

A Research Paper About Influence of Social Media in Agriculture Marketing With Reference to India

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Abstract

Conventionally newspapers, television, and magazines have controlled agricultural information interchange. Since the introduction of social media, communication is transforming into a new dynamic every day. Platforms like Facebook and WhatsApp have 346.2 million [10] and 400 million [11], active users, as of 2020. Communication has become virtual more than physical. People, young or adult, remain influenced by social media and it is a trend that is not going down very soon. Despite all the advantages, its exact use in rural areas of developing countries is still low due to infrastructural difficulties and psychological barriers. Skill and proficiency in using social media are lacking. The survey on the use of social media in agriculture marketing conducted using a questionnaire, 103 respondents provided fascinating results. WhatsApp was found to be the most popular social media platform used by participants. The principal source of information for the participants was determined to be in contact with farmers. A majority of participants admitted that infrastructure, lack of technical knowledge, and lack of understanding of working on social media are some of the challenges in adopting social media. Most of the participants also acknowledged that there is a need for training and creating awareness to popularize the practice of social media. The current pandemic has created innovative opportunities for use of social media in agriculture marketing. Overall, we can state that social media plays an influential role in agriculture marketing.

Keywords : Agriculture, farmers, marketing, pandemic, social media

I. INTRODUCTION

Agriculture is essential to India's economy. It is the primary source of livelihood for about 58% of India's population. Gross Value Added (GVA) by agriculture, forestry, and fishing was estimated at ₹ 19.48 lakh crores (US \$ 276.37 billion) in FY20. India has the 10th largest arable land resource in the world. With 20 agriculture climatic regions, all the 15 major climates in the world exist in India. The country also has 46 of the 60 soil types in the world. India is the largest producer of spices, pulses, milk, tea, cashew, and jute, and is the second-largest producer of wheat, rice, fruits and vegetables, sugarcane, cotton, and oilseeds. Further, India stands second in the global production of fruits and vegetables and is the largest producer of mango and banana. During

the 2019–2020 crop year, food grain production was estimated to reach a record of 295.67 million tonnes (MT). In 2020–21, the Government of India is targeting food grain production of 298 MT [9]. Despite this, most of the Indian farmers have remained quite poor.

Governments at the central and state level have a lot of conflicts and dents prevailing in the marketing of agricultural products. The high rate of agents involved in the buying and selling of agricultural goods results in disappointment, false practices in determining the price earned by farmers, and the price paid by the buyer. In India, traditional marketing methods for agricultural products are used, where goods are purchased and sold in a bazar which are accessible in nearby marketplaces. Since agriculture is vital to India's economy, there is a need for prevailing and appropriate information for sustainable

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agricultural production. Agricultural knowledge transfer has been ruled by media such as newspapers, television, and radio. However, in recent years, technology awareness, computer knowledge, and acceptance of smartphones, and the internet are progressing beyond all demographics in India. It is staggering to believe that in two short decades, the internet and social media have advanced so much. It was only in 1991 that the World Wide Web became known, only around 22 years since Google was founded and only 16 years since Facebook was founded. We now breathe in a system where questioning about the unexplained is usually accompanied by the expression “Google it”. Social media is the modern form of digital communication and on a global scale, we can love it, we can dislike it but it cannot be neglected anymore. Social media is more about sociology and psychology of communication than about technology. The remarkable growth of social media can often be associated with the public platform it presents to people to share their opinions and create their content, be it texts, images, sound clips, or videos, also the affordability of these platforms as they can be reached without acquiring additional charges. The popularity of social media platforms to the audience is like never before owing to the elevated reach of internet enabled mobile phones. Social media sites earned their following because not only they connected friends and family but also the huge potential of communication was realized soon and it started finding its use in professional communication. The preferences of social media platforms are still different based on their purpose. Social media has excellent potential to be used as a tool of expression and networking for the benefits of the agricultural community.

What is Social Media ?

Social media refers to the means of communication between people in which they create, share, consume, and exchange data and opinions in virtual societies and networks. Social media is any digital medium that enables users to instantly generate and share content with the public.

Why Social Media in Agriculture ?

Is social media relevant to agriculture? While many of us would never think to connect farmers with WhatsApp, Facebook, and Twitter, they represent a large number of

active users on social networking sites. According to some farmers, social media is essential information means for farmers to connect with their industry. It can help farmers create a unique voice. It can help farmers stand out among the competition and build brand consciousness. This is particularly important for farmers who directly market their goods. When it comes to food, buyers often look for transparency, that is, businesses that are honest about their practice. Social media is a great way to provide consumers with more knowledge about what occurs in your work regularly. It can help unite you with new customers and improve connections with existing buyers, that is, direct buyers, restaurants, chefs, etc., that you would not have encountered otherwise. Social media also offers a chance to receive feedback about your work and to discover more about what your target audience genuinely requires. If farmers are enthusiastic about certain aspects of food production, like organics, you can use it to train the population about it. The warning here is to make certain that you are presenting accurate knowledge in a suitable tone. It can help link farmers with other farmers and agribusiness experts. Farming can be an isolating task at times. An unpredictable schedule or dwelling in a rural area can make occasions for socializing with other producers rather rare. Social media can provide a digital way to unite with other farmers in your neighborhood throughout the country or even overseas. Uniting with other farmers and studying their social media pages cannot only help farmers get inspiration, but it may also help farmers discover new ways to enhance production.

Advantages

↳ **Networking** : It is a means for an individual to interact with others to exchange knowledge and expand professional or social connections.

↳ **Collaborating** : Working mutually towards a shared purpose. Using each other's assets and resources to accomplish results that are more beneficial.

↳ **Crowdsourcing** : Obtaining required assistance, thoughts, content, or input in responsibility by requesting participation from a wide group of people typically through the internet.

↳ **Consulting and Discussion** : Asking advice from experts working in the field. Exchanging viewpoints about topics in open and informal debate.

↳ Engaging – Making users share experience, connect, and participate.

Disadvantages

Knowledge is one of the most crucial inputs in agriculture; a shortage of genuine information can do more harm than good to the farmers. Due to the distribution of content and weak copyright rules due to public access to data, duplication of data is very high which might cause obtaining genuine content harder.

The volume of content created on particular topics is very high and the absence of monitoring presents problems at times. This enormous amount of data may mislead inexperienced users and can be more harmful than beneficial.

II. LITERATURE REVIEW

Thakur and Chander [1] concluded that the popular social media tools, that is, Facebook, WhatsApp, and YouTube are being used for knowledge delivery and sharing across different agriculture subsectors in India. Most of them are by individual struggles. There is a definite lack of organized efforts to use social media from the public extension system in India.

Zipper [2] concluded that Twitter is a useful data source for monitoring spatiotemporal dynamics of planting progress for major crops at the U.S. state level, with results comparable to traditional survey-based crop progress reports across a sample of 10 states and crops. Data from social media also provide additional contextual information.

Balkrishna and Deshmukh [3] concluded that farmers are making use of social media for innovative applications, sharing information etc. The most popular social media in agricultural marketing are Facebook, YouTube, and WhatsApp.

Mukherjee, Joshi, Sharma, Raksha, and Mahra [4] concluded that social media offers amazing opportunities for farmers. It can help farmers seek information on farm operations, clarify their doubts on plants/ livestock disease symptoms and can have immediate access to market-related information. However, this can be possible only when farmers are socially networked with human resources like agricultural researchers, extension agents, progressive farmers, sellers and other buyers in virtual space. The power of social media can be harnessed

and will be beneficial for farming communities.

Adio, Abu, Yusuf, and Nansoh [5] concluded that the available information sources utilized by farmers and the state were co-workers, television, mobile phones, radio and relations of farmers. Farmers used free information sources and services to know how to preserve and process raw agricultural produce using new post-harvest technology and to increase productivity. Other purposes of using available information sources and services were the marketing of agricultural produce. The problems in providing information sources and services are the inadequacy of required agricultural information sources, illiteracy, and unavailability of extension workers in Kwara State.

Jijina and Raju [6] concluded that social media can contribute a lot to the agricultural area for better production and marketing. Barriers to the use of social media incorporate a lack of easy and costly internet connection and a lack of experience and expertise. Precise training, internet connectivity, and availability of apps with easy user interfaces will develop the present usage of social media in particular for the improvement of agriculture.

Lathiya, Rathod and Choudhary [7] concluded that social media is a mainstream form of communication around the world and continues to growth in fame with the increment in the number of smartphones. Different industries have adopted these platforms in consumer engagement but it is not widely accepted in India.

