

Role of social and mass media in agricultural information dissemination among the farmers of tehsil Shakargarh, District Narowal, Punjab, Pakistan

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Abstract

The current study was conducted to assess the role of the social and mass media in agricultural information dissemination among the farmers of Tehsil Shakargarh, District Narowal. The study data was collected from 120 respondents selected through random selection from different UCs of the Tehsil Shakargarh. The study population consisted of different ages, landholdings, annual family income and experience of crop production and livestock rearing. The data showed significant awareness related to social media ($p = .011$), while the effect of mass media was not statistically significant ($p = .086$). However, a significant proportion of social media users faced problems while using these sources of information ($p = .015$). The recorded data showed that 100% of the population of the studied area had mobile phones and radio, however 50.8% and 38.3% had television and laptops, respectively. Among the mobile phone users, WhatsApp, YouTube, and Facebook software applications had been using 92.5%, 80.0%, and 79.2% population, respectively. Most of the farmers (approx.

80%) of Tehsil Shakargarh were having education level of matric or above. In addition, majority of farming community (54.1%) were small land holders and owners of their arable lands. Therefore, most of them were experienced farmers, belonging to middle class families and had easy access to social and mass media information. Farming community of the studied area was having awareness about social and mass media as well. However, inefficiency of agricultural extension service providers was also reported in the area. That might be due to their negligence, prevailing nepotism or the lack of modern agricultural technologies and the extensions services. That's why a large part of farming community was facing obstacles using social and mass media materials and ultimately following the digital agriculture. It was concluded that farming community of the studied area had access to social and mass media more over agricultural information (i.e. crop production technologies, climate pattern, innovative tools, and modern machinery) has been disseminated. © 2026 The Author(s)

Keywords: Agricultural innovations, Digital platforms, District Narowal, Electronic media, Print media, Technology adoption

Citation: Mosadduq, M. (2026). Role of social and mass media in agricultural information dissemination among the farmers of tehsil Shakargarh, District Narowal, Punjab, Pakistan. *Journal of Plant Production and Sustainability*, 2(1), 84–95. <https://doi.org/10.63072/jpps.26008>

Introduction

Social and mass media have been defined and explained across various disciplines according to their specific purposes and functions. They serve as important means of disseminating knowledge, raising awareness, shaping attitudes and behaviors, sharing experiences, and developing both soft and technical skills (Plantec et al., 2025). They also facilitate the communication and expression of ideas, thoughts, and perceptions through various forms, including art, galleries, print media, signs, typography, drawing, photography, graphic design, electronic and non-electronic resources, and illustrations (Sandel & Ju, 2019). These media can also communicate historical events and personal perceptions through both verbal and non-verbal forms of communication. Social and mass media are directly linked with visual communication

history (Gregor et al., 2020). In 18 centuries, it brought changes on the decade bases through the invention of phone, computer and internet. It makes it clear for the spreading of knowledge (Pollokoff, 2020). Media design was further promoted towards the 19th century. The computer and internet are directly linked with each other's performance in social networking and world business firms (Bez & Pirovano, 2019).

Internet was introduced in the 1960s. This programming connects billions of computers. The ARPANET, WWW, BBS, Geocities, WWW Theglobe.com, Tripod.com, PlanetAll, SixDegrees, Open Diary, Mixi, Alibaba, Yahoo, MSN messengers, Makeoutclub, LinkedIn, Skype, Facebook, YouTube, Qzone, Twitter, V Kontakte, WhatsApp, Instagram, Wechat, Painterest, Snapchat, Amazon, Tik Tok, are directly increased the utilization of the social media (Piper, 2021). These platforms increased the utilization of the phone among the world population with the help of social media (McFadden,

2020). The 4.54 billion of the world population recorded with the surfing of social media through mobile and computer internet. Social media increased public awareness about the public services, agricultural production, political, cultural, art, and economical sectors (Javornik et al., 2020). The use of social and mass media encourages universal exchange, data trade, and crisis reaction. The use of mobile phones provides an easy and cheap way of communication to different sectors, different ways of communication like SMS messages or voice calls. Through mobile phones, different kinds of information are provided to agricultural communities (FAO, 2007).

World Economic Forum has named the use of digital technology as the “Fourth Industrial Revolution” and it also includes the agriculture sector and also predicted that this will change the whole scenario of crop production and it will mark the start of Agriculture 4.0 with the start of 21st century (Schwab, 2018; Javaid et al., 2024). Agriculture is the key stakeholder in Pakistan economic development since its creation. Pakistan’s agriculture sector plays a central role in the economy as it contributes 18.5 percent to GDP and absorbs 42.3 percent of labor force. It is also an important source of foreign exchange earnings and stimulates growth in other sectors (Government of Pakistan [GoP], 2020). The contributions of agriculture reduction are measured by many researchers with different kinds of parameters such as lack of capital, knowledge, technology, quality of seed, waters, cultivated land, urbanization, industrialization, engagement of young and flood, heat weave, and heavy rain (Javaid et al., 2024). From a long period, many kinds of challenges are faced by the agriculture sector, but the basic ones are urbanization, industrialization, overpopulation and climate changes information. The growth of agriculture production is reduced to very low level of understanding. It directly reduced the number of farmers’ interest because it reduced their income (GoP, 2019).

