings suggest that successful agricultural communication requires not only technological infrastructure but also educational strategies that respond to learners' needs, motivations, and socio-cultural contexts (Mittal & Mehar, 2022; Klerkx et al., 2023; FAO, 2024).

Communication, Learning, and Adoption of Agricultural Innovations

Communication serves as a fundamental mechanism through which agricultural innovations are introduced, interpreted, evaluated, and adopted. Rather than functioning solely as channels for information dissemination, communication platforms facilitate learning processes that enable farmers to understand new technologies, assess their relevance, and integrate them into existing agricultural practices.

Recent studies demonstrate that farmers' adoption of innovations depends on repeated exposure to credible information, opportunities for social interaction, observation of successful practices, and continuous reinforcement through multiple communication channels. Social media supports these processes by enabling rapid dissemination of visual demonstrations, user-generated experiences, and expert guidance, whereas traditional media provide consistent reinforcement and broader community reach. Consequently, innovation adoption is increasingly understood as an educational process involving knowledge construction rather than simple technology transfer.

Researchers further argue that combining digital communication with traditional extension approaches strengthens learning outcomes because farmers receive complementary information from multiple sources. Such integrated communication systems increase confidence in new agricultural technologies while reducing uncertainty during adoption decisions (Klerkx et al., 2023; Davis & Sulaiman, 2023; FAO, 2024).

Although previous studies establish the usefulness of both digital and traditional communication channels in agricultural extension, less is known about how farmers distinguish between media frequency and perceived educational value when multiple channels are available within a single local extension program. Existing research has also given limited attention to the interaction between media utilization and farmers' demographic and agricultural characteristics in Philippine local-government extension contexts. The present study addresses this gap by examining media-use patterns, perceived educational impact, contextual determinants, and associations between farmer characteristics and media-platform utilization.

Statement of the Problem

The study addressed the following questions:

1. What are the socio-demographic and socio-economic characteristics of the farmer-respondents?
2. What communication media do the respondents use to seek agricultural information?
3. What is the perceived educational impact of the communication platforms used in promoting the Gulayan sa Barangay program?
4. What factors affect respondents' media utilization?
5. What associations exist between selected respondent characteristics and media-platform utilization?

Methodology

Research Design

This study employed an explanatory sequential mixed-methods design. The quantitative phase examined media-utilization patterns, perceived educational impact, determinants of media use, and associations between respondent characteristics and media-platform utilization. The qualitative phase followed the survey and explored participants' experiences and explanations of the quantitative patterns, particularly their perceptions of radio and social media as educational resources. The two strands were integrated during interpretation to identify convergent and complementary findings.

The integration of quantitative and qualitative evidence enabled methodological triangulation, thereby providing a richer interpretation of farmers' media utilization and learning experiences than either approach could provide independently.

Qualitative participants and interview questions were selected based on patterns identified in the quantitative findings, particularly the contrasting frequency of Facebook use and perceived educational impact of radio.

Locale

The study was conducted in six barangays in the eastern district of Tabuk City, Kalinga Province, Philippines: Agbannawag, Bulo, Lacnog East, Lacnog West, Nambaran, and Ipil. These barangays are predominantly agricultural communities and are among the beneficiaries of the Gulayan sa Barangay program implemented by the City Agriculture Office. The program utilizes both traditional media (radio) and digital media (Facebook) to disseminate agricultural information, promote sustainable vegetable production, and strengthen community participation in local food security initiatives.

Participants and Sampling Procedure

The quantitative participants consisted of 200 farmer-beneficiaries of the Gulayan sa Barangay program drawn from an estimated population of approximately 2,000 beneficiaries in six participating barangays in the eastern district of Tabuk City, Kalinga Province: Agbannawag, Bulo, Lacnog East, Lacnog West, Nambaran, and Ipil. The sampling frame was based on the official list of program beneficiaries maintained by the City Agriculture Office.

Eligible respondents were farmer-beneficiaries who met the study's inclusion criteria and voluntarily provided informed consent. Individuals who were not registered beneficiaries, did

not meet the eligibility requirements, or declined participation were excluded from the quantitative sample.

From the sampling frame, each eligible beneficiary was assigned a unique identification number. A simple random-sampling procedure was then used to select 200 participants, giving each eligible beneficiary an equal probability of selection. The selected participants were subsequently contacted and invited to complete the survey. The qualitative component involved five key informants from the City Agriculture Office and barangay officials and five farmer-participants who were purposively selected because of their direct involvement in the program and their ability to provide information-rich accounts of media use and agricultural learning.

The qualitative component involved five key informants representing the City Agriculture Office and barangay officials who were directly involved in the implementation of the program. In addition, five farmer-participants were interviewed to obtain deeper insights into their experiences regarding the use of radio and social media in accessing agricultural information and applying agricultural practices. These participants were selected purposively because of their direct involvement in the program and their ability to provide information-rich accounts of the educational value of the communication platforms.

Research Instruments

Two complementary research instruments were utilized.