White, Meyers, Doerfert and Irlbeck [8] concluded that participants became active using social media to defend against negative messages about agriculture. The study further found out that participants manage their social media presence and balance responsibilities. Overall, the study concluded that the farmers were positive about the use of social media for their operations.

The objectives of the study are :

- (1) To study how agricultural marketing can be enhanced by using social media as a medium of exchange and information seeking.
- (2) To explore various challenges in adopting social media as a marketing medium in agricultural marketing.
- (3) To study the role of social media in agriculture marketing.
- (4) To study if participants are willing to use social media

for various agriculture marketing purposes.

(5) To study factors that have an impact on the use of social media in agriculture marketing.

III. RESEARCH METHODOLOGY

The structured survey questionnaire was specifically developed for this study using Google Forms and circulated through social media platforms like WhatsApp and emails with an appeal for farmers to fill the survey. 103 respondents responded to the survey. Data were analyzed through descriptive statistics using SPSS, Anaconda Jupyter software, and R Studio.

TABLE I.

CROSSTAB BETWEEN EDUCATION AND SOCIAL MEDIA ACCOUNT

Social Media Account	No	Yes
Education		
Graduate and Above	6	39
Just Literate (Upto 4 years of Schooling)	2	10
Under Graduate	12	34

IV. FINDINGS

A. Personal Details of the Respondents

The data shows that major respondents were from the

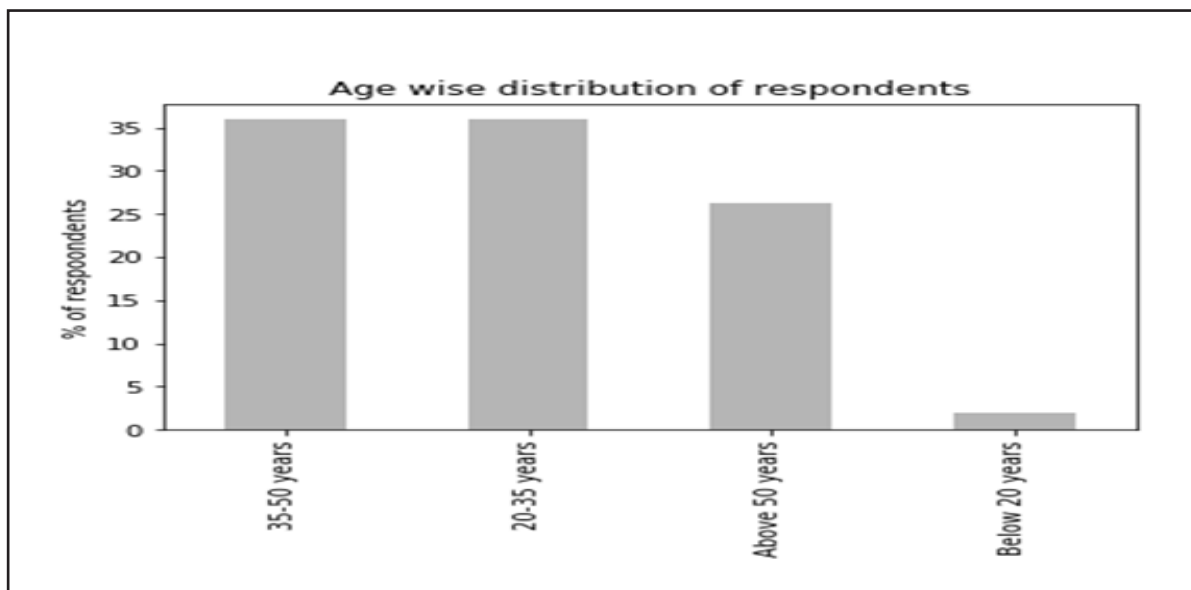


Fig. 1. Age Wise Distribution of Respondents

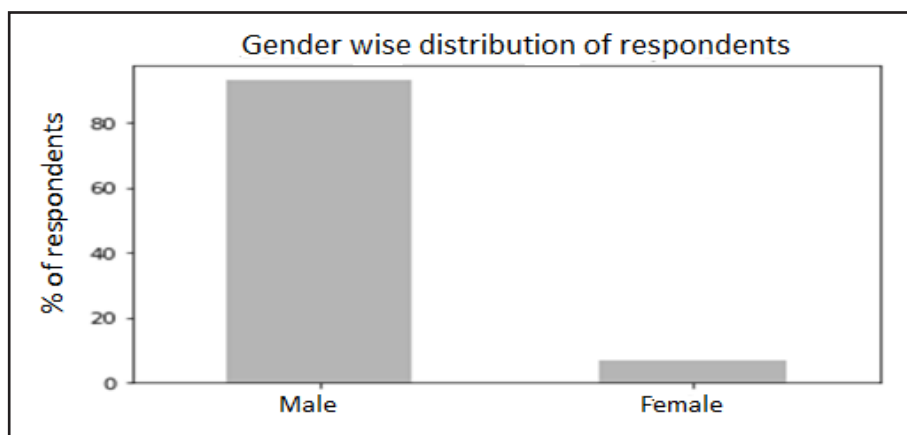


Fig. 2. Gender Wise Distribution

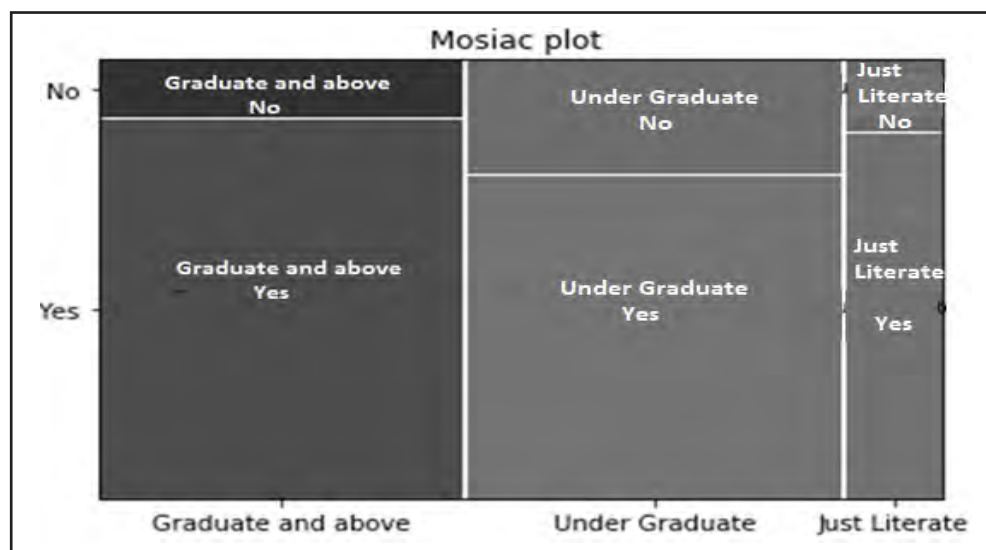


Fig. 3. Mosaic Plot for Education and Social Media Account

age group of 20–35 years and 35–50 years, that is, 35.92%. Below that the age group is and above 50 years, that is, 26.21%, below 20 years is 1.94% (Fig. 1).

The data shows that majority of the respondents were male, that is, 93.2% and female respondents were 6.8% (Fig. 2).

The data shows that 86.66% of graduates and above have social media account, 83.33% of just literate respondents have social media account and 73.91% of under graduate respondents have social media (Table I, Fig. 3). Overall 80.58% of all respondents have social media accounts.

B. Social Media Participation

The data shows that most of the respondents are visiting social media daily, that is, 80.58%, 11.65% visit social media occasionally, 5.83% visit weekly, and 1.94% visit social media monthly (Fig. 4).

The study identified WhatsApp as the most preferred social media platform by a large majority of the respondents (60.19%) followed by Facebook (40.77%), YouTube (33.98%), Instagram (33.00%), Twitter (39.80%), and LinkedIn (48.54%) (Fig. 5).

C. Sources of Information

The data shows that contact with farmers is the most used source of information by respondents which is 75.72% followed by television (50.48%), social media, and radio set (33.98%), extension agents (20.38%), workshop/conference/ agriculture exhibitions (13.59%) (Fig. 6).

