

Assessing Farmers' Mass Media Preferences and their Influence on Agricultural Information Dissemination

Yi Mon Thu*^{ORCID}, Nyein Nyein Htwe, Soe Paing Oo, Hsu Nyein Nyein San, Nyein Thu Aung, Yoon Dai Wi, Wint Hlaing Htwe, Wai Wai Hlaing, Nan Thazin, Hnin Yu Wai, Sein Pwint, Phyo Ei Nyein, Gabyar La Min, Mary Myat Noe, Myo Min Zaw, Okkar

Associate Professor, Department of Agricultural Extension, Yezin Agricultural University (YAU), Nay Pyi Taw 15013, Myanmar

Corresponding Author: Yi Mon Thu

Associate Professor, Department of Agricultural Extension, Yezin Agricultural University (YAU), Nay Pyi Taw 15013, Myanmar

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Abstract: This study aimed to identify farmers' preferences regarding mass media methods and to examine the influence of mass media on agricultural information dissemination in three villages of Tatkon Township, Nay Pyi Taw Union Territory. A total of 74 randomly selected respondents participated in the survey conducted in September 2023. Data were analyzed using descriptive statistics, Chi-square tests (Friedman test and Goodness of Fit test), and Likert scale measurements. The majority of respondents were middle-aged, married, native to the study area, and had attained primary education, with an average household size of 5. All respondents owned mobile phones, and over 97% used smartphones. Almost 84% had televisions, around 50% owned radios, and 16% possessed laptops. DOA mobile apps, DOA websites and DOA call center are the major ICT supports of Department of Agriculture (DOA). Among them, call center is the highest preference of the respondents. In terms of mobile application use, farmers favored Facebook pages, Facebook accounts, and Viber, typically accessing them 1–10 times per week. Among various agricultural extension methods, mass media was highly preferred. Specifically, television and radio (broadcast media), pamphlets and posters (printed media), and Facebook pages (digital media) were the most favored platforms. However, limited internet accessibility and high cost of internet services were significant challenges affecting media usage. Overall, mass media proved to be an effective channel for disseminating information related to seed, fertilizer application, and pest and disease control, enabling quicker and broader outreach compared to traditional, personal communication methods.

Keywords: farmers' preference; mass media; agricultural information dissemination.

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Introduction

Mass media are important in providing information for enabling rural community to make an informed decision regarding their farming activities, especially in the rural areas of developing countries (Lwoga, 2010). Mass media communication for the dissemination of agricultural information is usually very efficient and can reach a large audience for a very short time. Mass media is mostly effective in the transfer of technology to farmers and in disseminating agricultural related information by farmers. Mass media can separate three parts: broadcast media, printed media, and social media. Broadcast media includes TV and radio; printed media includes pamphlet, poster, bulletin, journal, newspaper; social media includes Facebook, mobile applications, messenger, Viber; and others include agricultural festival, exhibition (Hlaing, 2021).

The extension methods can be categorized as individual method, group method, mass method, and the knowledge and skills are distributed to the farmers through the extension methods (Hlaing, 2021). Agricultural extension service in Myanmar is classified: (1) farm and home visits, (2) group discussion, (3) farm demonstration, (4) training methods and (5) mass media (Oo, 2007). Myanmar Radio and Television (MRTV) and twenty knowledge centers are located in Tatkon Township, Nay Pyi Taw Union Territory (Htwe, 2017). The farmers in Tatkon township mostly used mobile applications (DOA mobile apps, Myanmar

Portal, Green Way, Htwet Toe) and leaflets to provide farmers' knowledge (DOA, 2022).

Farmers' preferences on mass media methods become the important role to adopt ICT-based extension services using ICT tools for getting farm information. Study of farmers' preferences on agricultural extension methods are still lacking in this area. Besides, mass media method is the mostly used method in the study area and there is need to explore the consequences of mass media influence on the agricultural dissemination in this study.

Objectives

1. Study the existing information and communication technologies (ICT), sources of agricultural information, farmers' preference source and the extension methods received by the respondents in the study area,
2. Identify the farmers' preference on mass media methods in this study, and
3. Explore the mass media methods influence on their agricultural information dissemination in the study area.

