



Social Media in Agricultural Extension: Benefits and Challenges under Indian Context

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Authors' contributions

This work was carried out in collaboration between both authors. Author DT designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author MC supervised and guided the study. Both authors read and approved the final manuscript.

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ABSTRACT

Aims: This study aimed to empirically test social media tools in farm extension communication activities.

Study Design: Quasi-Experimental Design.

Place and Duration of the Study: The study was conducted in 8 districts of the State of Himachal Pradesh, India, June 2016-December 2016.

Methodology: The current study involved the creation of social media communication intervention among the selected group of farmers from the state of Himachal Pradesh. This was achieved through the creation of Facebook and WhatsApp groups among smartphone user farmers and sharing relevant agricultural information for a period of six months.

Results: The notable benefits derived by farmers were seeking solutions to minimise crop and livestock losses, easy availability of information in multiple forms, regular learning, multimodal information delivery and the creation of social capital. Reported constraints were the high frequency of irrelevant posts by other members, increased internet data requirements and poor internet connectivity. The study also found users to prefer WhatsApp over Facebook due to convenience in

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use, privacy feature as well as lesser internet data requirements. Further, less use of Facebook, difficulty in understanding its use in agricultural extension was other reported constraints in its use for seeking and sharing agricultural information.

Conclusion: The study, therefore, recommends increased use of social media by state agricultural/animal husbandry departments to leverage the benefits of these tools with possible constraints and suggestive measures. The extension agencies should also quickly adapt and develop relevant information, which can be disseminated through these tools.

Keywords: Farmers; interactive ICTs; WhatsApp; benefits; constraints.

1. INTRODUCTION

Information and Communication Technologies [ICT] are important elements in promoting connectivity among the community in contemporary society [1]. Farmers in developing countries, in particular, constitute economically and geographically marginalised groups [2]. These vulnerable rural populations are at risk of digital exclusion and thereby social exclusion [3]. Several ICT initiatives face challenges like affordability, simplicity, accessibility, scalability, relevant and localised content in inappropriate language and form [4,5,6]. However, current mobile usage pattern is leapfrogging in developing countries such as India [7] and ensure use of the affordable mobile internet, utilisation of social media by information poor, particularly older, less educated, less affluent people. This, a new wave of ICT innovations had a lesser barrier in terms of skills and cost to the farmer and can be the decisive factor of ICT adoption process in agriculture. The use of smartphones in agriculture becomes even more important as farmers are constrained to travel in gaining necessary information or for using available public services in their disposition [8,9]. The access to a smartphone has a positive significant influence on gaining agricultural knowledge among farmers by smallholder farmers in India [10].

Social media by its nature is egalitarian and available to all with internet accessibility [11]. These applications have the potential to connect learners in remote, resource-poor locations across divergent geographical, social, temporal as well as virtual and on-site spaces [12]. They have the potential to overcome the limitations of delivering limited generic information through current mobile SMS and voice-enabled services to individual farmers [13,14]. It is to be noted that hosting web portals, e-learning and app-development requires higher cost, advanced technical knowledge, inputs apart from computer skills [15] whereas social media are cost-

effective, require minimum ICT skills to use and operate. Besides, among all Apps, social media apps have the maximum face time (29% of total app face time) by users installed by smartphone users [16]. WhatsApp, by its innate simplicity, has become integral to people's lives in rural India including farmers [17]. Further, these tools have helped to democratise the creation and dissemination of information as users can publish their content by themselves [18]. This makes these applications an interesting proposition for generating relevant and localised content in farm extension activities.

However, the relevance of using social media as an information source for professional application has been overlooked [19]. This is primarily due to lack of experience and hesitation on the part of extension educators [20,21]. This has resulted in a low acceptance of social media use in agricultural extension by administration, peers, and clients [22]. Contrary to popular perception, these tools can be effectively used for multi-modal sharing of information (photos, texts and audio-visuals) in farm extension activities [23]. Thus, it is essential to empirically test these tools for possible use in farm extension communication activities. The current study involved the creation of social media tools as an intervention among a selected group of farmers in regions of Himachal Pradesh, India. The study was conducted through the creation of Facebook and WhatsApp groups involving smartphone user farmers and sharing agricultural information for six months duration. Reported benefits and constraints faced by respondents during the experimental study were documented and analysed. Findings of this study would be useful in devising social media based communication interventions for effectively addressing the requirement of the farming community.