A structured questionnaire was developed based on the objectives of the study and relevant literature on agricultural communication and media utilization. The questionnaire consisted of four sections: demographic characteristics of respondents; media utilization patterns for agricultural information; perceived educational impact of media platforms in promoting agricultural programs; and factors influencing media utilization. Responses to perception items were measured using a five-point Likert scale, with higher scores indicating greater perceived educational impact.

Semi-Structured Interview Guide

A semi-structured interview guide was developed for key informants and selected farmers. The interview questions explored participants' experiences regarding: utilization of radio and social media; perceived educational benefits of communication platforms; changes in agricultural knowledge and practices; and recommendations for improving agricultural communication and extension services.

The flexible interview format allowed participants to elaborate on their experiences while ensuring consistency across interviews.

Validity and Reliability

Prior to data collection, the questionnaire was reviewed by experts with backgrounds in agricultural extension, development communication, and educational research. The experts evaluated the instrument for relevance, clarity, comprehensiveness, and alignment with the study objectives. The panel comprised university faculty and agricultural-extension practitioners with graduate-level training and relevant professional experience.

The structured questionnaire comprised four sections covering respondents' socio-demographic and socio-economic characteristics, media-utilization patterns, perceived educational impact of communication platforms, and factors affecting media utilization.

The revised questionnaire was pilot-tested with 23 farmers from non-participating barangays in Tabuk City. The pilot test was conducted to assess item clarity, comprehensibility, and administration procedures before the main data collection. Cronbach's alpha coefficients ranged from .93 to .96 across media utilization, perceived educational impact and factors affecting media use indicating high internal consistency.

Ethical Considerations

Ethical principles governing research involving human participants were observed throughout the conduct of the study. Permission to conduct the research was obtained from the City Agriculture Office and the respective barangay officials before data collection commenced. Eligible participants were informed of the purpose of the research, the voluntary nature of participation, confidentiality of their responses, and their right to withdraw from the study at any stage without penalty.

Written informed consent was obtained from all participants prior to data collection. Participant anonymity was preserved by removing personally identifiable information from the dataset and interview transcripts. Data were stored securely and used exclusively for research purposes.

Data Collection Procedure

Following approval from the City Agriculture Office and local government officials, trained research assistants administered the survey questionnaires to the selected respondents in their respective barangays. The questionnaires were completed through face-to-face administration to ensure that respondents clearly understood each question and to accommodate participants with varying literacy levels.

The qualitative interviews were conducted after completion of the survey. Individual interviews with key informants and selected farmers were undertaken using the semi-structured interview guide. Interviews were conducted in the participants' preferred language, audio-recorded with permission, and supplemented by field notes to capture contextual observations.

The integration of survey findings with interview data enabled methodological triangulation and enhanced the credibility of the study's findings.

Data Analysis

Quantitative data were encoded and analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including frequencies, percentages, weighted means, and standard deviations, were used to summarize respondents' demographic characteristics, media utilization patterns, and perceived educational impact of communication platforms. Associations between respondents' demographic and socio-economic characteristics and media-platform utilization were examined using the chi-square test of independence at $\alpha = .05$. Because the current manuscript reports p-values rather than the underlying chi-square statistics and expected-cell frequencies, the inferential tables are presented as p-value tables.

Before submission, the authors should verify chi-square assumptions and, where appropriate, report χ^2 , degrees of freedom, and Cramer's V from the original SPSS output. Sparse categories should be combined or analyzed using an appropriate exact procedure when expected frequencies are insufficient.

Qualitative interview data were analyzed using thematic analysis following the procedures proposed by Braun and Clarke. Audio recordings were transcribed verbatim, read repeatedly for familiarization, coded inductively, and grouped into broader themes representing participants' experiences regarding media utilization and agricultural learning. Emerging themes were reviewed and refined to ensure coherence and consistency across participants' narratives.

Finally, quantitative and qualitative findings were integrated during interpretation to identify convergent, complementary, and divergent patterns. This integration strengthened the overall validity of the findings by providing multiple perspectives on farmers' utilization of communication media in agricultural extension education

Results and Discussion

Respondents' Demographic and Socio-economic Characteristics

The demographic profile of the respondents provides important context for interpreting their utilization of communication media for agricultural learning. As shown in Table 1, the 200 farmer-participants represented diverse age groups, although the largest proportion belonged to the economically productive age brackets of 27–34 years (22.5%) and 43–50 years (21.0%). Female respondents comprised the majority (59.0%), while most participants were married (72.0%). Educational attainment was generally low to moderate, with elementary undergraduates (25.5%) and high school graduates (20.5%) constituting the largest educational groups. More than half of the respondents (56.5%) reported labor-related occupations in addition to farming activities. These findings indicate that the respondents represented heterogeneous farming households with varying educational backgrounds and livelihood characteristics that may influence their access to, and preferences for, different communication platforms.

Rather than serving merely as descriptive characteristics, these demographic variables provide a basis for understanding subsequent differences in media utilization. Previous research has shown that age, educational attainment, and occupational engagement shape individuals' digital literacy, communication preferences, and willingness to adopt new information technologies. Consequently, the demographic diversity observed among the respondents suggests that agricultural communication strategies should accommodate different learner profiles through complementary communication platforms.