Agricultural institutions increased their linkage with farmers through the social and mass media. Information and communication technology direct offers to the individuals and the society include a connected, intensively communicating society and a convenient lifestyle (Jabran et al., 2026). Mobile telecom's contribution in this respect includes increased affordability and opportunities for making various business sectors more efficient and creating new business opportunities (Kushchu, 2007; Iqbal, 2024). Web surfing serves as an effective agricultural information tool for disseminating agriculture-related information to the farming community (Temmel, 2014). In agriculture, the role of media in agricultural information cannot be over emphasized in enhancing the agricultural development. Agricultural information is crucial for increasing agricultural production and improving marketing and distribution strategies (Oladele, 2006). Extension works in a two-way fashion i.e. delivering the information to the farming community as well as getting feedback from the farmers and delivering it to the research (Leeuwis, 2004). Social and mass media technology

improved by telecommunication companies initiated an important service with the name of “Kissan Service” to provide the farmers with the latest information about different aspects of farming like typical weather forecast, products and their market prices and brief production technologies of major crops (Khan et al., 2020). As this service got low popularity, Mobilink has started new service with the name of *Bakhabar Kissan*. It provides information related to crops, weather forecast, market prices, management of livestock and videos etc. on mobile phone numbers (Mobilink, 2020).

Pakistan Telecommunication Authority (PTA) has reported that the aggregate numbers of users of cell phones have reached up to 131.4 million at the end of 2017. This number increased rapidly within last few years. This increase in number of subscriptions is due to better coverage availability and better packages offered by telecom companies for calls, SMS and internet service. It depicts the scope of digital agriculture in Pakistan (GoP, 2017). Global market today, our farmers should have latest information regarding new techniques of farming, new methods of cultivation, new crops, seeds, pesticides, water management, marketing of product, government policies regarding agriculture, export potential of their crops and the information about the allied activities like fish farming, apiculture, poultry, dairy and weather information on local and regional levels (Singh et al., 2011). Farming groups can catch related with the extension artful and with each other for receiving and dissemination of agricultural information, because of its passing on capacity, temperate and approach grand reputation (Khan et al., 2010). Government of Punjab has launched a five years project with title “Extension Services 2.0 Farmers Facilitation through Modernized Extension” from 01-07-2015 to 30-06-2020 and its objectives were to technologically transform the agriculture sector to enhance agricultural regarding weather situation, market prices through “Agriculture Marketing Information System”, GPS based water and soil sampling through digital mobile application “Meri Zameen”, customized fertilizer recommendation of major crops through soil health cards, marking of farm boundaries, establishment of call centers to provide information, and above all the development of soil fertility map of the province (Hassan, 2020).

Despite the rapid development of social and mass media as channels for agricultural information dissemination, many farmers in Tehsil Shakargarh remain unfamiliar with their effective use for accessing agricultural knowledge. Limited awareness, inadequate access, low digital literacy, and other socioeconomic and infrastructural constraints hinder the adoption of these communication technologies and the implementation of modern agricultural practices. As a result, the potential of social and mass media to facilitate the transfer of agricultural technologies and improve farm productivity has not been fully realized. Therefore, the present research study was conducted to analyze the various mass and social media platforms to provide modern agricultural technologies to the farming communities in the study area and to evaluate effectiveness of the social and mass media technology in agricultural information dissemination.

Materials and Methods

Research Design

Quantitative research design was used for this study. A cross-sectional survey was conducted to collect data from farmers in Tehsil Shakargarh regarding their use and perceptions of social and mass media for agricultural information dissemination. Primary data were collected through a structured questionnaire administered to the selected respondents. The collected data were coded, entered statistical software, and analyzed using descriptive and inferential statistical techniques to achieve the study objectives.

Population of the study

The population of this study comprised farmers residing in Tehsil Shakargarh, District Narowal, who use social and/or mass media for obtaining agricultural information. The study population was selected from five Union Councils of Tehsil Shakargarh: Shah Pur Bhango, Sukho Chak, Baran, Bhati Afghan, and Naurangabad.

Sample size of the study

A multistage sampling technique was used for the selection of respondents. Out of the 35 Union Councils in Tehsil Shakargarh, five Union Councils were selected randomly. From each selected Union Council, three villages were randomly selected, resulting in a total of 15 villages. From each village, eight farmers who used Android smartphones to access agricultural information through social and mass media were selected. Thus, the total sample size for the study comprised 120 farmers.