D. Reasons of Using Social Media

Exchanging information in the form of conversations is becoming influential activity on social media platforms, particularly for agriculture practitioners as it continued to be an obvious from the responses in the survey. Agriculture marketing can be divided in two parts. One consists of activities involved in procurement of farm inputs and movement of agriculture produce from farms to

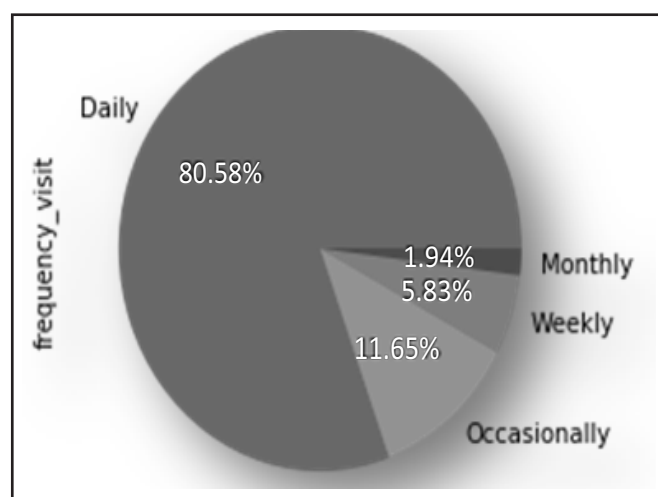


Fig. 4. Frequency of Visit

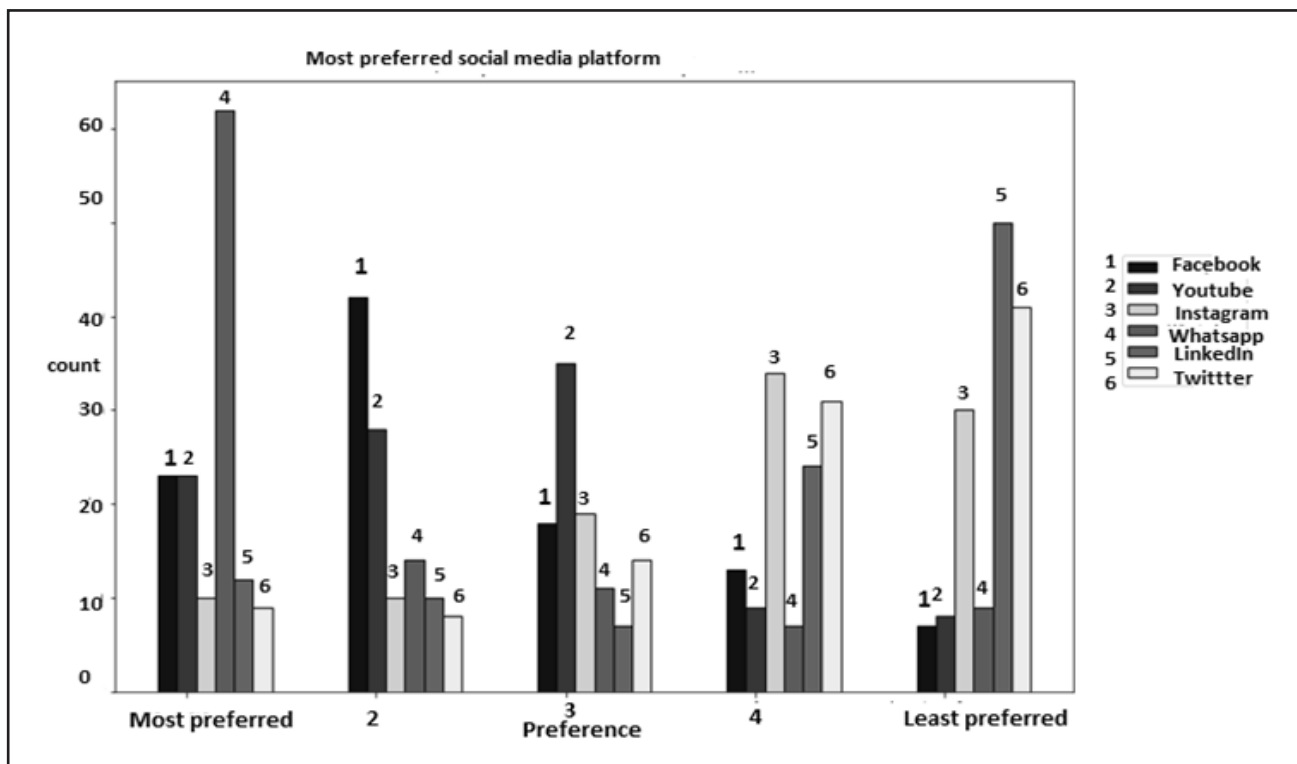


Fig. 5. Preference for Social Media

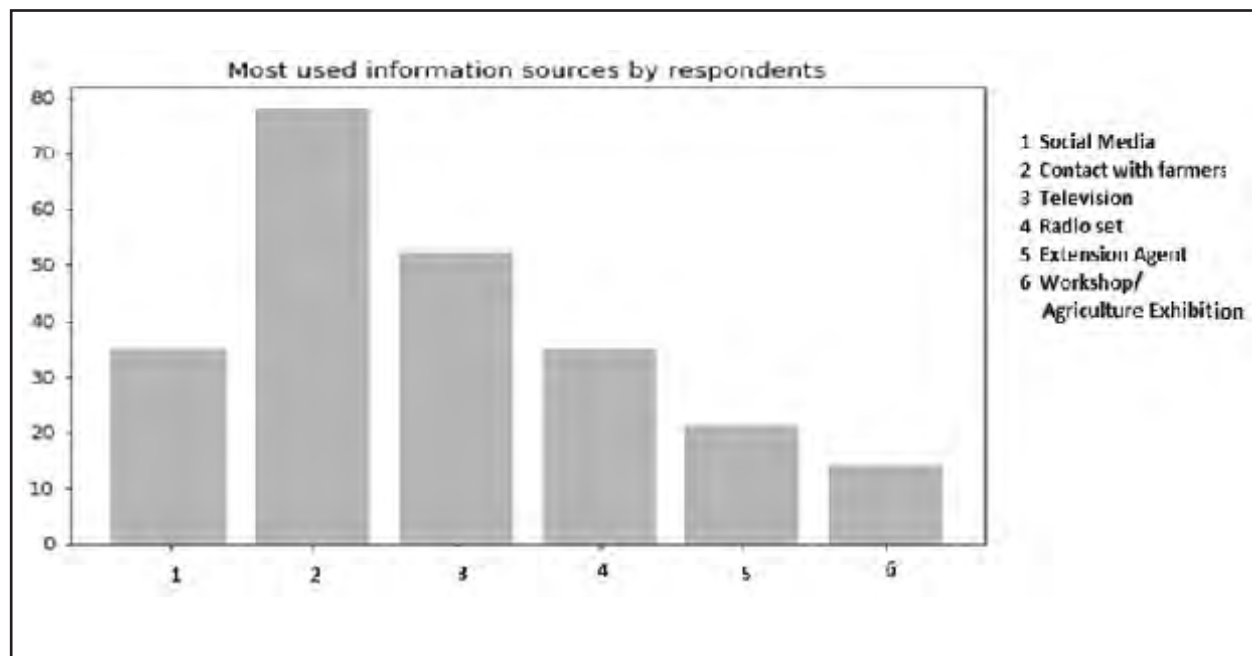


Fig. 6. Most Used Information Source

customers. The data shows that most of the respondents are likely willing to use social media for various purposes of agriculture marketing (Fig. 7) ; 69.90% respondents are likely to use social media for seeking information,

67.96% for sharing information, 36.89% for buying agriculture instruments, 69.90% for knowing current market price, 66.01% for branding agriculture produces, and 64.07% for selling agriculture produce (Table II).