2. MATERIALS AND METHODS

This experimental study was undertaken to utilise social media tools such as Facebook and

WhatsApp in the dissemination of agriculture and animal husbandry related information among farmers in Himachal Pradesh. The internet usage of 28 percent in rural regions of Himachal Pradesh is one of the highest in the country [24]. Eight out of twelve districts of Himachal Pradesh, India were selected, wherein; *Krishi Vigyan Kendras* (KVKs) of State Agricultural University were located. The initial list of farmers using social media was prepared in consultation with officials of these KVKs. Subsequently, 12 farmers from each district were randomly selected. Thus, a total of 96 farmers across 8 districts were purposively selected. After initial arbitrary selection, extensive field visits to these respondents were conducted between April to June 2016. These visits were conducted to interview and explain the concept of WhatsApp use in agriculture and animal husbandry. Consequently, two groups one in Facebook entitled progressive agriculture and one in WhatsApp “*Unnat Krishi Avam Pashupalan*” was created in June 2016 [25]. Following group formation, information sharing pattern among group members was recorded and studied for six months. After the study period, post-intervention feedback was received with the help of semi-structured interview schedule among respondents. This also involved assessing the benefits and constraints in the utilisation of social media-based information. Based on the experience of using social media tools, the respondents were asked to agree and disagree with the given set of suggestions to improve such interventions in farm extension. Rank based quotient analysis (RBQ) was done to analyse the perceived benefits and constraints. RBQ was

calculated using formulae given by Sabarathnam [26] as cited in Venugopalan [27].

$$RBQ = \frac{\sum f_i(n+1-i) \times 100}{N \times n}$$

Where

i=Concerned ranks, N=Number of farmers, n=Number of ranks, f_i =frequency of farmers for i th rank

3. RESULTS AND DISCUSSION

3.1 Perceived Benefits of Utilizing Social Media in Agriculture

Rank Based Quotient (RBQ) methodology was used to assess various benefits perceived by respondents in utilising social media in agriculture. The calculated RBQ values ranged from 24.83 to 85.94.

RBQ value (85.94%) is suggestive that social media proved immensely useful to farmers in seeking solutions to their day to day agricultural problems pertaining to crop and livestock diseases. Timely information availability ensured owners to overcome travelling difficulties in far way extension institutions. Relevant solutions through WhatsApp group helped owners to reduce livestock and crop losses [17]. Not surprisingly, queries to seek solutions of agricultural problems constituted the maximum frequency of posts shared by farmers in the WhatsApp group formed under the study [23].

Table 1. Rank based quotients in perceived benefits in utilising social media in agriculture

	I	II	III	IV	V	VI	RBQ	Rank order
1. Useful in seeking answers to problems.	34	45	15	2	0	0	85.94	I
2. Easy to receive and seek information.	45	32	3	16	0	0	85.07	II
3. Through discussions doubts get clarified.	0	1	14	63	15	3	49.13	III
4. Opportunity of continuous learning and connected to scientific information.	0	1	7	8	45	35	46.88	IV
5. Diverse information received in multiple forms (texts, pictures, photos, audio-visuals, booklets, word documents, and screenshots).	17	17	54	6	0	2	44.62	V
6. It helps in networking, recognition and motivation in agriculture.	0	0	3	1	36	56	24.83	VI

Another imperative advantage (RBQ value =85.07%) was that through social media the respondents could get information at their doorsteps. Seeking information did not require any substantial time and effort of farmers to obtain the information. This also helped them to receive immediate advice and save their crop and livestock losses¹⁷. Information archiving and later retrieval during leisure was also done by farmers.