Development of research tool

A structured interview schedule was developed as the primary research instrument for collecting data from the respondents. The research questions were developed in accordance with the objectives of the study and the variables under investigation. The interview schedule consisted of questions designed to obtain relevant information from the respondents regarding the subject of the study. The instrument was initially prepared in English to ensure clarity and consistency in the wording of the questions. During data collection, the questions were explained and asked to the respondents in their native language (Punjabi) to facilitate better understanding and accurate responses. Data were collected through face-to-face interviews, during which the researcher recorded the respondents' responses systematically. This approach enabled the researcher to clarify questions where necessary and ensure that the respondents fully understood the questions before providing their responses.

Validity of research instrument

The validity of the research instrument was ensured through expert evaluation. The statements included in the questionnaire were reviewed and assessed by three experts from the Institute of Agricultural Extension and Rural Development, University of Agriculture Faisalabad, Pakistan. Based on their valuable feedback and suggestions, necessary modifications, including the addition, deletion, and revision of items, were made to improve the clarity, relevance, and suitability of the instrument.

Reliability of research instrument

The reliability of the research instrument was assessed through a pilot study. The researcher personally visited the field and administered the questionnaire to 15 farmers to evaluate the consistency, practicality, and effectiveness of the instrument. The pilot testing helped identify potential difficulties in data collection and enabled further refinement of the questionnaire before its final administration.

Data collection and analysis

The finalized interview schedule was personally administered by the researcher in the field for data collection. Face-to-face interviews were conducted with the respondents to obtain the required information. Before data collection, the purpose and significance of the study were explained clearly to the respondents to ensure their understanding and cooperation. The collected data was coded, entered, and transferred into the Statistical Package for Social Sciences (SPSS) for further statistical analysis. The data was analyzed using descriptive statistical techniques, including frequencies, percentages, means, and ranking, along with inferential statistical methods.

Results and Discussion

Demographic characteristics of the respondents

An important factor of demography is age, which defines and determines the reaction of a person in various activities in his life. For the adoption of any innovation, age plays a vital role. The data regarding the age of social and mass media users are reported in Table 1 which shows that half (54.2%) of the respondents belong to middle aged (36 to 50 years). 38.3% of social media users were recorded with old age (above 50 years). Few farmers (7.5%) were recorded with young age (14 to 35 years). Education focuses on exposure and access to printed material and is defined as the way of enhancing knowledge and wisdom. Education directly or indirectly affects human performance. The educational level was recorded with the scattered mode of response which is reported in Table 1. The respondents of study area (24.3%) had matric education. The further response showed that 21.6% achieved middle, 20.8% had intermediate education, 10.6% mentioned bachelor, 13.3% recorded with the non- formal education while a high level of education was only achieved by 4.2%.

Occupation of the respondent is also worth full character which makes a farmer may or may not adopt any kind of innovation. Occupation is a skill that a person utilizes to generate survival. 61.7% of the farmers recorded with farming occupation in Table 1. The 17.5% of social and mass media users recorded with government jobholders and farming, followed by farming and private job holders which were recorded up to 13.3%. The size of landholding is very important factor for the farmer which may have an influence upon farmers' decisions about obtaining knowledge and skill related to agriculture and innovation technology. Table 1 showed that 54.1% of social media users mentioned that they had up to 5 acres of land. The 6 to 10 acres were recorded among 22.5% of the social media users. 16.7% of adopters also mentioned that they had 11 to 15 acres of land size. 6.7% of social media users had more than 15 acres of land in the research area. Leaser is the farmer who possesses his land and works on his land. Leaser cum tenant farmers is those who used their land to grow the crop as well as others' land and pay their share in return. The data are reported in Table 1. 64.2% of users mentioned that they owned their land as owners. 23.3% of the social and mass media adopters mentioned that they leased the cultivated land. 12.5% depends on the leased land. Marital status refers to the various relationships considered as (married, separated, and cohabiting or never married, divorced, and widowed). His/her behavior can be determined by his/her status. The marital status of social and mass media users is presented in Table 1. The findings

indicate that 75% of the respondents were married, while 20.8% were unmarried. The remaining 4.2% of the respondents were widowed. The respondents were asked about their family type either nuclear or joint. Nuclear mean husband, wife, and children living together. 70.8% of the social and mass media users are living in a joint family system which is reported in Table 1. 21.7% mentioned that they belonged to the extended type of family. While 7.5% are living in a nuclear family. The data regarding the family class of social and mass media users are reported in Table 1. The majority (69.2%) of the social and mass media users belong to the middle family class. 19.2% mentioned low economic class and 11.6% recorded with high economic class. The farmers also responded about their experience in farming which depicts that 39.2% of information and communication technologies adopters were cultivating their land up to 10 years. 27.5% of social and mass media users reported that they had 21 to 30 years of experience in the farming sector. The data regarding the source of income is reported in Table 1 which depicts that 90.8% of the respondents stated that they received their income from crops and livestock farming. 61.7% of the respondents showed that they are generating their annual income from crops. 30.8% of social media users are solely depending on their jobs for income generations. Table 1 showed the three-fourth (75.8%) of the beneficiary of farming societies mentioned that they had 6 to 10 years of experience in the use of social and mass media regarding agricultural practices. The 9.2% of growers mentioned 11 to 15 years of experience. 8.3% of social media users stated that they were using it for more than 15 years.