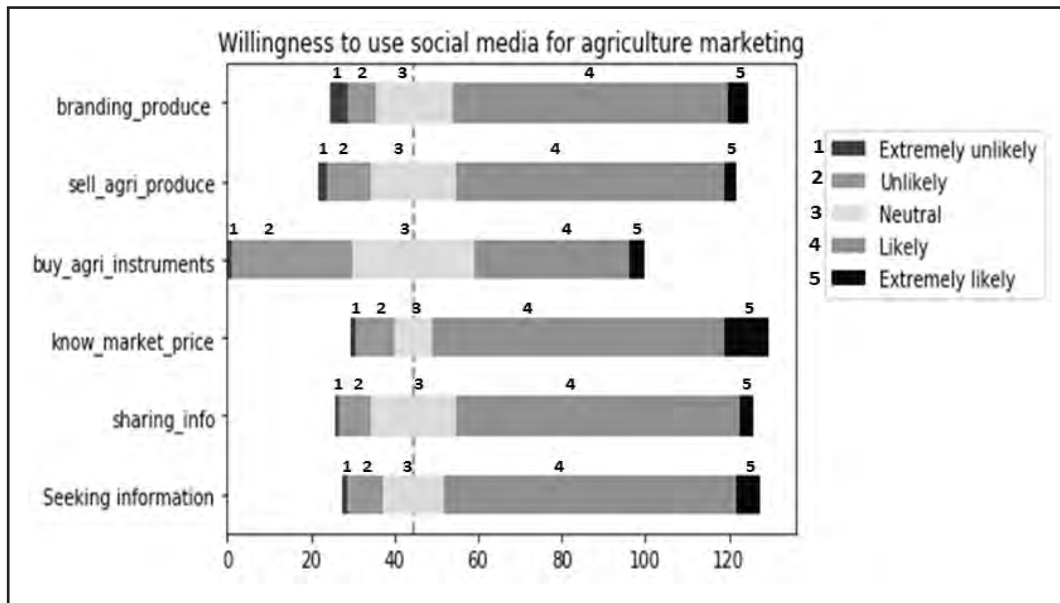


Fig. 7. Likert Scale Representation of Willingness

**TABLE II.
PERCENTAGE REPRESENTATION OF WILLINGNESS**

Seeking Information :				
Extremely Likely	Extremely Unlikely	Likely	Neutral	Unlikely
5.8252427	0.9708738	69.9029126	14.5631068	8.7378641
Sharing Information :				
Extremely Likely	Extremely Unlikely	Likely	Neutral	Unlikely
2.9126214	0.9708738	67.9611650	20.3883495	7.7669903
Buy Agriculture Instruments				
Extremely Likely	Extremely Unlikely	Likely	Neutral	Unlikely
3.8834951	0.9708738	36.8932039	29.1262136	29.1262136
Knowing Current Market Price :				
Extremely Likely	Extremely Unlikely	Likely	Neutral	Unlikely
10.6796117	0.9708738	69.9029126	8.7378641	9.7087379
Branding Agriculture Produce				
Extremely Likely	Extremely Unlikely	Likely	Neutral	Unlikely
4.854369	3.883495	66.019417	18.446602	6.796117
Selling Agriculture Produce				
Extremely Likely	Extremely Unlikely	Likely	Neutral	Unlikely
2.912621	1.941748	64.077670	20.388350	10.679612

Awareness About Social Media Pages

The data shows that most of the respondents are not at all aware of various social media pages which help them for various agriculture-related activities (Fig. 8). WhatsApp being the most preferred social media

platform by the respondents. Nearly 30.09% of respondents are not at all aware of groups that help farmers in various agriculture-related activities. Approximately 60% of the participants are not at all aware of ITC e-Choupal (Table III).

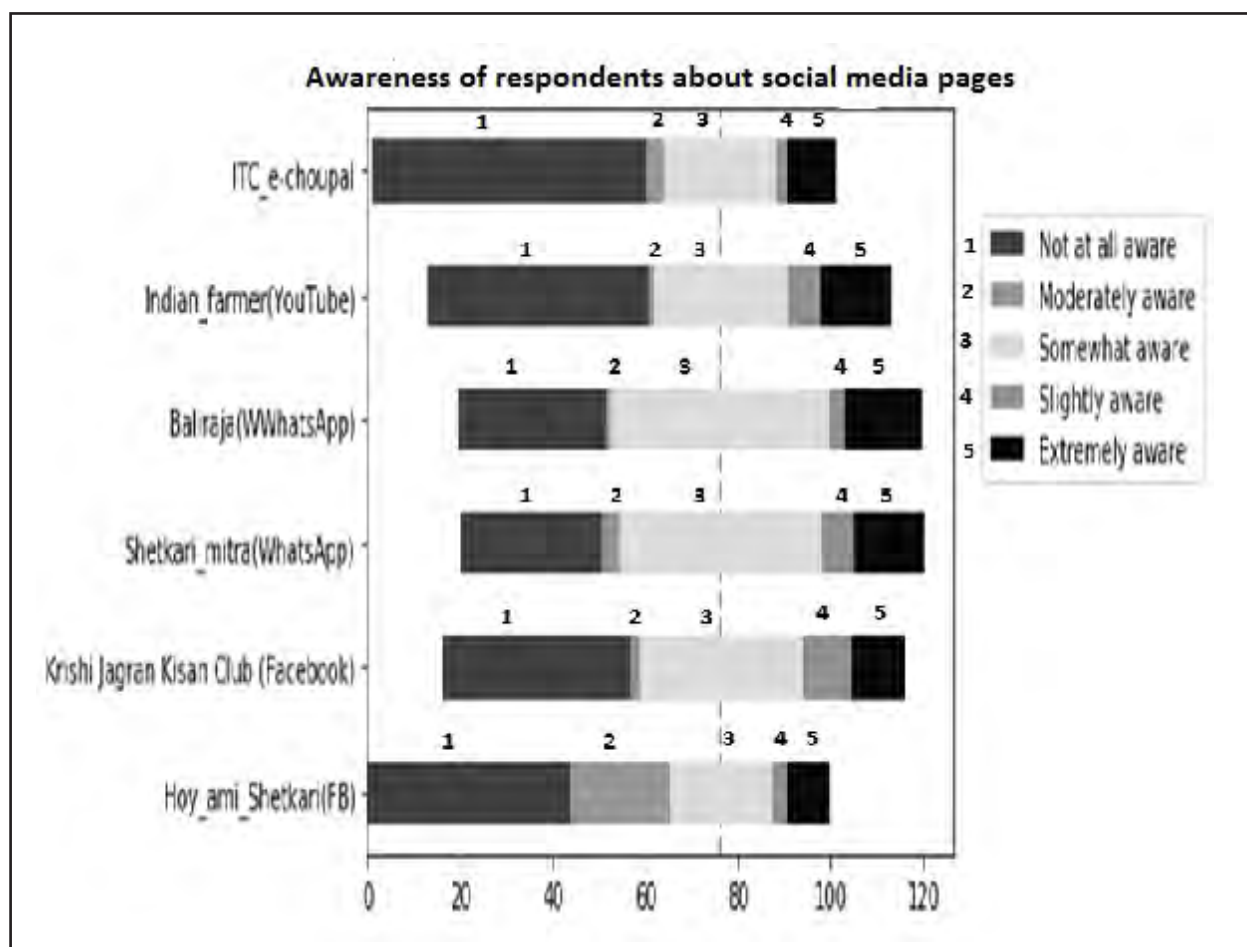


Fig. 8. Likert Scale Representation of Awareness

TABLE III.

PERCENTAGE REPRESENTATION OF AWARENESS

	Extremely Aware	Moderately Aware	Not at All Aware	Slightly Aware	Somewhat Aware
HAS(FB)	9.708738	21.359223	43.689320	2.912621	22.330097
SM(W)	15.533981	3.883495	30.097087	6.796117	43.689320
IF(Y)	15.5339806	0.9708738	47.5728155	6.7961165	29.1262136
KJ(FB)	11.650485	1.941748	40.776699	10.679612	34.951456
B(W)	16.5048544	0.9708738	32.0388350	2.9126214	47.5728155
E-choupal	10.679612	3.883495	59.223301	1.941748	24.271845

E. Challenges

The data showed that 61.17% of respondents agree that infrastructure is a challenge faced in adopting social media for agriculture marketing, 64.08% agree that lack of educational and technical literacy is a challenge.

F. Factors that have an Impact on Willingness to use of Social Media for Agriculture Marketing

↳ H_0 : Form of agriculture has no impact on willingness to use of social media for agriculture marketing.

↳ H_1 : Form of agriculture has impact on willingness to use social media for agriculture marketing.