Materials and Methods

Data Collection and Analysis

Seventy-four respondents were collected from 3 villages (Kan Hla, Ma Kyi Kone, and Shar Taw) of Tatkon Township, Nay Pyi Taw Union Territory. Pilot test and main survey were

conducted in September, 2023. Five points likert scale, Chi-square Friedman test, Chi-square goodness and fit test were used to explore the existing sources of information, farmers’ preference source, mass media methods influence on their agricultural information dissemination in the study area.

Results and Discussion

Demographic Factors

Description of the data on gender, civil status, and age of the respondents in the study area was provided in Table 1. According to the data, the 60.8% of respondents are male and

39.2% are female. Almost 95.9% of the respondents are already married. Htun (2013) reported that percentage of men farmers are much than women farmers in Myanmar. Nmadu et al. (2012) also found that majority of the respondents are male farmers and married people. The mean age of the respondents was 51 years within the range 24-63 years. Most of them (51.36%) are between 54-63 years old followed by 23% of them are between 44-53 years old. This finding is agreed with the finding of Khaing et al. (2021), who found that majority of the farmers are between 40 and 70 years. Thiha (2022) also reported that the largest age group (middle age) of groundnut growers were between 51-60 years.

Table-1. Demographic factors of the respondents

Variables	Frequency	Percent
Gender		
Male	45	60.8
Female	29	39.2
Civil Status		
Single	3	4.1
Married	71	95.9
Age		
24-33	7	9.46
34-43	12	16.22
44-53	17	22.96
54-63	38	51.36
Mean=		51
St.Dev.=		10

Source: Field survey (2023).

About 27% of the respondents had monastic education while other 21.6%, 25.7%, 14.9%, 10.8% had the level of primary school, middle school, high school, and graduate (see in Table 2). However, 10.8% of the respondents are graduated persons in this study. The finding similar to Htun (2013), most farmers were in the monastery education and graduated level was the lowest

percentage among the education levels. About 50% of the households have small household size (50 members), while the rest (50%) have large household size (50 members). The average household size is 5. Kyaw (2015) also reported that farm family size was 5 persons on average, ranging from 2 to 9 persons.

Table-2. Demographic factors of the respondents

Variables	Frequency	Percentage
Educational Attainment		
Monastery (1)	20	27.0
Primary School (2)	16	21.6
Middle School (3)	19	25.7
High School (4)	11	14.9
Graduate School (5)	8	10.8
Household Size		
Small (below mean)	37	50.0
Large (above mean)	37	50.0
Mean		5

Source: Field survey (2023).

Communication Assets

The communication assets can be studied in Table 3. Almost 96% of the respondents used smart phone but only 4.1% of them are still used keypad. Nearly 84% of the respondents have TV and 43.3% have radio in their home. Some respondents (16.2%) have laptops in their houses because their children can use these items. Wai (2019) also reported that most farmers in maximum that owned mobile phone, TV, and radio in their houses while minimum

possessed assets were laptop, car and generator accounted, respectively.

Table-3. Communication assets by the respondents in the study area

Items	Frequency	Percent
Mobile Phone (1. Keypad)	3	4.1
Mobile Phone (2. Smart Phone)	71	95.9
TV	62	83.8
Radio	32	43.3
Laptop	12	16.2
Others	5	6.8

Source: Field survey (2023).

Sources of Agricultural Information

According to the Table 4, the data presented that there are three types of sources of agricultural information received by the respondents which are DOA (Department of Agriculture), Companies and NGO (Non Government Organization). The respondents mostly received agricultural information about weather forecasting (90.5%), market access (86.5%), yield (81.1%), water requirement (79.7%), seed (71.6%), farm-products (68.9%), pest and disease control (64.9%), fertilizer application (63.5%), fertilizer law (37.8) and seed law (37%), pesticide law (35.1%) from farmer to farmer but they did not receive any information from NGO.