Table 1 Demographic characteristics of the respondents (n = 120)

Demographic characteristics	Category	Frequency	Percentage
Age (years)	Young age (14-35)	09	7.5
	Middle age (36-50)	65	54.2
	Old age (above 50)	46	38.3
Education level	Non- formal education	16	13.3
	Primary	7	5.8
	Middle	26	21.6
	Matric	29	24.3
	FSC /FA	25	20.8
	Bachelor	12	10.0
	Above bachelor	5	4.2
Occupation of the respondents	Farming only	74	61.7
	Farming + Government job	21	17.5
	Farming + Private job	16	13.3
	Farming +Business	9	7.5
Land size (in acres)	Small farmers (up to 12.5)	92	76.6
	Medium farmers (12.5 to 25)	20	16.7
	Large farmers (above 25)	8	6.7
Tenancy status	Owner	77	64.2
	Owner-cum-tenant	28	23.3
	Tenant	15	12.5
Marital status	Single	25	20.8
	Married	90	75
	Widow	5	4.2
Type of family	Nuclear	26	21.7
	Joint	85	70.8
	Extended	9	7.5

Family class	Low economic class	23	19.2
	Middle economic class	83	69.2
	High economic class	14	11.6
Farming experience (years)	Up to 10 years	47	39.2
	11 to 20 years	29	24.2
	21 to 30 years	33	27.5
	More than 30 years	11	9.1
Sources of income	Job	37	30.8
	Crops	74	61.7
	Livestock	35	29.2
	Crops and livestock	109	90.8
Experience of using media	Up to 5 years	8	6.7
	6 to 10 years	91	75.8
	11 to 15 years	11	9.2
	More than 15 years	10	8.3

Sources of social and mass media tools

The farmer's responses about their source of these media are reported in Table 2. It showed that all (100%) of the farmers had mobiles and radio. Half (50.8%) of them mentioned that they are using the television for Information innovations. 38.3% of the growers recorded the presence of laptops and only 10.8% of them had telephone information and communication tools.

Table 2 Frequency analysis of the farmers regarding their sources of social and mass media

Source of social and mass media	Frequency	Percentage
Mobile	120	100.0
Television	61	50.8
Telephone	13	10.8
Laptop	46	38.3
Radio	120	100.0

Mass media and social media

The data regarding social and mass media innovation, adoption, diffusions, and enrollment of the farmers with these media are reported in Table 3. Almost (92.5%) of the beneficiary of social media in agriculture practices stated

that they were utilizing WhatsApp as a medium for connecting with agricultural-related services.

Table 3 Frequency analysis of the farmers regarding the utilization in form of mass and social media tools

Forms of media	Frequency	Percentage
Social media		
YouTube	96	80.0
WhatsApp	111	92.5
Facebook	95	79.2
Mass media		
TV	61	50.8
Radio	120	100.0
Video (CD form)	54	45.0

Note: Total is not hundred percent due to respondents multiple responses

Usage of social and mass media tools

Table 4 is reporting the response of the social and mass media tools users. It shows that 25% of users stated that they are using YouTube and WhatsApp for agriculture information with fair awareness level. 10% of the respondents mentioned their awareness and importance of YouTube and Facebook regarding the source of information.

Table 4 Frequency analysis of the rate of various social and mass media tools on the basis of use as perceived by the respondents

Media	1		2		3		4		5	
	F	%	F	%	F	%	F	%	F	%
<i>Social media</i>										
YouTube	25	20.5	30	25.0	15	12.5	14	11.7	12	10.0
WhatsApp	29	24.2	30	25	21	17.5	16	13.3	15	12.5
Facebook	22	18.3	29	24.2	20	16.7	11	9.2	13	10.8
<i>Mass media</i>										
TV	18	15	17	14.2	14	11.7	7	5.8	5	4.2
Radio	28	23.3	35	29.2	29	24.2	15	12.5	13	10.8
Video	10	8.3	11	9.7	18	15	9	7.5	6	5

1 = Poor; 2 = Fair; 3 = Satisfactory; 4 = Good; 5 = Excellent; F = Frequency; % = Percentage

Ranking awareness level of media

The ranking of various social and mass media tools is reported in Table 5. The data shows that awareness and interest of the farmers in the social and mass media tools regarding the

agricultural information is higher (1st) ranked with WhatsApp. The WhatsApp weighted scores were higher (292) among the social media tools. It shows that the

majority of farmers are using WhatsApp for communication and agricultural information.