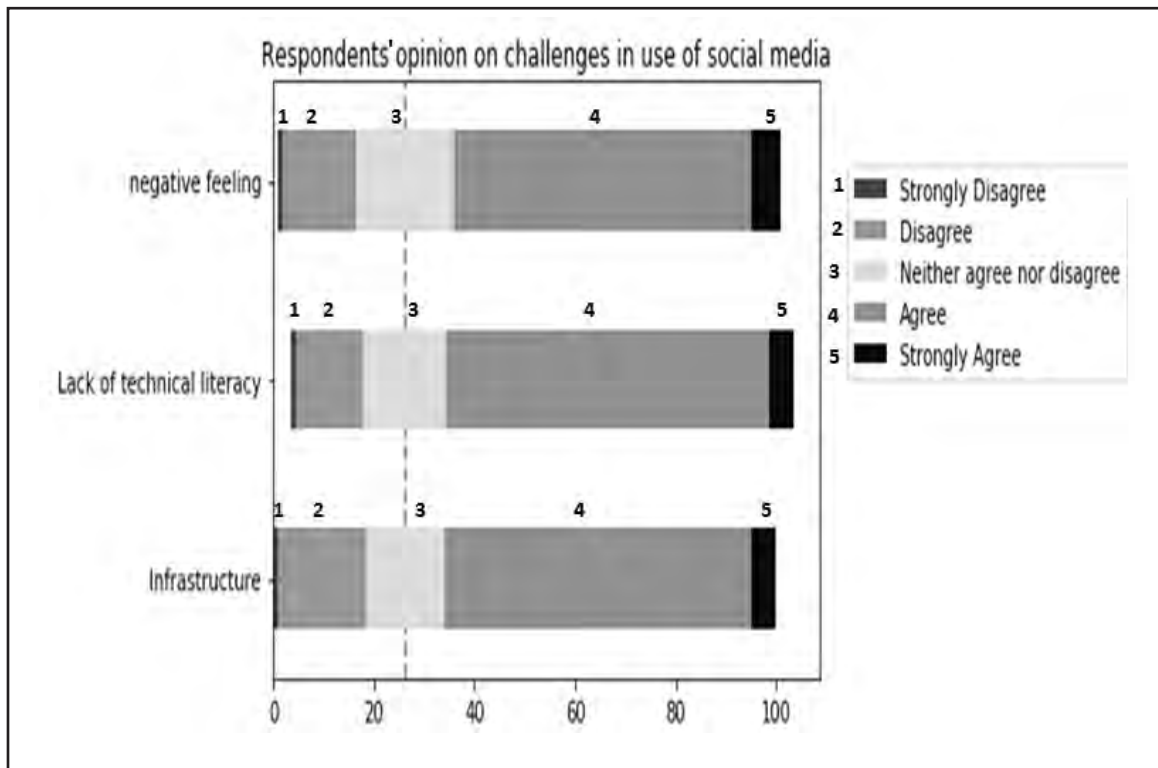


Fig. 9. Likert Scale Representation of Challenges

TABLE IV.
PERCENTAGE REPRESENTATION OF CHALLENGES

	Agree	Disagree	Neither Agree or disagree	Strongly Agree	Strongly Disagree
Infrastructure	61.17	17.48	15.53	4.85	0.97
Lack Tech lit	64.08	13.59	16.50	4.85	0.97
Lack Understanding	59.22	14.56	19.42	5.83	0.97
Encourage Positive Attitude	71.84	2.91	14.56	9.71	0.97
Need Awareness	70.87	1.94	18.45	7.77	0.97

Since p -value > 0.05 for willingness to use social media for seeking information, sharing information, buying agriculture inputs, knowing current market price. Therefore, we do not reject H_0 .

p -value < 0.05 for willingness to use social media for branding and selling agriculture produce, therefore, we reject H_0 and conclude that form of agriculture has an impact on willingness to use social media for branding and selling agriculture produce (Table V).

↪ H_0 : Type of land holding has no impact on willingness to use of social media for agriculture marketing.

↪ H_1 : Type of land holding has an impact on willingness to use of social media for agriculture marketing.

Since p -value > 0.05 for willingness to use social media for seeking information, sharing information, buying agriculture inputs, knowing current market price and selling agriculture produce, therefore we do not reject H_0 .

p -value < 0.05 for willingness to use social media for branding agriculture produce, therefore, we reject H_0 and conclude that type of land holdings has an impact on willingness to use social media for branding agriculture produce (Table VI).

↪ H_0 : Purpose of farming has no impact on willingness to use of social media for agriculture marketing.

↪ H_1 : Purpose of farming has impact on willingness to use of social media for agriculture marketing.

Since p -value > 0.05 for willingness to use social media for seeking information, sharing information, buying agriculture inputs, branding and selling agriculture

TABLE V.
FORMS OF AGRICULTURE

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Seeking Information	Between Groups	2.966	2	1.483	2.731	0.070
	Within Groups	54.296	100	0.543		
	Total	57.262	102			
Sharing Information	Between Groups	2.977	2	1.488	3.054	0.052
	Within Groups	48.732	100	0.487		
	Total	51.709	102			
Buy Agriculture Instruments	Between Groups	0.710	2	0.355	0.416	0.661
	Within Groups	85.387	100	0.854		
	Total	86.097	102			
Sell Agriculture Produce	Between Groups	6.591	2	3.296	5.598	0.005
	Within Groups	58.865	100	0.589		
	Total	65.456	102			
Know Market Price	Between Groups	3.311	2	1.656	2.696	0.072
	Within Groups	61.407	100	0.614		
	Total	64.718	102			
Branding Produce	Between Groups	6.919	2	3.460	5.278	0.007
	Within Groups	65.547	100	0.655		
	Total	72.466	102			

TABLE VI.
TYPE OF LAND HOLDINGS

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Seeking Information	Between Groups	3.434	4	0.859	1.563	0.190
	Within Groups	53.828	98	0.549		
	Total	57.262	102			
Sharing Information	Between Groups	4.501	4	1.125	2.336	0.061
	Within Groups	47.208	98	0.482		
	Total	51.709	102			
Buy Agriculture Instruments	Between Groups	4.354	4	1.089	1.305	0.273
	Within Groups	81.743	98	0.834		
	Total	86.097	102			
Sell Agriculture Produce	Between Groups	3.182	4	0.795	1.252	0.294
	Within Groups	62.274	98	0.635		
	Total	65.456	102			
Know Market Price	Between Groups	4.289	4	1.072	1.739	0.148
	Within Groups	60.429	98	0.617		
	Total	64.718	102			
Branding Produce	Between Groups	7.217	4	1.804	2.710	0.034
	Within Groups	65.249	98	0.666		
	Total	72.466	102			

produce, therefore, we do not reject H_0 .

p -value < 0.05 for willingness to use social media for knowing current market price, therefore we reject H_0 and

conclude that purpose of farming has an impact on willingness to use social media for knowing current market price (Table VII).

TABLE VII.
PURPOSE OF FARMING

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Seeking Information	Between Groups	0.218	2	0.109	0.191	0.827
	Within Groups	57.045	100	0.570		
	Total	57.262	102			
Sharing Information	Between Groups	1.590	2	0.795	1.586	0.210
	Within Groups	50.119	100	0.501		
	Total	51.709	102			
Buy Agriculture Instruments	Between Groups	3.998	2	1.999	2.435	0.093
	Within Groups	82.099	100	.821		
	Total	86.097	102			
Sell Agriculture Produce	Between Groups	1.278	2	.639	.996	0.373
	Within Groups	64.178	100	.642		
	Total	65.456	102			
Know Market Price	Between Groups	4.348	2	2.174	3.601	0.031
	Within Groups	60.370	100	.604		
	Total	64.718	102			
Branding Produce	Between Groups	2.924	2	1.462	2.102	0.128
	Within Groups	69.542	100	.695		
	Total	72.466	102			

TABLE VIII.
EDUCATION

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Seeking Information	Between Groups	0.458	2	0.229	0.403	0.669
	Within Groups	56.804	100	0.568		
	Total	57.262	102			
Sharing Information	Between Groups	0.605	2	0.302	0.592	0.555
	Within Groups	51.104	100	0.511		
	Total	51.709	102			
Buy Agriculture Instruments	Between Groups	4.134	2	2.067	2.522	0.085
	Within Groups	81.963	100	0.820		
	Total	86.097	102			
Sell Agriculture Produce	Between Groups	1.972	2	0.986	1.553	0.217
	Within Groups	63.485	100	0.635		
	Total	65.456	102			
Know Market Price	Between Groups	0.815	2	0.407	0.637	0.531
	Within Groups	63.904	100	0.639		
	Total	64.718	102			
Branding Produce	Between Groups	0.253	2	0.127	0.175	0.839
	Within Groups	72.213	100	0.722		
	Total	72.466	102			

↪ H_0 : Education has no impact on willingness to use of social media for agriculture marketing.

↪ H_1 : Education has impact on willingness to use of social media for agriculture marketing.

• Since p -value > 0.05 for willingness to use social media for seeking information, sharing information, buying agriculture inputs, knowing the current market price, branding, and selling agriculture produce, therefore, we do not reject H_0 and conclude that education has no

impact on various purposes of agriculture marketing

↪ H_0 : Age has no impact on willingness to use of social media for agriculture marketing.

↪ H_1 : Age has impact on willingness to use of social media for agriculture marketing.

Since p -value > 0.05 for willingness to use social media for seeking information, sharing information, branding and selling agriculture produce, therefore we do not reject H_0 .

TABLE IX.