Table 1

Demographic characteristics of farmer-respondents

Demographic Profile		Frequency <i>n=200</i>	Percent (%)
Age			
	27-34	45	22.50
	43-50	42	21.00
	51-58	37	18.50
	35-42	28	14.00
	59-66	24	12.00
	19-26	11	5.50
	67-74	6	3.00
	Prefer not to say	7	3.50
Total		200	100.00
Gender			
	Female	118	59.00
	Male	82	41.00
Total		200	100.00
Civil Status			
	Married	144	72.00
	Single	39	19.50
	Widowed	13	6.50
	Separated	4	2.00
Total		200	100.00
Educational Attainment			
	Elementary Undergraduate	51	25.50
	Highschool Graduate	41	20.50
	Highschool Undergraduate	20	10.00
	College Undergraduate	37	18.50
	College Graduate	27	13.50
	Elementary Graduate	17	8.50
	Prefer not to say	7	3.50
Total		200	100.00
Occupation			
	Labor	113	56.50
	Government	44	22.00
	Homemaker	36	18.00
	Other	7	3.50
Total		200	100.00
Total		199	100.00

Respondents' Socio-economic Profile

Table 2 further illustrates the socio-economic characteristics of the respondents. More than half of the participants (55.5%) identified agricultural production as their primary source of income, reflecting the central role of farming in household livelihoods. Most respondents operated relatively small farms, with 35.5% cultivating between 0.20 and 1.19 hectares. Cereal crops, particularly rice and corn, dominated agricultural production (63.0%), while vegetable gardening was generally undertaken on relatively small plots. A substantial proportion of respondents (71.5%) declined to disclose their monthly income, indicating sensitivity regarding financial information and suggesting that income-related findings should be interpreted cautiously.

The respondents' socio-economic characteristics have important implications for agricultural communication and extension education. Farmers managing small-scale agricultural operations generally require practical, localized, and immediately applicable information that can support day-to-day production decisions. Likewise, differences in income, farm size, and cropping systems may influence both access to communication technologies and the perceived usefulness of particular information sources. These findings reinforce the importance of designing extension communication strategies that are responsive to the varied educational and informational needs of farming communities rather than assuming a homogeneous audience.

Table 2

Socio-economic and agricultural characteristics of farmer-respondents

Socio-economic and Agricultural Characteristics	Frequency (n=200)	Percent (%)
Sources of Income		
Agricultural Production	111	55.50
Entrepreneurial Activities	13	6.50
Passive Income and Social Assistance	54	27.00
Skilled and Unskilled Labor	22	11.00
Total	200	100.00
Monthly Income (₱)		
2,000 – 7,428	24	12.00
7,429 - 12,857	22	11.00
12,858 - 18,286	5	2.50
18,287 - 23,715	3	1.50
29,145 - 34,573	2	1.00
34,574 - 40,000	1	0.50
Prefer not to say	143	71.50
Total	200	100.00
Size of Farm (ha)		
0.20 - 1.19	71	35.50
1.20 - 2.19	34	17.00
2.20 - 3.19	25	12.50
3.20 - 4.19	9	4.50
4.20 - 5.19	6	3.00
6.20 - 7.00	1	0.50

Prefer not to say	54	27.00
Total	200	100.00
Crops Being Planted		
Cereal Crops	126	63.00
Mixed Cereal & Cash Crops	29	14.50
Unspecified/Undisclosed	44	22.00
Vegetables & Root Crops	1	0.50
Total	200	100.00
Size of Area Devoted to Vegetable Gardening (sqm)		
173 - 257	52	26.00
88 - 172	43	21.50
428 - 512	27	13.50
3 - 87	16	8.00
258 - 342	8	4.00
343 - 427	5	2.50
513 - 600	1	0.50
Prefer not to say	48	24.00
Total	200	100.00
Kinds of Vegetables Planted		
Vegetables (eggplant, tomatoes, okra, pechay, bitter gourd, string beans)	135	67.50
Legumes & Pulses (pigeon peas)	45	22.50
Others	11	5.50
Root & Bulb Crops	5	2.50
Prefer not to say	4	2.00
Total	200	100

The qualitative interviews provided additional context for these quantitative findings. Participants consistently described farming as their principal livelihood and emphasized that acquiring practical agricultural knowledge directly influenced household food security and income generation. Several interviewees explained that communication platforms became valuable when they delivered locally relevant information that could be readily applied to vegetable production, pest management, and crop improvement. These accounts support the quantitative profile by illustrating that respondents evaluated communication media primarily according to their usefulness in addressing immediate agricultural concerns rather than their technological sophistication alone.

Taken together, the demographic and socio-economic profiles establish the contextual foundation for interpreting farmers' utilization of traditional and digital communication platforms presented in the succeeding sections. The diversity observed among respondents suggests that agricultural extension programs should adopt inclusive communication approaches capable of addressing differences in age, educational attainment, livelihood conditions, and technological accessibility.

Media Channels as a Source of Agricultural Information

Table 3 presents the communication platforms used by farmer-participants in accessing agricultural information. Among the available media channels, Facebook emerged as the

dominant source of agricultural information, followed by radio and television. The findings indicate that respondents increasingly rely on digital platforms while continuing to utilize traditional media to complement their information needs. Because respondents were allowed to select multiple sources, the results reflect a diversified pattern of media use rather than exclusive dependence on a single communication platform.