The third particular recognised benefit (RBQ =49.13%) was that social media provided a possibility to clarify the doubts. Many of them reported acquiring advantages from finding answers to a similar set of the problems faced by them. Social media has the potential to help farmers to clarify their doubts about plants/livestock disease symptoms when they are networked with various institutional actors [25].

Additionally, social media gave participants a sense of connectedness (RBQ=46.88%) an opportunity for continuous learning in farming practices. Lack of connectedness with farmers has long been noted as severe lacunae of extension services and social media provides sufficient chance to resolve this trouble [28].

Multiple forms information received through WhatsApp through text messages, pictures, photos, screenshots, word files, videos which they did no longer acquire earlier was another perceived benefit (RBQ=44.62%). These features make social media tools an interesting addition to the toolbox of dissemination strategies of extension educators [29].

The capacity of social media in constructing social capital (networking, motivation) in

agriculture was an additional perceived benefit (RBQ=24.83) by the respondents. Particular online interactions and discussions in the WhatsApp group helped farmers of different districts to come together and even link up with other institutional actors such as Krishi Vigyan Kendra [25,26]. Geographical remoteness of rural regions may be overcome via online interactions which are most useful in the development of bonding capital whilst complementing face to face networking [30]. Such tools enable farmers in information exchange with other community members, pursuance of mutual interests (networking), seeking access to expert networks [31] and enables social empowerment [32].

3.2 Constraint Analysis for Utilisation of Social Media Tools in Agriculture

The constraints faced by owners were different in the use of WhatsApp, and Facebook use in agriculture, so constraint analysis was separately done for these two social media tools.

Sharing of irrelevant information (RBQ=92.36) such as greetings and jokes by a few members in the WhatsApp group was the prime constraint in seeking information. Irrelevant posts result in information overload among the readers [33] and also result in the loss of precious internet data for the farmers. This phenomenon suggests that the group administrator must communicate clear guidelines about the professional nature of the group and should remove the repeat offenders. Though, the latter option could not be exercised due to the experimental nature of the study. This problem can now also be overcome by use of WhatsApp admin features, which permits only administrators to share posts in the group.

Table 2. Rank based quotients of constraints in the utilisation of WhatsApp in agriculture

Constraints	I	II	III	IV	V	VI	RBQ	Rank order
1. Irrelevant posts	77	6	2	10	1	0	92.36	I
2. Increased internet data requirements	7	28	61	0	0	0	73.95	II
3. Slow internet connectivity	10	31	6	22	21	6	61.28	III
4. Lack of sufficient time to use information	0	22	20	21	26	7	54.16	IV
5. Problems of phone storage	2	8	0	27	43	16	40.79	V
6. Difficulty in understanding and proper utilisation of information	0	1	7	16	5	67	27.43	VI

Increased internet data requirements (RBQ = 73.95) especially in downloading pictures, photos and videos were another perceived constraints by respondents. This happened as the vast majority of the owners were operating under limited data plans with short data recharge packs. Further, internet access charges in India are more than four times that of China, Brazil and Argentina, and 20 to 30 percent higher than that of Vietnam and Malaysia [34]. Affordable internet data remains a necessary prerequisite for farmers to access vital information and inputs through smartphones under digital India initiatives [35].

Slow internet connectivity (RBQ = 61.28) was also a noteworthy constraint. This problem was observed as a good number of respondents were operating in 2G internet networks. This resulted in downloading information especially data-heavy files (Videos and images) taking substantial time. Almost two-thirds of rural internet users are connected to mainly 2G and sometimes 3G networks [24].

Lack of sufficient time in proper utilisation of information (RBQ = 54.16) was also another constraint. Also, they reported that sometimes the information available was more than they could decipher. Thus, it is appropriate to limit the number of posts to avoid information overload among the farmers.

Another constraint (RBQ = 40.79) that emerged was phone software and hardware issues such as phone memory problems due to a large number of posts.