		ANOVA				
		Sum of Squares	df	Mean Square	F	Sig.
Seeking Information	Between Groups	3.731	3	1.244	2.300	0.082
	Within Groups	53.532	99	0.541		
	Total	57.262	102			
Sharing Information	Between Groups	3.129	3	1.043	2.125	0.102
	Within Groups	48.580	99	0.491		
	Total	51.709	102			
Buy Agriculture Instruments	Between Groups	10.890	3	3.630	4.778	0.004
	Within Groups	75.207	99	0.760		
	Total	86.097	102			
Sell Agriculture Produce	Between Groups	2.051	3	0.684	1.067	0.367
	Within Groups	63.405	99	0.640		
	Total	65.456	102			
Know Market Price	Between Groups	3.059	3	1.020	1.637	0.186
	Within Groups	61.660	99	0.623		
	Total	64.718	102			
Branding Produce	Between Groups	0.590	3	0.197	0.271	0.846
	Within Groups	71.876	99	0.726		
	Total	72.466	102			

TABLE X.

SUMMARY OF ANOVA TESTS						
Purpose Factors	Seeking Information	Sharing Information	Know Market Price	Buy Agriculture Instruments	Branding Produce	Sell Agriculture Produce
Age	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0	Reject H_0 (has Impact)	Do not Reject H_0	Do not Reject H_0
Education	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0
Form of Agriculture	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0 (has Impact)	Do not Reject H_0 (has Impact)
Type of Land Holding	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0 (has Impact)	Do not Reject H_0
Purpose of Agriculture	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0 (has Impact)	Do not Reject H_0	Do not Reject H_0	Do not Reject H_0

p -value < 0.05 for willingness to use social media for buying agriculture inputs, therefore we reject H_0 and conclude that age has an impact on willingness to use social media for buying agriculture instruments.

G. Further Analysis

Further analysis was done using crosstabs. Results of cross tab shows that most of the respondents, that is, 47.57% of respondents with arable (crops) form of agriculture are likely willing to use social media for selling agriculture produce (Table XI, Fig.10) and 49.51% of respondents with arable form of agriculture

are likely willing to use social media for branding agriculture produce (Table XII, Fig. 11).

The data shows that 26.21% of the respondent having small land holdings are likely willing to use social media for branding their agriculture produce as compared to others (Table XIII, Fig. 12).

The data shows that 37.86% of the respondents have commercial purpose of farming, 27.18% of respondents have semi-subsistence purpose of farming, and 4.85% of respondents have subsistence purpose of farming and are likely willing to use social media for knowing current market prices (Table XIV, Fig. 13).

The data shows that 17% of the respondents in the age

TABLE XI.
CROSSTAB BETWEEN FORMS OF AGRICULTURE AND SALE OF AGRICULTURE PRODUCE

Sell Agriculture Produce	Extremely Likely	Extremely Unlikely	Likely	Neutral	Unlikely
Form of Agriculture					
Arable (crops)	1.941748	0.970874	47.572816	14.563107	7.766990
Mixed (crops and animals)	0.970874	0.000000	16.504854	5.825243	2.912621
Pastoral (animals)	0.000000	0.970874	0.000000	0.000000	0.000000

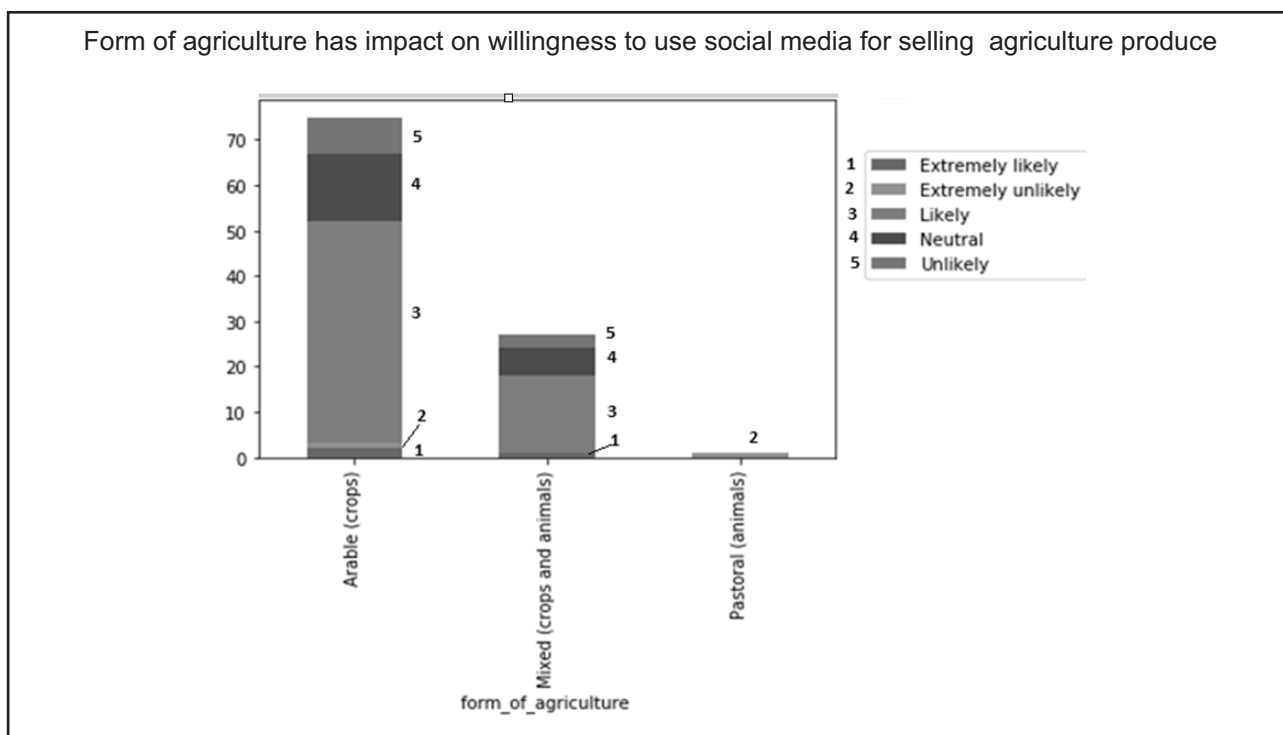


Fig. 10. Graphical Representation of Cross Tab Between Agriculture and Selling Agriculture Produce

TABLE XII.
CROSSTAB BETWEEN FORM OF AGRICULTURE AND BRAND AGRICULTURE
PRODUCE

Branding Produce	Extremely Likely	Extremely Unlikely	Likely	Neutral	Unlikely
Form of Agriculture					
Arable (crops)	1.941748	1.941748	49.514563	15.533981	3.883495
Mixed (crops and animals)	2.912621	0.970874	16.504854	2.912621	2.912621
Pastoral (animals)	0.000000	0.970874	0.000000	0.000000	0.000000

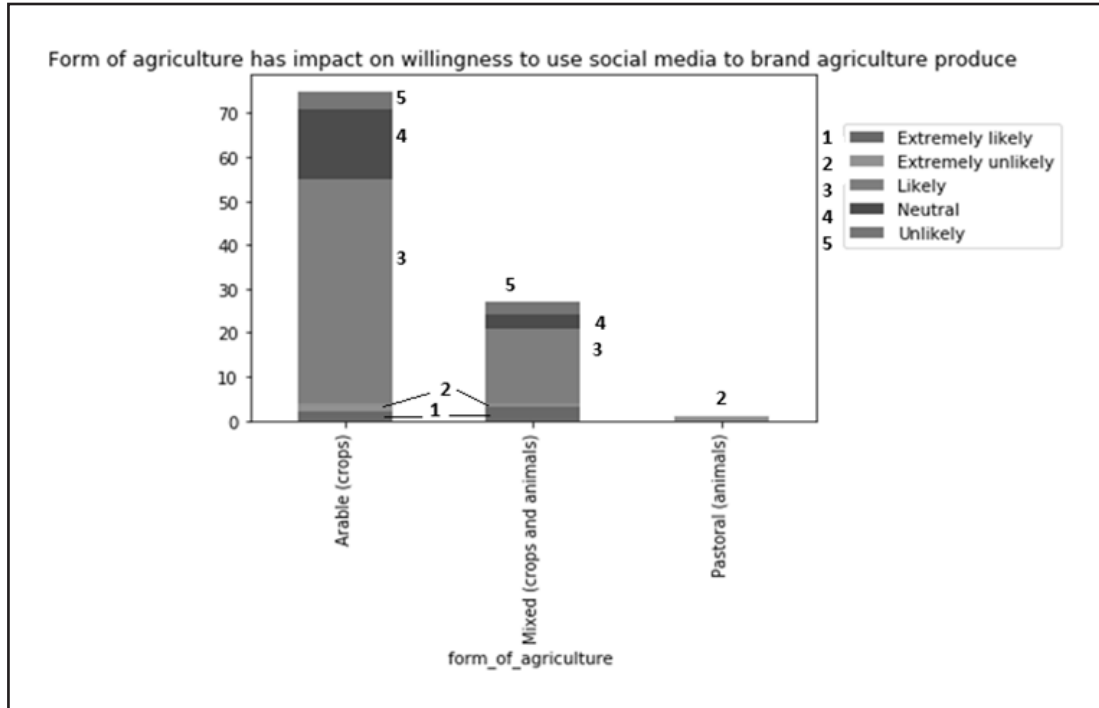


Fig. 11. Graphical Representation of Cross Tab Between Form and Brand Agriculture Produce

group of 20–35 years are likely willing to use social media for buying agriculture instruments (Table XV, Fig. 14). It also shows that 17.47% of respondents within the age group of 35–50 years are not likely to use social media for buying agriculture instruments.