This finding is similar with the finding of Haumba and Kaddu (2021), the farmers seek information from the neighbors and friends who lead in the fields. They also described that little information is obtained from extension workers and cooperative societies due to the scarcity of extension services to the farmers

and demise of cooperative societies. The respondents received information from DOA and companies by individual, group and mass media methods. They mostly received information from DOA for seed (27%), fertilizer application (24.3%), GAP (18.9%), weather forecasting (17.6%), market access and farm-product (16.2%), pest and disease control (15.7%), yield (14.9%), water requirement (12.2%), fertilizer law and pesticide law (10.8%), seed law (9.5%) through mass media method. Aye (2017) reported that Agricultural Extension Division, Department of Agriculture (DOA) plays a key role in disseminating agricultural information to the farmers. When in turn to the company, the respondents mostly received information for fertilizer application (34.2%), pest and disease control (28.4%), law of fertilizer, seed, and pesticide (9.5%), yield (8.1%), GAP, market access and water requirement (6.8%), weather forecasting (5.4%), farm-products (4.1%) by group method. Aye (2017) and Hlaing (2021) reported that farmers got agricultural information not only from the government but also from the private sector, friends and neighbors in Myanmar.

Table-4. Sources of agricultural information received by the respondents

Information needed	DOA			Co.			FF
	ID	GP	MM	ID	GP	MM	
Seed	6(8.1)	20(27.0)	20(27.0)	6(8.1)	0(0)	0(0)	53(71.6)
Fertilizer Application	5(6.8)	14(18.9)	18(24.3)	8(10.8)	25(34.2)	13(17.6)	47(63.5)
Pest and Disease Control	4(5.4)	13(17.6)	19(15.7)	14(18.9)	21(28.4)	14(18.9)	48(64.9)
GAP	2(2.7)	12(16.2)	14(18.9)	0	5(6.8)	5(6.8)	0
Weather Forecasting	1(1.4)	8(10.8)	13(17.6)	1(1.4)	4(5.4)	7(9.5)	67(90.5)
Market Access	1(1.4)	6(8.1)	12(16.2)	2(2.7)	5(6.8)	7(9.5)	64(86.5)
Farm Products	1(1.4)	8(10.8)	12(16.2)	1(1.4)	3(4.1)	3(4.1)	51(68.9)
Yield	0	9(12.2)	11(14.9)	0	6(8.1)	5(6.8)	60(81.1)
Water Requirement	0	9(12.2)	9(12.2)	0	5(6.8)	4(5.4)	59(79.7)
Fertilizer Law	1(1.4)	16(21.6)	8(10.8)	1(1.4)	7(9.5)	2(2.7)	28(37.8)
Seed Law	1(1.4)	15(20.3)	7(9.5)	0	7(9.5)	2(2.7)	27(37.0)
Pesticide Law	1(1.4)	15(20.3)	8(10.8)	1(1.4)	7(9.6)	2(2.7)	26(35.1)

Source: Field survey (2023).

Note: 1. DOA=Department of Agriculture, Co.=Company, FF= Farmer to farmer.

Note: 2. ID= Individual method, Gp=Group method, MM=Mass media method, GAP= Good Agricultural Practices

As shown in Table 5, the information received time of the respondents from the extension organizations per crop season. According to the results, DOA and company stand as the mostly distributed information organizations in the study area. The data shows that the extension agents from DOA and company visited to the respondents at least 1-2 times per crop season. DOA extension workers visited to the farmers to provide needed information for seed (36.5%), fertilizer application and pest and disease control (27%), good agricultural practices (25.7%), weather forecasting and fertilizer law (18.9%), market condition (16.2%), yield, seed law and fertilizer law (14.9%), and water requirement and farm-products (13.5%) per crop season. Besides, the extension workers

from company visited to the farmers at least 1 to 2 times for pest and disease control (51.4%), fertilizer application (50%), seed (33.8%), market access (17.6%), weather forecasting and yield (13.5%), GAP, fertilizer law, and pesticide law (12.2%), water requirement and seed law (10.8%), farm products (9.5%). According to the data, the extension agents from NGO did not visit to the farmers per crop season. The results show that agricultural extension services are not accessible to most of the study area. Some agricultural extension services are based upon a single crop and the single crop extension approach is more common, and the farmers received 1-2 times extension services per crop season (FAO, 1985).