Table 5 Ranking of various social and mass media on the basis of the relative scores achieved by the respondents

Media	Weighted scores	Ranked order	Mean	SD
<i>Social media</i>				
YouTube	246	3 rd	2.050	1.203
WhatsApp	291	1 st	2.425	1.432
Facebook	249	2 nd	2.075	1.321
<i>Mass media</i>				
TV	147	3 rd	1.225	1.253
Radio	310	1 st	2.583	1.192
Video	152	2 nd	1.266	1.862

Effectiveness of the social media application

Table 6 was reporting the awareness level of the farmer about the social and mass media. 10.83% of the farmers stated that they had excellent awareness about YouTube

and WhatsApp. They stated they are using YouTube (10.8%) and Facebook (10%) with good command among the social media tools. 13.3% of farmers also stated that they are using the radio with good command and awareness.

Table 6 Frequency analysis of the rate of social and mass media on the effectiveness of utilization of these tools by respondents

Media	1		2		3		4		5	
	F	%	F	%	F	%	F	%	F	%
<i>Social media</i>										
YouTube	19	15.8	27	22.5	24	20	13	10.8	13	10.83
WhatsApp	24	20	32	26	24	20	18	15	13	10.83
Facebook	20	16.7	24	20	27	22.5	12	10	12	10
<i>Mass media</i>										
TV	15	12.5	18	15	13	10.83	8	6.7	7	5.83
Radio	30	25	33	27.5	27	22.5	16	13.3	14	11.7
Video	13	10.8	14	11.7	15	12.5	8	6.7	4	3.3

1 = Poor; 2 = Fair; 3 = Satisfactory; 4 = Good; 5 = Excellent; F = Frequency; % = Percentage

Ranking awareness level of mass and social media

The ranking of various social and mass media tools was reported in Table 7. The data shows that awareness and interest of the farmers in the social and mass media tools regarding the agricultural information is higher (1st) ranked with WhatsApp. The WhatsApp weighted scores were

higher (297) among the social media tools. It shows that the majority of the farmers are using WhatsApp for communication and achieving the information about agricultural through it. The radio related weighted scores reported with higher response (311) among the mass media. The radio was ranked in the top position (1st) among the mass media.

Table 7 Ranking awareness level about utilization of these tools by respondents

Media	Weighted scores	Ranked order	Mean	SD
<i>Social media</i>				
YouTube	262	2 nd	2.1833	1.2932
WhatsApp	297	1 st	2.4750	1.2932
Facebook	257	3 rd	2.1417	1.2932
<i>Mass media</i>				
TV	157	2 nd	1.3083	1.5921
Radio	311	1 st	2.5917	1.5921
Video	138	3 rd	1.1500	1.592

Cost of information and communication technology tools

The social media tool cost was reported in Table 8. The 75.0% of adopters of the mobile stated that they paid up to 10,000 Pakistani rupees. The 17.5% of the social media utilizer stated that their mobile cost 10,001 to 20,000

Pakistani rupees. The 9.2% of them recorded with 20,001 to 30,000 Pakistani rupees. 6.7% of them stated that they paid more than 30,000 for their mobile. 33.3% of them stated that their television cost them up to 10,000, while 7.5% of them mentioned 10,000 to 20,000. 5.8 and 4.2% of social media tools users stated they paid 20,001 to 30,000 and more than 30,000 respectively. 29.2% of the farmers were using the

laptop which cost them 20,001 to 30,000 Pakistani rupees. 5.8% of the farmers stated that they paid more than 30,000 for their laptop. While all (100%) of them stated that they

paid less than 10,000 for their radio. The cost of the social media tools depends on their performance and their applications.

Table 8 Frequency analysis of the farmer's response regarding the cost of the information and communication tools

Information tools	Up to PKR. 10,000	PKR. 10,001-20,000	PKR. 20,001-30,000	PKR. >30,000
Mobile	66.7	17.5	9.2	6.7
Television	33.3	7.5	5.8	4.2
Telephone	10.8	0.0	0.0	0.0
Laptop	0.0	3.3	29.2	5.8
Radio	100.0	0.0	0.0	0.0

Constraints of sources adoption

All beneficiaries (100%) of the social media highly believed that the lack of internet services, education, awareness in form of skills, and high taxes (Table 9) these services are the main constraints in the adoption and diffusion of social media sources. Several studies showed that in the village area's the farmers need more attention towards internet services, with high speed, knowledge of local language, and low taxes or free of taxes for agricultural production and increased the education level of

the users of social media sources. It would improve the production rate of the farmers. Social media sources increased the awareness of the farmers regarding microfinance and its agriculture production. A few constraints increased the hurdle among them such as the lack of internet services, education, awareness in form of skills, and high taxes these services are the main constraints in the adoption and diffusion of social media sources. The service charges, low network, and irrelevant information recorded with very high constraints they faced during in social media.