H. Observations

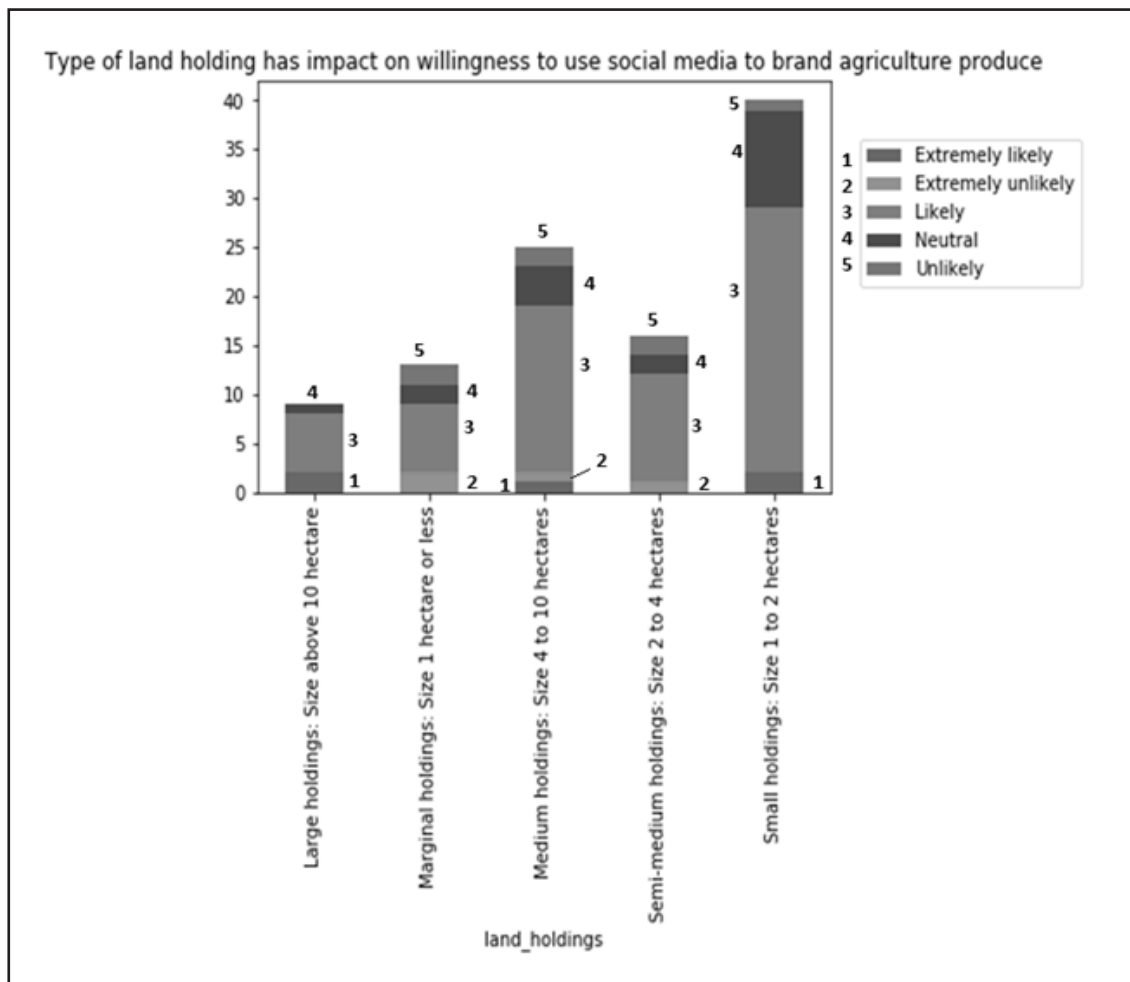
A farmer based in Talegaon Dabhade of Maharashtra wiped out his crop owing to the low price offered by the dealer. He complained that the dealers gave very less of the total expenditure made on the produce. However, he said that he could have got a better price if he sold in

distant markets which is not feasible due to transportation problems amid the lockdown. Similarly, he stated that farmers are struggling to sell their crop as markets remain closed amid the lockdown. He also stated that suddenly there were no buyers, restaurants, and hotels all closed down and domestic demand dipped severely because many fear that vegetables are handled by too many people. Apart from this, he complained of shortage of labor due to which selling his agricultural produce has become a difficult job. He also stated that farmers are oblivious about what to do as the prices in the market are increasing but the transportation cost is increasing amid lockdown leading to a decrease in profit for the farmers and above

TABLE XIII.

**CROSSTAB BETWEEN TYPE OF LAND HOLDING AND BRANDING AGRICULTURE
PRODUCE**

Branding Produce	Extremely Likely	Extremely Unlikely	Likely	Neutral	Unlikely
Land holdings					
Large holdings: Size above 10 hectare	1.941748	0.000000	5.825243	0.970874	0.000000
Marginal holdings: Size 1 hectare or less	0.000000	1.941748	6.796117	1.941748	1.941748
Medium holdings: Size 4 to 10 hectares	0.970874	0.970874	16.504854	3.883495	1.941748
Semi-medium holdings: Size 2 to 4 hectares	0.000000	0.970874	10.679612	1.941748	1.941748
Small holdings: Size 1 to 2 hectares	1.941748	0.000000	26.213592	9.708738	0.970874



**Fig. 12. Graphical Representation of Cross Tab Between Type of Land Holding
and Brand**

TABLE XIV.
CROSSTAB BETWEEN PURPOSE OF FARMING AND KNOWING
CURRENT MARKET PRICE

know Market _ Price	Extremely Likely	Extremely Unlikely	Likely	Neutral	Unlikely
Purpose					
Commercial	6.796117	0.0000000	37.864078	0.970874	2.912621
Semi-Subsistence	2.912621	0.970874	27.184456	4.854369	4.854369
Subsistence	0.970874	0.0000000	4.854369	2.912621	1.941748

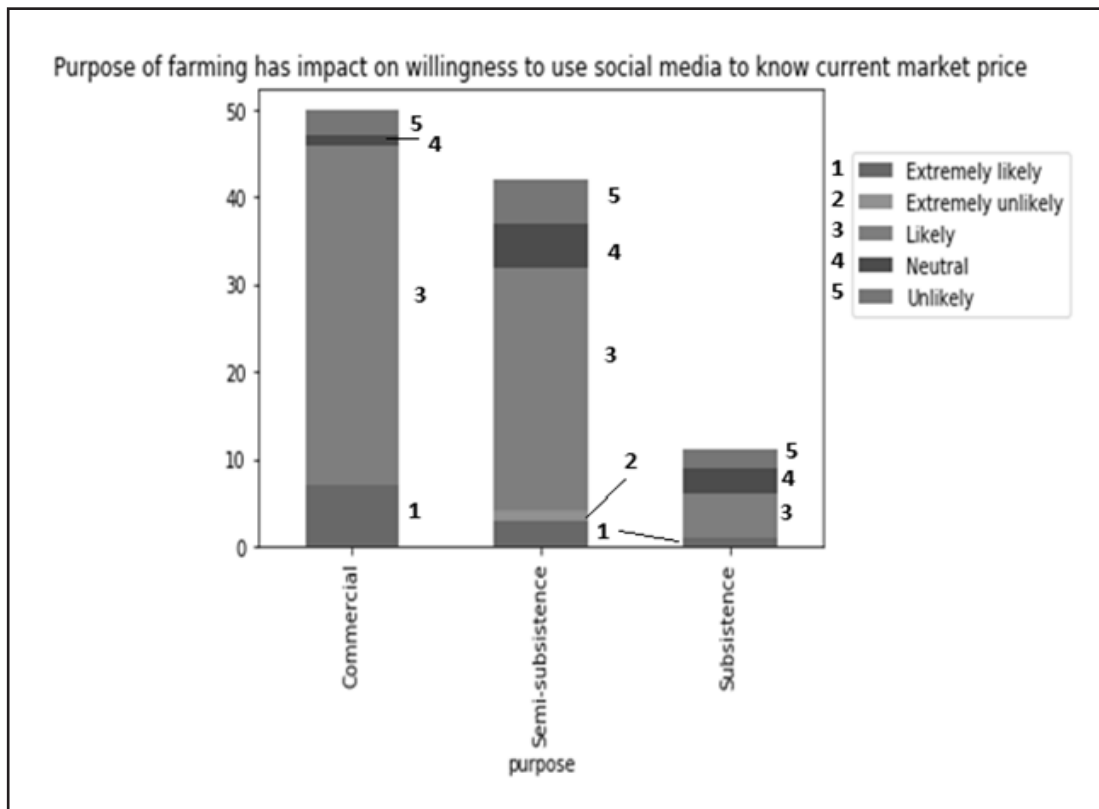


Fig. 13. Graphical Representation of Cross Tabs Between Purpose of Farming and Knowing Current Market Price