The observed pattern suggests that farmers actively combine traditional and digital media according to accessibility, convenience, and the type of agricultural information required. Rather than replacing conventional communication channels, social media appears to expand farmers' opportunities to obtain timely agricultural information while radio continues to provide an accessible source of locally relevant knowledge.

The qualitative interviews support this quantitative pattern. Several participants explained that Facebook allowed them to receive announcements regarding farming activities, weather updates, and new agricultural technologies more quickly than other communication channels. At the same time, respondents indicated that radio remained an important source of practical farming advice because broadcasts were delivered in familiar languages and could be accessed while performing routine farming activities. These findings suggest that farmers view social media and radio as complementary rather than competing educational resources.

Table 3

*Media channels used by the respondents in seeking agricultural information****

Media Channels Used	Responses		Percent of Cases
	Frequency	Percent	
Social Media (Facebook)	134	36.61	69.07
Radio	77	21.04	39.69
Television	69	18.85	35.57
Others	68	18.58	35.05
Newspaper	14	3.83	7.22
Social Media (Instagram)	4	1.09	2.06
Total	366	100.00	188.70

***Multiple response: N=200

Most Frequently Used Media for Agricultural Information

The utilization pattern shown in Table 4 reinforces the previous findings. Facebook was identified as the most frequently accessed platform, while radio and television continued to serve as regular sources of agricultural information for a considerable proportion of respondents. The consistency between Tables 3 and 4 indicates that Facebook is not only widely available but also routinely incorporated into farmers' information-seeking behavior. The frequent use of Facebook suggests that respondents perceive the platform as an efficient medium for obtaining current agricultural information. Nevertheless, the continued utilization of radio demonstrates that traditional media remain relevant, particularly for farmers who may have limited internet access or who prefer receiving information through scheduled broadcasts.

Interview responses further revealed that many participants routinely checked Facebook for updates while simultaneously listening to agricultural radio programs during the early

morning before beginning farm work. This complementary pattern illustrates how farmers integrate multiple communication channels into their everyday learning practices.

Table 4

*Most Frequently Used Media for Seeking Agricultural Information****

Types of Media Used for Seeking Information***	Responses		Percent of Cases
	N	Percent	
Social Media (Facebook)	106	37.32	66.25
Radio	64	22.54	40.00
Television	60	21.13	37.50
Social Media (Instagram)	24	8.45	15.00
Others	24	8.45	15.00
Newspaper	6	2.11	3.75
Total	284	100.0	177.50

***Multiple response: n=200

Frequency of Media Utilization

Table 5 further demonstrates that Facebook was the communication platform used most frequently on a daily basis, considerably exceeding the daily utilization of radio, television, and other information sources. Although respondents reported consulting several communication channels, Facebook clearly functioned as the principal medium for continuous access to agricultural information.

The predominance of Facebook indicates that digital communication has become embedded in respondents' routine learning activities. Daily exposure increases opportunities for repeated reinforcement of agricultural knowledge and timely access to announcements, thereby supporting continuous learning among farming communities. Conversely, the continued use of radio suggests that farmers maintain multiple communication pathways to ensure consistent access to agricultural information.

Qualitative findings reinforce this interpretation. Respondents reported that the combination of regular Facebook updates and scheduled radio broadcasts enabled them to remain informed about agricultural practices while accommodating their daily work schedules. Participants particularly appreciated receiving practical information that could be immediately applied to vegetable production and farm management.

Table 5

*Frequency of use of media and other sources for agricultural information****

Info Source/ Media	Daily		Weekly		Fortnightly		Once a month	
	F	%	F	%	F	%	F	%
Radio	39	19.50	3	1.50	9	4.50	3	1.50
Newspaper	0	0.00	0	0.00	0.00	0.00	1	0.50
Television	28	14.00	9	4.50	5	2.50	0	0.00
Social Media (Facebook)	134	67.00	25	12.50	4	2.00	4	2.00
Social Media (Instagram)	14	7.00	6	3.00	1	0.50	0	0.00
Neighbor	1	0.50	1	0.50	0	0.00	0	0.00
DILG	1	0.50	0	0.00	0	0.00	0	0.00
Co-Farmer	0	0.00	1	0.50	0	0.00	0	0.00

***Multiple response: n=200

Media Utilized for the Gulayan sa Barangay Program

When respondents were asked specifically about information related to the Gulayan sa Barangay program, Facebook again emerged as the primary communication platform, followed by radio and television (Table 6). The findings indicate that beneficiaries accessed program-related information through both digital and traditional media, with Facebook serving as the most frequently reported platform and radio remaining an important complementary source.

The continued prominence of Facebook suggests that the platform effectively facilitated communication between extension personnel and farmer-beneficiaries. At the same time, radio remained an important supplementary medium that broadened the reach of program-related information, particularly among participants with limited digital access.

Interview participants consistently reported that they learned about community gardening activities, agricultural trainings, and extension services through both Facebook announcements and radio broadcasts. Several respondents explained that receiving similar information from multiple communication channels increased their confidence in the credibility of program announcements and encouraged participation in project activities.