Table 9 Frequency analysis of the farmer's response about the constraints of sources adoptions

Constraints	1		2		3		4		5	
	f	%	f	%	f	%	f	%	f	%
Lack of skills	20	16.7	25	20.8	40	33.3	24	20.0	11	9.2
Lack of capital	25	20.8	30	25	35	29.2	20	16.7	10	8.3
Service charges	17	14.2	17	14.2	21	17.5	35	29.2	30	25.0
Lack of internet	25	20.8	20	16.7	15	12.5	35	29.2	25	20.8
Lack of education	17	14.2	24	20	20	16.7	29	24.2	30	25.0
Lack of awareness	28	23.3	13	10.8	30	25	24	20	25	20.8
Extra taxes of services	14	11.7	15	12.5	12	10	60	50	19	15.3
Low network problem	19	15.8	14	11.7	11	9.2	12	10	64	53.3
Lack learning sources	10	8.3	30	25	54	45	12	10	14	11.7
Irrelevant information	20	16.7	10	8.3	17	14.2	11	9.2	62	51.7
Lack of native language	12	10	10	8.3	14	11.7	65	54.2	19	15.8

1 = Poor; 2 = Fair; 3 = Satisfactory; 4 = Good; 5 = Excellent; F = Frequency; % = Percentage

Ranking of various constraints in agriculture

The ranking of various constraints affecting the adoption and use of social and mass media as sources of agricultural information is presented in Table 10. The weighted scores indicate the relative importance of the constraints reported by the respondents. Among the identified constraints, the poor or low network connectivity ranked first, with a weighted score of 448, indicating that inadequate network coverage and connectivity were the most prominent barriers faced by farmers in receiving agricultural information through social and mass media. Limited network connectivity may restrict farmers' ability to access timely information, particularly information requiring mobile internet, online platforms, or other digital communication channels. The irrelevance of available

information ranked second, with a weighted score of 445. This finding indicates that, although agricultural information may be available through social and mass media, it does not always correspond to the specific needs, farming conditions, crops, or production problems of farmers. The availability of information alone may therefore not be sufficient unless the information is relevant, location-specific, timely, and applicable to farmers' production needs. The third-ranked constraint, with a weighted score of 429, was also reported as an important barrier by the respondents. This finding suggests that farmers face additional limitations in effectively receiving and utilizing agricultural information through social and mass media. The presence of multiple constraints indicates that the effectiveness of information dissemination depends not only on the availability of communication channels but also on the supporting facilities and services.

Information technologies and agricultural production

The world introduced different agricultural programs with the help of internet things, which increased the crop production of the selected target of farmers' societies. Table 11 shows a frequency analysis of the farmer's response about social media and its impact on their crops production; they were supposed to rate their response on any one category from SDA to SA. 100% of the farmers reported that IT helps in the identification of harvesting timings while a same proportion of the respondents

declared that they strongly disagree with the statement. 66.7% of the farmers strongly agreed on the point that the use of social media increased farmers' knowledge regarding fertilizers' application. An increase in farmers' awareness regarding seed selection and agricultural practices due to the use of social media is agreed by 91.7% and 85.8% of the respondents respectively. Three-fourths of the farmers agreed on the statement that social media enhanced farmer's awareness regarding cultivation timing of crops, and number of irrigations. The study showed that it increased the knowledge and awareness level of the farmers.

Table 10 Frequency analysis of the farmer's response about the constraints of sources adoptions

Constraints	Weighted scores	Ranked order	Mean	Standard deviation
Lack of skills	413	5 th	3.4417	1.9726
Lack of capital	320	11 th	2.6667	1.9756
Service charges	404	6 th	3.3667	1.9798
Lack of internet	375	8 th	3.1250	1.9723
Lack of education	391	7 th	3.2583	1.9765
Lack of awareness	335	10 th	2.7917	1.9786
Extra taxes of services	415	4 th	3.4583	1.9897
Low network problem	448	1 st	3.7333	1.9654
Lack learning sources	350	9 th	2.9167	1.9987
Irrelevant information	445	2 nd	3.7083	1.9653
Lack of native language	429	3 rd	3.5750	1.9543

Inferential statistics results

Table 12 reports the paired samples t-test results of the respondents' responses regarding the information sources providing knowledge about agricultural practices. The results showed that respondents' awareness regarding social media information was statistically significant ($p = .011$), whereas the result for mass media information was not significant ($p = .467$). Regarding knowledge of information sources, the results showed that social media was significant ($p = .027$), while mass media was not significant ($p = .086$). Regarding the ease of using

information sources, the results showed that neither social media ($p = .201$) nor mass media ($p = .101$) was statistically significant. For the mostly used information sources, both social media ($p = .024$) and mass media ($p = .047$) showed statistically significant results. The results further showed that respondents facing obstacles while using social media information were statistically significant ($p = .015$), whereas the result for mass media information was not significant ($p = .614$). Finally, the overall respondent score for social media was statistically significant ($p = .041$), while the overall respondent score for mass media was not significant ($p = .408$).