all, going to market after incurring all the costs there is still a threat to their life. Also, if a farmer waits for a longer time for perishable products, the amount would decrease, giving a substantial blow to profits.

Parth Kulkarni, an entrepreneur based in Pimpri-Chinchwad not only used this business opportunity but also did welfare of farmers and consumers. He established an assembly line and buys vegetables from farmers. He then prepares a box of vegetables and fruits using this assembly line for a certain

amount and delivers the boxes to consumers, thus assuring complete disinfected delivery of produce. He uses WhatsApp to take orders from consumers and stated that out of all social media platforms, 70% of the orders are acquired through WhatsApp. He stated that there are several advantages of using social media for agriculture marketing. One of the advantages is that nearby farmers are getting proper returns for their produce at their doorstep. Secondly, during the COVID pandemic situation, the life risk to the farmers is

TABLE XV.

CROSS TAB BETWEEN AGE AND BUYING AGRICULTURE INSTRUMENTS

Buy Agriculture Instrument	Extremely Likely	Extremely Unlikely	Likely	Neutral	Unlikely
Age					
20–35 years	2.912621	0.000000	17.475728	9.708738	5.825243
35–50 years	0.970874	0.000000	5.825243	11.650485	17.475728
Above 50 years	0.000000	0.970874	12.621359	7.766990	4.854369
Below 20 years	0.000000	0.000000	0.970874	0.000000	0.970874

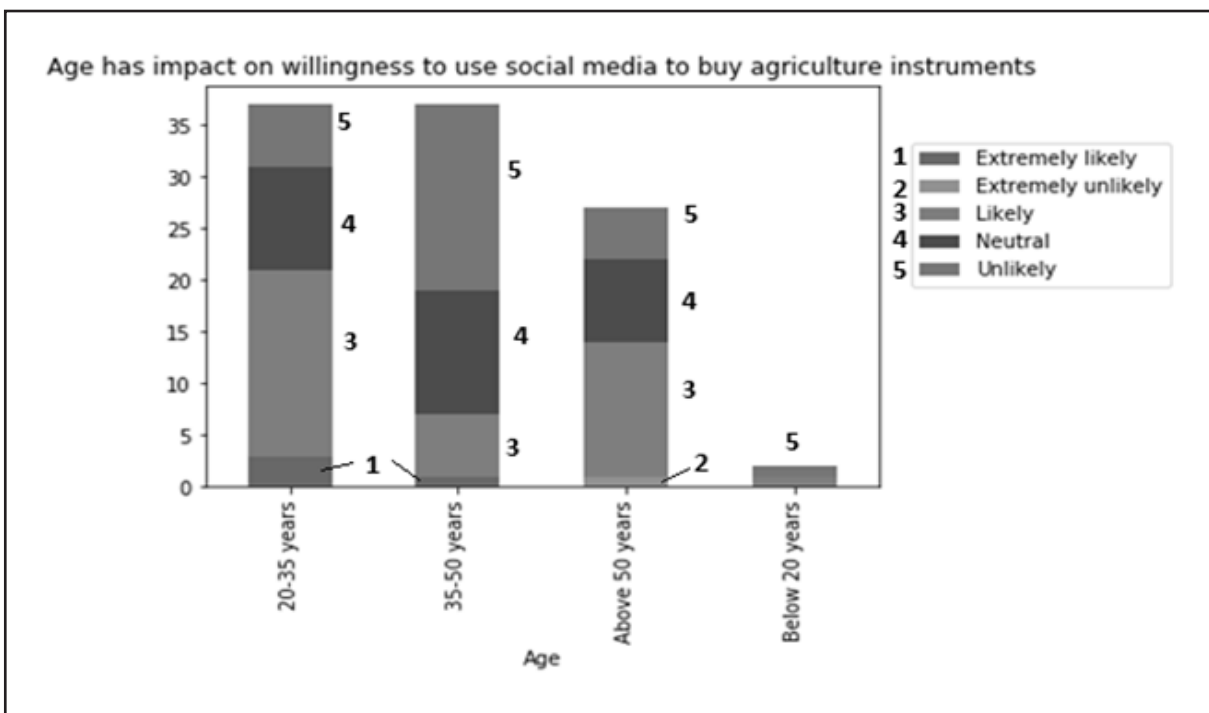


Fig. 14. Graphical Representation of Cross Tab Between Age and Buying Agriculture Instruments

reduced, as they do not have to go to markets to sell their products. The profits of farmers increased due to the saving of transportation cost, rent of the market place. Since receipt and delivery of vegetables is being done as early as possible, consumers get hygienic, healthy, and fresh vegetables. This mindful business in such a pandemic situation has created employment. To become self-dependent for fresh and hygienic vegetables, he is developing a setup of hydroponic farming.

V. SUGGESTIONS

(a) Fig. 6 shows that only 20% of the respondents use extension agents as a source of information. Extension system in India plays an important role in addressing agriculture concerns, have various constraints such as financial, infrastructural, and human resource. Young farmers who are unemployed can be given the training to become extension agents.

(b) Encouraging farmers to directly connect with consumers through social media can raise awareness about agriculture in the general public and increase income.

(c) Training farmers and creating awareness is needed to popularize social media in agriculture marketing.

(d) Innovative ways must be found to promote social media use in agriculture among farming communities, especially among rural youth and women to make farming attractive.

(e) Promoting the use of social media at the government level can reassure faster acceptance. Major social media awareness campaigns and other such initiatives for increasing social media technical literacy of rural people.

(f) Basic infrastructure like power supply and access to network services is necessary to access social media.

(g) Free Wi-Fi in public places in rural areas by the government can help access social media.

VI. LIMITATIONS

Social media can be overwhelming as it is fast-moving and one has to keep constantly checking which can be addicting. There is an opportunity cost of time that must be recognized. Once an individual becomes dependent on social media he loses confidence in himself for doing small things, removing himself from the contact of the physical world. Social media should not be a replacement to social networks and associations in the physical world, nevertheless, social media can be used as a tool to promote those social communications. Managing social media presence and the responsibilities of agriculture can be a difficult task.

VII. CONCLUSION

The results of the study show factors which have an impact on the use of social media in agriculture marketing. The participants in the age group of 20–35 years are more likely to use social media to buy agriculture instruments as compared to participants of other age groups. Most of the participants are having a social media account and they visit these social media platforms daily. Participants are willing to use social media for various agriculture-marketing purposes like seeking information, sharing information, knowing current market prices, buying agriculture instruments, branding, and selling their agriculture produce. The most popular social media in agricultural marketing is

WhatsApp, followed by Facebook, YouTube, Instagram, Twitter, and LinkedIn. Traditional sources of information such as contact with farmers, television are the most used sources of information by the participants but social media ranks third in the list of sources of information. Obstacles to the use of social media include infrastructure and lack of awareness and technical literacy. Ministry of Agriculture & Farmer's Welfare, Government of India not only maintains a Facebook account but also recently posts about Pradhan Mantri Fasal Bima Yojana which aims at covering the losses suffered by farmers due to reduction in crop yield as estimated by the local appropriate government authorities. The scheme also covers pre-sowing losses, post-harvest losses due to cyclonic rains and losses due to unseasonal rainfall in India which is a significant move forward to enhance the use of social media. During the pandemic, various new complications appeared for the agriculture sector but this presented new opportunities.

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