Table-5. Number of times of information received from the extension organizations per crop season

Information needed	DOA			Co.	
	1-2	3-4	>5	1-2	3-4
Seed	27(36.5)	11(14.9)	5(6.8)	25(33.8)	6(8.1)
Fertilizer Application	20(27.0)	11(14.9)	3(4.1)	37(50.0)	8(10.8)
Pest and Disease Control	20(27.0)	10(13.5)	3(4.1)	38(51.4)	10(13.5)
Weather Forecasting	14(18.9)	5(6.8)	3(4.1)	10(13.5)	2(2.7)
Market Access	12(16.2)	4(5.4)	3(4.1)	13(17.6)	1(1.4)
GAP	19(25.7)	4(5.4)	4(5.4)	9(12.2)	1(1.4)
Yield	11(14.9)	5(6.8)	3(4.1)	10(13.5)	1(1.4)
Water Requirement	10(13.5)	5(6.8)	3(4.1)	8(10.8)	1(1.4)
Farm Products	10(13.5)	6(8.1)	3(4.1)	7(9.5)	0
Fertilizer Law	14(18.9)	6(8.1)	3(4.1)	9(12.2)	1(1.4)
Seed Law	11(14.9)	6(8.1)	3(4.1)	8(10.8)	1(1.4)
Pesticide Law	11(14.9)	7(9.5)	3(4.1)	9(12.2)	1(1.4)

Source: Field survey (2023).

Note: 1. DOA=Department of Agriculture, Co.=Company

Note: 2. ID= Individual method, Gp=Group method, MM=Mass media method, GAP= Good Agricultural Practices

DOA ICT Usage

Although Department of Agriculture (DOA) has been developed certain agricultural mobile applications and websites, the survey results significantly showed that majority of the respondents received agricultural information from DOA call center (Table 6). By contacting DOA call center, 40.5% of the respondents received seed information followed by fertilizer application (39.2%), pest and disease control (36.5%), market

access, fertilizer law, seed law and pesticide law (20.3%), weather forecasting (21.6%), GAP and farm products (18.9%), yield (16.2%). A few respondents used DOA mobile apps and DOA websites. Koshy et.al (2015) reported that farmers mostly contacted call center to get information on plant protection, crop cultivation and majority of the farmers were satisfied with those call center services.

Table-6. Agricultural information received from DOA mobile apps, websites and call center

Information Received	DOA ICT Usage						
	Mobile Apps				Websites		Call Centre
	PP	LUD	GAP	MIS	DOA-Agri-BOT	YSI	
Seed	2(2.7)	1(1.4)	3(4.1)	1(1.4)	1(1.4)	0	30(40.5)
Fertilizer Application	2(2.7)	1(1.4)	3(4.1)	0	1(1.4)	0	29(39.2)
Pest and Disease Control	2(2.7)	1(1.4)	5(6.8)	0	2(2.7)	0	27(36.5)
Weather Forecasting	0	1(1.4)	4(5.4)	0	0	2(2.7)	16(21.6)
Market Access	0	0	3(4.1)	16(21.6)	2(2.7)	0	17(23.0)
GAP	1(1.4)	0	5(6.8)	0	2(2.7)	0	15(18.9)
Yield	0	1(1.4)	4(5.4)	0	2(2.7)	0	12(16.2)
Water Requirement	1(1.4)	0	3(4.1)	0	2(2.7)	0	0
Farm Products	0	0	3(4.1)	0	2(2.7)	0	14(18.9)
Fertilizer Law	0	0	3(4.1)	0	2(2.7)	0	15(20.3)
Seed Law	0	0	3(4.1)	0	2(2.7)	0	15(20.3)
Pesticide Law	0	0	3(4.1)	0	2(2.7)	0	15(20.3)

Source: Field survey (2023).

Note: 1. DOA=Department of Agriculture, PP=Plant Protection, LUD=Land Use Division, GAP=Good Agricultural Practices, MIS= Marketing Information System, DOA-Agri-BOT=DOA AgriChatBot, YSI=Young Scientists Initiative

Social Media

For accessing to the agricultural information in Table 7, the respondents were using social media like Facebook individual account, Facebook page, Viber, Messenger and Facebook group. Agricultural information received by farmers in the study area from social media platforms include seed, fertilizer application, pest and disease control, weather forecasting, market access, GAP,

yield, water requirement, farm products, fertilizer law, seed law and pesticide law. Among these social media platforms, farmers mostly received agricultural information about weather forecasting (36.5%), fertilizer application (35.2%), market access (32.5%), seed (31.1%), pest and disease control (28.5%), yield (12.2%), and GAP (15.0%) through their personal Facebook accounts. Secondly, the respondents received information from the Facebook page were market access (59.5%), seed, fertilizer application, and pest and

disease control (27.1%), weather forecasting (25.7%), and GAP, and yield (13.6%). The third mostly used social media platform is Viber application and some respondents received information about seed and fertilizer application (16.3%), pest and disease control (14.9%) and weather forecasting and market access (13.6%) through Viber. Uddin and Karim (2023) reported that

Bangladeshi farmers were using social media and agricultural information mostly received from those platforms such as Facebook pages, groups and messenger groups. Hlaing (2021) also described that Viber is the farmers used social media application after Facebook.