Table 11 Frequency analysis of the farmer's response about information technology and its impact on their crops production

Agriculture production	Extent				
	SDA	DA	UC	A	SA
Agriculture practices knowledge	0.0	0.0	14.2	85.8	0.0
Seed selection	0.0	0.0	8.3	91.7	0.0
Numbers of tillage	0.0	0.0	25.0	75.0	0.0
Cultivation timing of crops	0.0	0.0	25.0	75.0	0.0
Numbers of irrigations	0.0	0.0	25.0	75.0	0.0
Fertilizer applications	0.0	16.7	16.7	0.0	66.7
Cropping pattern	8.3	0.0	66.7	25.0	0.0
Cropping system	0.0	0.0	25.0	75.0	0.0
Weed practices	0.0	0.0	75.0	25.0	0.0
Utilization of chemical	0.0	0.0	75.0	25.0	0.0
Availing the capital support	100.0	0.0	0.0	0.0	0.0
Adoption of insecticides/ pesticides	0.0	0.0	75.0	25.0	0.0
Identification of the diseases	0.0	0.0	75.0	25.0	0.0
Identification of the plant stages	100.0	0.0	0.0	0.0	0.0
Harvesting timing identification	0.0	0.0	0.0	100.0	0.0
Marketing accessibilities	0.0	25.0	0.0	75.0	0.0

SDA = Strongly disagree; DA = Disagree; UC = Uncertain; A = Agree; SA = Strongly agree

Table 12 Summary of paired samples t-test results for information sources

Variable	Information source	Mean	SD	t-value	df	p-value (2-tailed)	Interpretation
Received information	Social media	73.00	45.93	3.89	5	.011	Significant
	Mass media	33.30	103.65	0.78	5	.467	Not significant
Knowledge of information sources	Social media	44.66	100.81	-1.08	5	.027	Significant
	Mass media	92.33	106.21	2.12	5	.086	Not significant
Ease of using information sources	Social media	80.33	133.62	1.40	5	.201	Not significant
	Mass media	89.66	109.48	2.00	5	.101	Not significant
Mostly used information source	Social media	24.00	85.82	0.68	5	.024	Significant
	Mass media	52.00	57.24	2.20	5	.047	Significant
Faced obstacles while using information sources	Social media	65.40	67.26	2.10	4	.015	Significant
	Mass media	28.60	117.20	0.54	4	.614	Not significant
Overall respondent score	Social media	24.44	109.90	1.20	28	.041	Significant
	Mass media	16.58	106.40	0.83	28	.408	Not significant

SD = Standard deviation; df = Degree of freedom

Discussion

The results indicated that respondents in the middle-age group (36–50 years) were using social and mass media to enhance their agricultural productivity. Waseem (2017) found that young age is very energetic for the adoption process. The middle-age is the part of innovator category of the adopter, in this stage; the energetic farmers easily pursue innovation and adoption of mass media users. The social media users belonged to the middle age and respondents of all age were involved in farming occupation. The middle-aged farmers strongly accepted the adoption of innovation on the agricultural and socio-economic development.

Khan (2017) determined the majority of the farmers in Pakistan were based on farming because of a lack of capital formation and a low ratio of education hence they only depend on farming. The majority focused on their available sources of income generation such as livestock, agriculture production, forest, poultry, fishery, etc. due to low accessibility of social and mass media the farmers faced problems to adopt it. 24.3 percent of the social media users had matric education. Education is the basic component of understanding modern innovative technologies. The education levels of social and mass media adopters were very low. Sabir (2019) mentioned that a high education level of education is important for better understanding of innovation and its impact on their rural development. The result of this study showed that the level of higher education is very low among those farmers who are utilizing the sources of social media.

54.1 percent of the social media users mentioned that they had up to 5 acres of land. The adoption of social media is directly linked with the cultivated land. The maximum farming community in the research area had land up to 12.5 acres (small farmers). Marital status and family structure can provide individuals with greater opportunities for independent decision-making at different stages of technology adoption (Malabayabas et al., 2023). In Pakistan, married couples may have greater autonomy in making such decisions because they are often involved in family planning and decision-making concerning their

future (Tunio et al., 2026). It may be concluded from the result that majority of social media users were the married respondents. It was concluded that farming community of the studied area had access to social and mass media more over agricultural information (i.e., crop production technologies, climate pattern, innovative tools, and modern machinery) had already been disseminated to them through these platforms. These results showed that percent of the owners is more than rest of the tenancy status. The large numbers of social media users in the study area are those who cultivated their own land as compared to tenants. Similar to our findings, Bilawal (2019) mentioned that the most of them were experienced farmers, belonging to middle class families and had easy access to social and mass media information. Farming community of the studied area was having awareness about social and mass media as well. Consequently, a substantial proportion of the farming community faced challenges in using social and mass media, which ultimately hindered their adoption of digital agriculture.