Table 6

Types of media sought about Gulayan sa Barangay

Sources of Information Sought About Gulayan sa Barangay	Responses		Percent of Cases
	N	Percent	
Social Media (Facebook)	110	33.13	66.67
Radio	68	20.46	41.21
Television	65	19.58	39.39
Others (Neighbors, DILG, Co-farmers)	59	17.77	35.76
Newspaper	15	4.52	9.09

Social Media (Instagram)	15	4.52	9.09
Total	332	100.00	201.21

***Multiple response: n=200

Types of Agricultural Information Sought

The results presented in Table 7 indicate that respondents used communication platforms to obtain a wide range of agricultural information, particularly weather updates, agricultural techniques, market prices, and crop varieties. Across these information categories, Facebook consistently emerged as the most frequently utilized communication platform, while radio served as an important complementary source for technical agricultural information.

These findings suggest that farmers selectively utilize communication platforms according to the type of information they require. Social media appears particularly effective for rapidly disseminating diverse agricultural information, whereas radio continues to provide practical guidance that supports farming decisions.

Qualitative evidence strengthens this interpretation. Participants reported that radio programs helped them understand appropriate planting schedules, compost preparation, and pest management techniques, while Facebook enabled them to receive immediate updates regarding weather conditions, agricultural activities, and community extension programs.

Table 7

*Types of information sought about Gulayan sa Barangay****

Media	Agricultural Techniques		Pest Management		Weather Update		Market Price		Crop Variety	
	F	%	F	%	F	%	F	%	F	%
Radio	53	26.50	16	8.00	33	16.50	25	12.50	40	20.00
Newspaper	1	0.50	0	0.00	0	0.00	0	0.00	0	0.00
Television	11	5.50	11	5.50	15	7.50	26	13.00	20	20.00
Social Media (Facebook)	68	34.00	16	8.00	79	39.50	52	26.00	58	29.00
Social Media (Instagram)	3	1.50	0	0.00	0	0.00	0	0.00	2	1.00
Technician	1	0.50	0	0.00	0	0.00	0	0.00	0	0.00
DA	0	0.00	0	0.00	1	0.50	0	0.00	0	0.00
Co-farmer	0	0.00	0	0.00	0	0.00	0	0.00	1	0.05

***Multiple response: n=200

Perceived Educational Impact of Communication Platforms

Table 8 shows that respondents perceived radio and Facebook as the communication platforms with the greatest educational impact, both receiving ratings within the "Very High Impact" category. Other communication channels were consistently rated substantially lower.

Although Facebook was the platform most frequently utilized, respondents gave radio the highest perceived educational-impact rating. This distinction is important because frequency

of exposure does not, by itself, establish educational effectiveness; participants' explanations suggest that radio was valued for the clarity, detail, and practical applicability of its content. This finding suggests that communication effectiveness depends not only on frequency of use but also on the perceived quality, clarity, and practical applicability of educational content delivered through a particular medium.

Interview findings provide additional insight into this pattern. Participants described radio broadcasts as highly informative because they provided detailed explanations of farming practices, while Facebook served primarily as an efficient mechanism for announcements and dissemination of current agricultural information. Respondents further explained that combining information obtained from both platforms was perceived by participants as supporting their understanding of vegetable production, pest management, and sustainable farming practices.

Table 8

Respondents' Perceived Impact of Media Forms in Promoting Agricultural Programs in Tabuk City, Kalinga Province

Media Forms Used in Promoting Agricultural Programs in the City of Tabuk, Kalinga Province	Weighted Score	Verbal Description
Radio	4.800	Very High Impact
Social Media (Facebook)	4.470	Very High Impact
Television	1.320	Very Low Impact
Social Media (Instagram)	1.310	Very Low Impact
Newspaper	1.160	Very Low Impact
Others	1.110	Very Low Impact

Mean Descriptive Rating: 1.00 - 1.79 - Very Low Impact; 1.80 - 2.59 - Low Impact; 2.60 - 3.39 - Moderate Impact; 3.40 - 4.19 - High Impact; 4.20 - 5.00 - Very High Impact

To further seek information about the perception of the respondents on the possible impact of the SM and FM media interventions done in the project, a focus interview was conducted among five farmer participants of the project. Based on the focus interview results, Radyo Pilipinas' *Usapang Agrikultura*, which airs every Monday to Friday from 5:00 am to 6:00 am, was well appreciated by most of the respondents interviewed because they said that the program is highly informative and closely related to their farming activities. They also noted that the airtime is very convenient, as it coincides with their morning coffee routine, making it an ideal time for listening.

This practice of airing radio programs for farmers has been adopted by many radio stations, especially those that are participating in the national program of the Department of Agriculture concerning the Palay-Aralan School-on-the-Air launched in different regions of the country (ATI Central Office, 2023). It goes to show that the practices started in the early stages of the project (PhilRice, 2007, as cited by Jimenez, 2021) served as a basis for the succeeding programs and were adopted successfully in different agricultural radio programs like the *Gulayan sa Barangay* project of CAO.