Table-7. Agricultural Information received from social media

Information Received	Social Media				
	FB Individual Ac	FB Page	Viber	Messenger	FB Group
Seed	23(31.1)	20(27.1)	12(16.3)	6(8.1)	5(6.8)
Fertilizer Application	26(35.2)	20(27.1)	12(16.3)	6(8.1)	5(6.8)
Pest and Disease Control	21(28.5)	20(27.1)	11(14.9)	6(8.1)	7(9.6)
Weather Forecasting	27(36.5)	19(25.7)	10(13.6)	6(8.1)	7(9.6)
Market Access	24(32.5)	44(59.5)	10(13.6)	6(8.1)	4(5.5)
GAP	11(15.0)	10(13.6)	7(9.5)	5(6.8)	2(2.8)
Yield	9(12.2)	10(13.6)	7(9.5)	5(6.8)	3(4.1)
Water Requirement	7(9.5)	6(8.2)	6(8.2)	4(5.5)	3(4.1)
Farm Products	7(9.5)	5(6.8)	5(6.8)	4(5.5)	3(4.1)
Fertilizer Law	8(10.9)	8(10.9)	5(6.8)	4(5.5)	1(1.4)
Seed Law	8(10.9)	6(8.2)	5(6.8)	4(5.5)	1(1.4)
Pesticide Law	7(9.5)	8(10.8)	5(6.8)	4(5.5)	1(1.4)

Source: Field survey (2023).

Note: 1. FB Individual Ac=Facebook Individual Account, FB Page=Facebook Page, FB Group=Facebook Group, GAP=Good Agricultural Practices.

The number of times of using mobile apps by the respondents during one week in Table 8. The respondents in the study area used Facebook (23.0%), Yae Ta Khon (18.9%), Viber (17.6%), Awba (6.8%), Htwet Toe (5.5%), Green Way and Myanmar Portal (4.1%) and plant protection (PP) (2.7%) for 1 to 5 times during one week. The respondent used Facebook (23.0%),

Viber (10.8%), Yae Ta Khon (4.1%), Htwet Toe, Green Way, and Awba (1.4%) for 6 to 10 times in one week. Some respondents used Facebook (18.9%) over 20 times per week. According to Thar (2020), most farmers stated that mobile apps are useful, and the intensity of mobile apps usage varied among farmers, but, some farmers used apps once a week and some used every day.

Table-8. Usage times of mobile apps per week by the respondents

Mobile apps	Usage times per week				
	1-5	6-10	11-15	16-20	>20
Facebook	17(23.0)	17(23.0)	2(2.7)	2(2.7)	14(18.9)
Viber	13(17.6)	8(10.8)	4(5.4)	2(2.7)	5(6.8)
PP	2(2.7)	0	0	0	1(1.4)
Htwet Toe	4(5.5)	1(1.4)	0	0	0
Green Way	3(4.1)	1(1.4)	0	0	0
Yae Ta Khon	14(18.9)	3(4.1)	3(4.1)	0	0
Myanmar Portal	3(4.1)	0	0	0	0
Awba	5(6.8)	1(1.4)	0	0	0

Source: Field survey (2023).

Note: 1. PP=Plant Protection.

According to the results of Table 9, the farmers' preference of ICT usage on DOA mobile apps are PP, LUD, GAP and; DOA websites are MIS, E- Library, DOA Agri Bot, YSI; and DOA call center. The respondents have most preference on DOA call center (14.9%), followed by PP, LUD, GAP (6.8%) of DOA mobile apps; and MIS, E- Library, DOA Agri Bot, YSI (4.1%) of DOA websites, respectively.