The findings of this study showed that the length of farmers' experience in agricultural activities was an important factor influencing on-farm productivity. Our study concludes that most of the farming community had low farming experience up to 10 years, while the minimum number of respondents had more than 30 years of experience. Data was collected to know about the source of income of the respondents. To check the source of income, six categories were formed. It was necessary to collect the sources of income of respondents because it can add to the better living conditions and the overall situation of the farmers. It may be concluded from above result crops and livestock were the main sources of income of the respondents. The adoption and diffusion of social and mass media increased during the 21st century (Bilawal, 2019). The covid-19 increased the use of social and mass media in life. It increased the knowledge of the farmers regarding agricultural practices and their production. It may be recorded maximum 6 to 10 years' experience as compared to 5 years' experience of using social and mass media in perspective of agricultural innovation. According to Mary (2016), it provided a sample and easy way of conveying and sending any kind of information and communication. It introduced the different programming systems in form of mass

media and social media. Day by day, utilization of mass media tools such as television, radio, telephone, sample mobile, smart mobile, laptop, computer, and tab, etc. are increasing in number. The results indicated that farmers of the study area used 100 percent mobile and half of them used television.

Our findings depicted that 92.5 percent of the respondents used WhatsApp for the dissemination of agricultural technologies and strategies for enhancing productivity. The second highest-rate 80 percent of users recorded with the surfing of YouTube. 79.2 percent of the users also stated that they also use Facebook as a source of information and communication for the adoption of technologies and connect with different friends. All 100 percent of mass media users stated that they were using the radio for awareness about the production of the crops. Half 50.8 percent of them are watching television for seeking information about agriculture production and related climate nature. The findings of this study are consistent with those of Grover et al. (2019), who reported that online communication through WhatsApp increased the adoption and diffusion of agricultural practices among youth by 90%. Our study showed that social media, especially Facebook, had increased the social interaction between different languages, cultures, and international nationalities. These increased the online class opportunities and labor training services. Our results showed that the knowledge and importance of social media play vital role in farmers' knowledge regarding agricultural practices. 29 percent of them stated that they received fair agricultural practices through radio. 12.5 percent of the farmers stated that they are using the radio with good command to enhance the agriculture knowledge. It may be concluded from above mentioned awareness level of the different tools of social and mass media; radio was maximum farmers used in the study area and second WhatsApp.

Conclusion and Recommendations

It is concluded from the results that the majority of farmers belong to middle and matric education which adopted the social and mass media. They had up to 5 acres of land and they owned their land as owners. All social and mass media users have mobile and radio, half of them use television, is social and mass media tools. It provided a simple and easy way of conveying and sending any kind of social media communication. The 21st century increased the innovation of internet things. Social media increased the numbers of social and mass media tools, such as television, radio, telephone, sample mobile, smart mobile, laptop, computer, and tab, etc. Almost were utilizing WhatsApp as a social media for connecting with agricultural-related services. The entire beneficiary of the media highly faced with the lack of internet services, education, awareness in form of skills, and high taxes these services are the main constraints in the adoption and diffusion of the media sources. Several studies showed that in the village area's the farmers need more attention

towards the internet services, with high speed, local language knowledge, and low taxes or free taxes for agricultural production and increased the education level of the users of social media sources. It will improve the production rate of farmers. The extension services generating very high difficulties in the diffusion of social and mass media. They ignored their line of connection. It generated a high level of constraint by keeping themselves offline. The majority of extension services providers working in a favoritism manner. They had a low level of knowledge about social media; they also faced a high level of hurdle in a clear voice and its description. Several countries adopted the agricultural extension education method for the purpose of transferring knowledge and skill about the innovation of the 21st century. The interaction of the extension services increased the diffusion of social media. Majority of social media users were using it for communicating with friends, family, colleagues, community members, and agricultural officers and watching the news for one hour a day. They utilize the television, radio, mobile, laptop, and computer to watch the news from the internet, and radiofrequency are using for reasoning. In some areas, social media increased the social and economic status of its users. Based on our findings, it is recommended that to increase skill and agricultural knowledge about modern production technologies, the government of Punjab should systematize and raise non-formal education. Government of Pakistan should strengthen the private media and telecommunication companies to disseminate agricultural information among the rural community. It is suggested to organize the short-term training session about the awareness of social and mass media technologies for the better dissemination of the agricultural practices.

Declarations

i. Ethics approval and consent to participate

This study did not require formal ethical approval from an institutional review board, as per the policies of the researcher's affiliated institution. However, all ethical considerations for social research involving human participants were carefully followed. Informed consent was obtained from all participating farmers prior to data collection. Participation was entirely voluntary, and confidentiality and anonymity of responses were ensured.

ii. Consent for publication

Consent for publication is not applicable, as the study does not include any identifying information or personal data of individual participants.

iii. Data availability

All data generated or analyzed during this study are included in this article.

iv. Competing interests

Author has declared that no competing interests exist.

v. Authors' contributions

The author is solely responsible for all aspects of the study and manuscript preparation.

vi. Funding

No funding was received for the design, data collection, analysis, interpretation, or writing of this research manuscript.

vii. Acknowledgement

Not applicable.

viii. SDGs addressed

Zero Hunger (SDG 2), Decent Work and Economic Growth ((SDG 8), Industry, Innovation and Infrastructure (SDG 9)

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