Regarding the Facebook pages, the Tabuk City Information Office Facebook Page was also very popular among the farmer participants, as they see it as a multi-program platform. It was shared during the focus interview conducted among the farmer respondents who said that the Facebook page created for the project actively featured the city's partnerships with line agencies such as the Department of Trade and Industry (DTI), Department of Science and Technology (DOST), National Irrigation Administration (NIA), Department of Agriculture (DA), and the City Agricultural Office. The posts highlighted various agriculture-related activities and initiatives, which the respondents found to be a wide-scope platform for them to get updated.

By listening to radio programs and browsing the Facebook page related to *Gulayan sa Barangay*, the respondents claimed that they gained important knowledge about sustainable farming practices, such as proper seed selection, organic fertilizer use, and pest management techniques. They asserted that they became more aware of the importance of community gardens in promoting food security, nutrition, and livelihood at the barangay level. They also said that they learned practical steps in starting and maintaining a vegetable garden project, including soil preparation, planting schedules, and crop rotation methods. The respondents appreciated that the programs and posts emphasized the value of community involvement, environmental care, and self-reliance through backyard and communal gardening.

Interview results further revealed that listening to the radio programs and following the Facebook page influenced the respondents' attitude by making them appreciate the value of simple, sustainable technologies in farming. Hearing real success stories from other barangays inspired them to see gardening not just as a hobby but as an important way to support the community's food needs. They became more interested in trying out organic methods, using composting techniques, and setting up a small garden at home. The accessible and practical advice made them realize that even with limited resources, they could contribute to food security and healthy living.

Participants reported developing practical skills after listening to the radio programs and browsing the Facebook page in basic gardening, such as preparing the soil properly, planting seeds at the correct depth and spacing, and creating organic fertilizers like compost and vermicast. They also learned how to build simple garden beds, manage pests naturally, and schedule planting and harvesting. These hands-on skills have helped them start and maintain a small vegetable garden at home, applying the techniques they learned from the programs.

Respondents' Perceived Socio-economic Impact of *Gulayan sa Barangay* Project

As part of the qualitative component of this study, a focus interview was conducted among five representatives of the farmer respondents to assess some perceived changes in the lives of the farmers, especially in their livelihood, which could be attributed to their participation in the *Gulayan sa Barangay* project.

Participants reported perceived improvements in harvest and household income since their participation in the *Gulayan sa Barangay* initiatives. Because these accounts were retrospective and qualitative, they should be interpreted as participant perceptions rather than independently measured changes attributable to media exposure. According to them,

through the skills and knowledge they gained from the radio programs and the announcements they got from social media, which encouraged them to participate in the project actively, their harvest became more consistent and abundant. As some farmers said:

"Uray kaskasano ket lumag-an panagbiag mi babaen t panaglako t apit mi nga nateng ken haan kami nga gumatgatang t nateng ta ada sarili mi nga mula."

["Kahit papaano ay gumagaan ang aming buhay dahil sa pagbebenta ng aming mga tanim na gulay at hindi na rin kami bumibili ng gulay dahil may sarili kaming taniman."]

"Ada met maiduldulin ko nga allowance anak ko ken ada balunen da nga nateng nu parubuatek isuda."

["May naibibigay din akong kaunting allowance sa aking mga anak at may baon silang gulay kapag bumabalik sila sa kung saan sila nag-aaral."]

The respondents were able to grow a variety of vegetables such as tomatoes, eggplants, pechay, and okra. The surplus from their harvest was sold within the community, which provided an additional source of income for their family.

"Dito Kalinga kt dgitoy t sumaganad nga mapabiyagmi: utung, tarung, parya, petsay, kamatis, karabasa kn dgjy bukel ajas t balatung, bitwelas . Dgitoy t mayat panagtubu da iti klase t klima na dgitoy Kalinga isunga nagdakkel nga tulong kadakami nu ilako mi digijay apit mi."

["Dito sa Kalinga, ilan sa mga pwedeng itanim ay ang sitaw, talong, ampalaya, petchay ,kamatis, kalabasa at mga butil gaya ng monggo, Baguio beans na malagong nabubuhay sa klase ng klima natin kaya naman napakalaking tulong ang pagbebenta sa aming mga ani."]

Participants described modest earnings and household food savings associated with vegetable production. These accounts indicate perceived livelihood and food-security benefits, but the study did not independently measure changes in income, harvest, or food-security outcomes.

Factors that Affect Media Use for Agricultural Promotion

Table 9 indicates that respondents perceived, with age receiving the highest weighted score. Other influential factors included technological accessibility, educational attainment, familiarity with social media, cost of access, content relevance, and trust in information sources.

The findings suggest that farmers' communication preferences are shaped by an interaction of personal, technological, and contextual characteristics rather than by technological availability alone. Effective agricultural communication therefore requires extension

strategies that recognize differences in learners' technological capabilities, educational backgrounds, and access to communication resources.

Interview participants similarly emphasized that communication platforms were most useful when information was easy to understand, directly applicable to local farming conditions, and delivered through accessible technologies. Older respondents frequently expressed greater confidence in radio, whereas younger participants described Facebook as more convenient for obtaining timely agricultural information.