Table-9. DOA ICT usage preferred by the respondents in the study area

ICT Usage	Ways of Preferences				
	Not-preferred	Low preferred	Normal	Preferred	Most preferred
DOA Mobile Apps					
PP	3(4.1)	5(6.8)	1(1.4)	1(1.4)	5(6.8)
LUD	3(4.1)	5(6.8)	1(1.4)	0	5(6.8)
GAP	3(4.1)	5(6.8)	4(5.4)	3(4.1)	5(6.8)
DOA Websites					
MIS	5(6.8)	4(5.4)	2(2.7)	0	3(4.1)
E-Library	4(5.4)	4(5.4)	2(2.7)	0	3(4.1)
DOA-Agri-Bot	4(5.4)	4(5.4)	2(2.7)	1(1.4)	3(4.1)
YSI	4(5.4)	4(5.4)	2(2.7)	0	3(4.1)
DOA Call-Center	4(5.4)	4(5.4)	5(6.8)	8(10.8)	11(14.9)

Source: Field survey (2023).

Note: 1. DOA= Department of Agriculture, PP=Plant Protection, LUD=Land Use Division, GAP=Good Agricultural Practices, MIS= Marketing Information System, DOA-Agri-BOT=DOA AgriChatBot, YSI=Young Scientists Initiative

The farmers in the study area answered that they did not prefer the usage of DOA websites such as MIS (6.8%), E- Library, DOA Agri Bot, YSI (5.4%); DOA call center (5.4%); and DOA mobile apps such as PP, LUD, GAP (4.1%). Their preference is low upon on DOA mobile apps such as PP, LUD, GAP (6.8%); DOA websites such as MIS, E- Library, DOA- Agri-Bot, YSI (5.4%); and DOA call center (5.4%). Among the preferences, call center was the most preference of DOA ICT usage in the study area. Rudroju (2013) highlighted that call center is more popular among the farmers’ level of DOA ICT usage.

Mass Media

According to results, farmers have their preferences upon the mass media distributed by the extension agents in the study

area (see in Table 10). It can be seen farmers’ preference on mass media methods by grading with 5 points-likert scale (1= no-preferred, 2= low-preferred, 3= neutral, 4= preferred, 5= most preferred). Then, the respondents have the most preference on television (48.6%) followed by pamphlets (39.2%), Facebook page (32.4%), poster and radio (25.7%), agricultural festival (20.3%) messenger (17.6%), journal (16.2%), bulletins and Viber (14.9%), newspaper (13.5%), and mobile application (9.5%), respectively. This finding is agreed with the finding of Sethy and Mukhopadhyay (2020), they described that the mass media are the preference choices of farmers and their highly preference on mass media for market information.

Table- 10. Mass media methods preferred by respondents

Use of Mass Media	Ways of Preferences				
	No-preferred	Low preferred	Normal	Preferred	Most preferred
Television(Broadcast)	0	2(2.7)	10(13.5)	19(25.7)	36(48.6)
Pamphlets(Printed)	3(4.1)	0	10(13.5)	27(36.5)	29(39.2)
Facebook Page(Digital and Social)	1(1.4)	1(1.4)	14(18.9)	15(20.3)	24(32.4)
Radio (Broadcast)	2(2.7)	3(4.1)	9(12.3)	15(20.3)	19(25.7)
Poster(Printed)	1(1.4)	1(1.4)	11(14.9)	27(36.5)	19(25.7)
Agricultural Festival(others)	0	0	6(8.1)	21(28.4)	15(20.3)
Messenger (Digital and Social)	2(2.7)	4(5.4)	14(18.9)	14(18.9)	13(17.6)
Journal(Printed)	2(2.7)	2(2.7)	16(21.6)	16(21.6)	12(16.2)
Bulletin (Printed)	2(2.7)	6(8.1)	8(10.8)	12(16.2)	11(14.9)
Viber (Digital and Social)	2(2.7)	6(8.1)	16(21.6)	11(14.9)	11(14.9)
Newspaper(Printed)	4(5.4)	8(10.8)	17(23.0)	15(20.3)	10(13.5)
Mobile Application (Digital and Social)	2(2.7)	8(10.8)	8(10.8)	9(12.2)	7(9.5)

Source: Field survey (2023).

The results show that the mean values of farmers’ preference on the mass media in Table 11.