Table 9

Determinants of media utilization in agricultural promotion

Factors Influencing Media Use in Agricultural Promotion	Weighted Score	Verbal Description
Age of farmers	2.800	High Effect
Limited Access to Technology and the Internet	2.600	High Effect
Cost of access (internet, radio)	2.650	High Effect
Familiarity with social media (Facebook)	2.660	High Effect
Availability of the radio signal	2.550	High Effect
Educational level of farmers	2.660	High Effect
Relevance of content to local agriculture	2.550	High Effect
Ease of use of technology	2.570	High Effect
Trust in information sources	2.570	High Effect
Community influence and peer usage	2.590	High Effect

Mean Descriptive Rating: 1.00 - 1.66 - Low Effect; 1.67 - 2.32 - Moderate Effect; 2.33 - 3.00 - High Effect

Association Between Respondents' Characteristics and Media Utilization

The inferential analysis identified several statistically significant associations between respondents' demographic and socio-economic characteristics and their utilization of communication media (Tables 10 and 11). Significant relationships were observed for selected demographic variables, including age, educational attainment, occupation, and civil status, while several socio-economic indicators such as monthly income, source of income, crop type, and gardening area also demonstrated significant associations with specific communication platforms ($p < .05$).

These findings indicate that media utilization is not uniform across farmer populations. Rather, communication preferences vary according to respondents' demographic and socio-economic characteristics, highlighting the importance of developing differentiated communication strategies capable of addressing diverse educational needs within agricultural communities.

The qualitative findings provided contextual explanations for these statistical patterns. Participants consistently described selecting communication platforms according to accessibility, familiarity, and perceived usefulness. Younger farmers generally reported greater reliance on digital communication, whereas older participants emphasized the convenience and credibility of radio broadcasts. Respondents further explained that limited internet connectivity, financial constraints, and educational background influenced their ability to access and utilize digital communication platforms.

Taken together, the quantitative and qualitative findings demonstrate that effective agricultural communication requires a balanced integration of traditional and digital media to accommodate the heterogeneous characteristics of farming communities while maximizing opportunities for agricultural learning.

Table 10

Association Between Demographic Factors and Media Platform Utilization in Agricultural Promotion

Variable	p-value					
	Radio	Newspaper	Television	Social Media (Facebook)	Social Media (Instagram)	Others
Age	0.020*	0.041*	0.908	0.155	0.000*	0.938
Gender	0.083	0.222	0.045*	0.923	0.755	0.346
Civil Status	0.620	0.000*	0.917	0.691	0.122	0.979
Educational Attainment	0.226	0.034*	0.000*	0.312	0.111	0.627
Occupation	0.704	0.117	0.025*	0.048*	0.000*	0.571

*means the significant relationship between the demographic profile and the extent of impact of the identified media forms in promoting agricultural programs

n=200

$\alpha = 0.05$

Table 11 summarizes the reported p-values for associations between socio-economic characteristics and media-platform utilization. Significant associations were reported for source of income with television and other media; monthly income with newspaper, television, Instagram, and other media; farm size with other media; crop type with television; vegetable-gardening area with radio and Instagram; and types of vegetables planted with newspaper and Instagram ($p < .05$). These findings indicate variation in media utilization across socio-economic groups, but they should not be interpreted as causal effects.

This finding finds coherence with the claim of Mtega et al. (2021) that factors like age, money, farm size, and education frequently affect the media genres that farmers prefer. As stated in their paper, older farmers typically rely on conventional media like radio and community meetings, whereas younger and better-educated farmers are more likely to use digital platforms. In the case of income, they said that commercial farmers with larger operations, as compared to subsistence farmers, are more likely to invest in ICT equipment.

In this study, source of income was significantly associated with television ($p = 0.000$) and other media ($p = 0.001$), suggesting that livelihood types may affect media access. Again, families with extra sources of income are more capable of getting access to relatively high-cost media.

On the other hand, the size of the area devoted to vegetable gardening had significant associations with radio ($p = 0.020$) and Instagram ($p = 0.007$), while the kinds of vegetables

planted were found to be significantly associated with newspaper use ($p = 0.001$) and Instagram ($p = 0.003$). The observed association should be interpreted cautiously because the cross-sectional design does not establish why farm characteristics and media utilization are related. One plausible explanation is that differences in production activities create different information needs, but this interpretation requires further investigation. The association involving Instagram should likewise be interpreted cautiously. The available data establish an association, not a causal pathway from farm size or crop diversity to platform preference. Moreover, television usage also had a significant association with the types of crops planted ($p = 0.000$), and farm size was significantly related to other media ($p = 0.003$).

Table 11

Association Between Socio-Economic Factors and Media Platform Utilization in Agricultural Promotion

Variable		p-value					
		Radio	Newspaper	Television	Social Media (Facebook)	Social Media (Instagram)	Others
Source of Income		0.876	0.452	0.000*	0.078	0.385	0.001*
Monthly Income		0.644	0.000*	0.000*	0.323	0.019*	0.000*
Size of Farm		0.239	0.563	0.575	0.060	0.357	0.003*
Crops Being Planted		0.233	0.296	0.000*	0.123	0.069	0.643
Size of Area Devoted to Vegetable Gardening		0.020*	0.556	0.441	0.419	0.007*	0.944
Kinds of Vegetables Being Planted		0.241	0.001*	0.167	0.356	0.003*	0.555

*means the significant relationship between the socio-economic profile and the extent of impact of the identified media forms in promoting agricultural programs

n=200

$\alpha = 0.05$

Theoretical Implications

The findings provide support for an integrated interpretation of media use in agricultural extension. From a Uses and Gratifications perspective, the high frequency of Facebook use is consistent with farmers' active selection of a convenient and timely platform for announcements, updates, and information seeking. From an adult-learning perspective, the high perceived educational value of radio highlights the importance of practical, locally relevant, and immediately applicable content rather than platform novelty alone. From a diffusion perspective, the complementary use of radio and Facebook provides repeated and socially embedded exposure to agricultural information, which may help farmers interpret and circulate new practices. These theoretical interpretations remain explanatory rather than causal because the study did not directly test the theories through structural or experimental models.

Limitations

Several limitations should be considered when interpreting the findings. First, the cross-sectional design captures media utilization and perceptions at one point in time and therefore cannot establish causal effects on agricultural knowledge, behavior, income, or productivity. Second, the educational-impact measures are self-reported and may be affected by recall or social-desirability bias. Third, the qualitative component involved a small purposive group, which was intended to explain the quantitative findings rather than represent all program beneficiaries. Fourth, several variables contained sparse categories and substantial nonresponse, particularly monthly income; consequently, inferential results involving these variables require careful interpretation and verification of chi-square assumptions. Finally, the current manuscript reports p-values but not the underlying χ^2 statistics, degrees of freedom, expected-cell frequencies, or Cramer's V. These statistics should be recovered from the original SPSS output before final submission.

Conclusion

This study examined how farmers utilize traditional and digital media as educational resources for agricultural extension through the Gulayan sa Barangay program in Tabuk City, Kalinga, Philippines. The findings revealed a distinction between media-use frequency and perceived educational value: Facebook was the most frequently used platform for agricultural information, whereas radio received the highest perceived educational-impact rating. The qualitative findings helped explain this distinction, with Facebook valued for timely announcements and updates and radio appreciated for its detailed, practical, and locally relevant agricultural guidance. These findings suggest that the two media serve complementary communication and learning functions rather than operating as direct substitutes.

Addressing the limited empirical evidence on how traditional and digital media function together as educational resources in local government-led agricultural extension programs, this study contributes to agricultural-extension communication literature by demonstrating that the frequency of media use does not necessarily correspond to its perceived educational value. The findings extend understanding of multimodal, learner-centered communication by highlighting the importance of aligning communication channels with the nature of agricultural information, farmers' learning needs, technological access, and communication preferences. The significant associations identified between selected demographic and socio-economic characteristics and media-platform utilization further indicate that farmers constitute a heterogeneous learning population whose communication needs cannot be adequately addressed through a single medium.

From an educational perspective, the findings support the use of complementary communication strategies in which digital platforms such as Facebook facilitate timely information dissemination, while radio provides an accessible channel for detailed and practical agricultural instruction. Such an approach is consistent with learner-centered extension education, which recognizes the relevance of prior experience, practical application, and accessibility in adult learning. Extension agencies and local government units may therefore consider integrating traditional and digital media when planning communication initiatives, while taking into account differences in farmers' characteristics, resources, and learning requirements.

These conclusions must be interpreted within the study's methodological limitations. The cross-sectional design and largely perception-based measures do not establish that exposure to Facebook, radio, or their combined use caused improvements in agricultural knowledge, farming practices, productivity, income, or food security. Rather, the findings document farmers' media-utilization patterns, perceived educational value, and reported learning experiences within a specific local extension program. Future research using longitudinal, quasi-experimental, or experimental designs, together with direct measures of learning and agricultural outcomes, could establish more clearly whether and under what conditions integrated communication strategies contribute to measurable educational and livelihood benefits.

Educational Implications

The findings suggest several implications for agricultural extension education and educational communication. First, extension agencies and local government units may adopt integrated communication strategies that combine radio and digital platforms such as Facebook. The objective should not be to replace one medium with another but to assign complementary functions: digital platforms can provide timely announcements and updates, while radio can provide accessible, detailed, and practical instructional content.

Second, agricultural communication materials should follow adult-learning principles by emphasizing relevance, practical application, prior experience, and immediate usefulness. Content should be localized to farmers' production conditions and delivered in forms that accommodate differences in literacy, digital access, age, and livelihood circumstances.

Third, extension planners should use audience characteristics to guide channel selection. The observed associations between respondent characteristics and media utilization indicate that a single communication strategy may not serve all farmers equally well. Communication planning should therefore consider access constraints, educational background, income conditions, farm characteristics, and familiarity with digital platforms.

Finally, future studies should use longitudinal, quasi-experimental, or mixed-methods designs that directly measure agricultural learning, innovation adoption, productivity, or livelihood outcomes. Such designs would allow researchers to determine whether and under what conditions exposure to integrated communication strategies produces measurable educational and agricultural benefits.

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