Table-11. Mass media methods Preferred by respondents

Use of Mass Media	Ways of Preferences		
	Mean	SD	Mean Rank
Television (Broadcast)	3.86	1.608	8.05
Pamphlets (Printed)	3.86	1.608	8.05
Facebook (Digital and Social)	3.86	1.608	8.05
Radio (Broadcast)	3.04	1.982	6.82
Poster (Printed)	3.23	1.810	6.81
Bulletin (Printed)	2.57	2.101	6.73
Journal (Printed)	1.91	2.015	5.82
Newspapers (Printed)	2.41	1.965	5.62
Messenger (Digital and Social)	2.45	1.799	5.68
Viber (Digital and Social)	2.34	1.988	5.89
Mobile Applications (Digital and Social)	2.18	1.926	5.57
Agricultural Festival (Others)	1.53	1.860	5.11
χ^2			132.868**

Source: Field survey (2023).

Note: 1. SD= Standard Deviation.

The highest mean value of farmers' preference on the mass media such as television (broadcast) (mean=3.86), pamphlets (printed) (mean=3.86), Facebook (digital and social) (mean=3.86) followed by poster (printed) (mean=3.23) and radio (broadcast) (mean=3.04). Other mean values of farmers' preference on mass media are bulletin (printed) (mean=2.57), messenger (digital and social) (mean=2.45), newspapers (printed) (mean=2.41), Viber (digital and social) (mean=2.34), mobile applications (digital and social) (mean=2.18), journal (printed) (mean=1.91), agricultural festival (others) (mean=1.53).

Friedman test was used to determine if significant differences existed among the mass media preferred by the farmers. The Friedman test ($\chi^2 = 132.868, p < 0.05$) was significant, which meant that significant differences existed. In other words, television (broadcast), pamphlets (printed), Facebook (digital and social) (mean rank = 8.05) were significant as the most preference.

Besides, radio (broadcast) (mean rank = 6.82), poster (printed) (mean rank = 6.81), and bulletin (printed) (mean rank = 6.73) were as the second preferences of the respondents. Additionally, Viber (digital and social) (mean rank =5.89), journal (printed) (mean rank =5.82), messenger (digital and social) (mean rank = 5.68), newspapers (printed) (mean rank =5.62), mobile applications (digital and social) (mean rank = 5.57), and agricultural festival (others) (mean rank = 5.11) were slightly

significant differences and the preference of the respondents was slightly low. This finding is similar with the finding of Hlaing (2021), she reported that television (broadcast), pamphlet (printed), poster (printed), and Facebook (digital & social) are the highly preference of the farmers in Nay Pyi Taw territory.

The major limitations faced by the respondents when using ICT are difficult to access internet easily (60.8%), high cost of internet services (54.1%), unreliable electricity supply (50.0%), financial constraints (43.2%), limited exposure to ICT (39.2%), inadequate dissemination of ICT by extension services (36.5%), lack of digital literacy training (32.4%) and low interest to use ICT (20.3%) (see in Table 12). Baruah and Mohan (2018) and Jadhav et al., (2021) explained that the farmers faced many constraints related with ICT in their farming practices due to high cost of ICT tools, insufficient financial resources, poor support from extension agents and other institutional agriculture service providers, lack of training on using ICT tools for improving agricultural practices, low levels of faith/trust on ICT tools and lack of awareness about different mobile phone-based ICT tools. Agha, et.al (2018) also highlighted farmers experienced difficulties to get ICT information during farm operations are no internet facility in village, clients' electricity use problem for operating laptops/computers/projectors, lack of farmer's interest in ICT tools, less knowledge of farmers about ICTs.

Table-12. Limitations on the usage of ICT (Mass Media) by the respondents

Limitations	Frequency	Percent
Limited Internet Accessibility	45	60.8
High Cost of Internet Services	40	54.1
Unreliable Electricity Supply	37	50.0
Financial Constraints	32	43.2
Limited Exposure to ICT	29	39.2
Inadequate Dissemination of ICT by Extension Services	27	36.5
Lack of Digital Literacy Training	24	32.4
Low Interest to Use ICT	15	20.3

Source: Field survey (2023).

Influence of mass media methods on the agricultural information dissemination in the study area

Farmers have enormously benefited by using mass media through agricultural information. Effectiveness in this context of the study was the capacity of mass media in dissemination of agricultural-related information assessed by respondents were presented in Table 13. In access to seed, 51.4% of respondents believed that mass media was the most effective, where as 37.8% and 5.4% of respondents considered effectiveness and less effectiveness. Seed information was ranked at the highest mean value (mean=3.30) and the effectiveness scores significantly different among the respondents ($\chi^2 = 48.162$; $p < 0.05$).

When it comes to fertilizer application, the respondents answered they had most effectiveness (55.4%), effectiveness (35.1%) and less effectiveness (1.4%) on mass media. Fertilizer application stands as the same mean value (mean=3.30) with seed information and the scores on effectiveness were significantly different ($\chi^2 = 55.405$; $p < 0.05$). Besides, the respondents had effectiveness on the mass media related with other agricultural information including pest and disease control, weather forecasting, farm products, market access, GAP, yield, seed law, fertilizer law, water requirement, and pesticide law. The mean values and the effective scores were significantly different at 0.05% level.

Table-13. Influence of mass media methods on the agricultural information dissemination in the study area

Information needed	Preference of Mass Media						
	NE	LE	E	ME	Mean	χ^2	Mean Rank
Seed	0	5.4	37.8	51.4	3.30	48.162 ^a	9.28
Fertilizer Application	0	1.4	35.1	55.4	3.30	55.405 ^a	9.27
Pest and Disease Control	0	0	18.9	50.0	2.57	10.892 ^b	7.70
Weather Forecasting	0	0	16.2	50.0	2.49	12.676 ^b	7.52
Farm Products	0	4.1	31.1	33.8	2.36	17.459 ^a	6.87
Market Access	0	2.7	13.5	37.8	1.97	36.486 ^a	6.18
GAP	0	8.1	18.9	32.4	2.03	18.324 ^a	6.05
Yield	0	0	21.6	31.1	1.89	7.486 ^b	5.78
Seed Law	1.4	1.4	14.9	25.7	1.51	77.892 ^c	4.96
Fertilizer Law	0	0	10.8	27.0	1.41	30.595 ^b	4.86
Water Requirement	1.4	2.7	12.2	25.7	1.46	81.135 ^c	4.84
Pesticide Law	0	0	10.8	25.7	1.35	32.784 ^b	4.73
χ^2						378.606**	

Source: Field survey (2023).

Note: 1. Effectiveness, n = 74

Note: 2. NE = No effective (1), LE = Less effective (2), E = Effective (3), ME = Most effective (4).

The Friedman test ($\chi^2 = 378.606$; $p < 0.05$) showed significant, which meant significant differences existed among the effectiveness of agricultural related information in the dissemination of mass media. According to the results, the highest mean rank of the mass media effectiveness by respondents was assessed to seed information (mean rank= 9.28) and the second highest mean rank of mass media effectiveness of fertilizer application (mean rank= 9.27) followed by other mean rank of mass media effectiveness of pest and disease control (mean rank=7.70), weather forecasting (mean rank=7.52), farm products (mean rank= 6.87), market access (mean rank= 6.18), GAP (mean rank= 6.05), yield (mean rank= 5.78), seed law (mean rank= 4.96), fertilizer law (mean rank=4.86), water requirement (mean rank= 4.84), pesticide law (mean rank= 4.73). The results show that to seed information and fertilizer information could be assessed as the most effectiveness by the respondents. Therefore, the effects of mass media related with other agricultural information were significantly different among the respondents. The finding is agreed with the finding of Hlaing (2021), she reported that the farmers mostly received about seed information, agrochemicals, pest and disease control measure, weather condition, market condition etc. in Nay Pyi Taw Territory.

Conclusion

Mass media method was slightly more received than the individual and group extension methods in this study area. Majority of respondents preferred DOA call center but they have

low preferred on DOA mobile apps and websites. The highest preference of the respondents on the television (broadcast media), pamphlet (printed media), Facebook (digital and social media) in the study. In the results of mobile applications, the respondents preferred use of FB page, FB account, and Viber and their FB and Viber usage time are at least 1-5 and 6-10 times in a week. Limited internet accessibility, high cost of internet services, and unreliable electricity supply are the major constraints faced by the respondents in using mass media. Respondents should be received effective agricultural ICT trainings in disseminating agricultural information by using mass media methods. The needed information regarding seed, fertilizer application, pest and disease control, weather forecasting, market access should be provided on time by various media. Besides, less of interesting of farmers in government policies and programs may lead to the failure of projects implementation. Thus, the respondents should receive agricultural information in time and they should be educated to the farmers for a better understanding of government policies and plans.

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