Also, even though the concept was explained during interviews, few respondents found it difficult in deciphering the information and use through social media tools. Referring to use of social networking tools for rural users, [36] reported the use of local intermediates to provide technology intermediation in the form of support, encouragement and on the spot training to the low-literate farmers remained as of paramount importance.

The major perceived constraint was the preference for WhatsApp (RBQ=80.41%) for receiving agricultural information. As all of the respondents had access to information through the WhatsApp group as well, they did not feel the need to use another tool to receive agricultural information.

In fact, less or no use of Facebook during the study period was also a perceived constraint (RBQ=61.04%). Many of them felt that operating Facebook for agricultural use (RBQ=57.7%) was slightly tricky to use due to slower internet network and lack of proper understanding about its possible use in agriculture. The closed nature of platform [37] higher perceived safety [38] has made use of WhatsApp more popular than Facebook in Asian/Indian context.

The social nature of Facebook among the respondents also proved to be an obstacle in seeking and sharing farming based information (RBQ=48.12%). Referring to the usage of social networking sites for professional use, [36] reported that though users' posts would pertain to their social life, yet they are likely to pay attention to agricultural posts as farming concerns pervade their lives.

3.3 Suggestions for Effective Use of Social Media in Farm Extension Activities

As evident from Table 4, the majority (79.17%) of the respondents felt that the internet connectivity should be improved in their region. This was reported as a large percentage of users were using 2G network at the time of the study. Also, a sufficient number of users (77.08%) felt that the reduction in internet data tariffs can be the important step to avail full benefits of social media use in agriculture. Sizeable (76.04%) number of respondents reported that social media should be used by state line departments in sharing and discussing agricultural issues. Some the government bodies such as Indian Council of Agricultural Research (ICAR) has been exploring the possibilities of utilising social media tools to expand its reach by engaging with farmers, partners and stakeholders [39]. Also, in the Indian State of Kerala, the state agriculture department even initiated a scheme to incentivise farmers to use social media tool for agricultural extension purpose [40].

High percentage (64.58%) of farmers suggested that more awareness should be created about such type of possible use of social media in agriculture so that increased number of farmers get benefited. Although, these respondents were regular social media users yet very few percentage (4.17%) of them had any previous experience of social media use in agriculture [41].

Table 3. Rank based quotients of constraints in the utilisation of Facebook in agriculture

	1	2	3	4	5	RBQ	Rank order
1. Preference for WhatsApp over Facebook	21	40	23	0	12	80.41	I
2. Use less frequently/Do not use Facebook	47	0	10	29	10	61.04	II
3. Difficulty in operation due to slow access and lack of understanding in use	0	35	29	18	14	57.7	III
4. Heavy internet data usage	12	16	23	15	30	52.7	IV
5. More social value	16	5	11	34	30	48.12	V

Table 4. Suggestions for effective use of social media in farm extension activities

Suggestions	F	%
1. Improvement in internet connectivity	74	79.17
2. Reduction in internet data tariffs	76	77.08
3. Use of social media by state line departments in sharing and discussing agricultural information	73	76.04
4. Awareness about use of social media in agriculture should be increased	62	64.58
5. Minimising the number of irrelevant posts	61	63.54
6. The time of responding the query should be minimal	58	60.42
7. Low-cost smartphone should be provided on free/subsidised rates	56	58.33

Also, 63.54 percent of respondents reported that the number of irrelevant posts in the WhatsApp group should be minimised. Thakur [41] reported that members may be frequently reminded and warned not to post irrelevant posts and repeat offenders may be removed from social media groups. The time of responding to the query should be minimal (60.42%) and low cost smartphone should be provided on free/subsidised rates (58.33%). Reduction in the cost of smartphones and data exchange among rural communities can boost the spread of agricultural extension advisory services through social media among the farmers [42].

4. CONCLUSIONS

Results suggest that the engagement of the farming community through social media tools by agricultural institutions can improve the quality of agricultural information regarding timeliness and accuracy. The benefits accrued are an easy bi-directional flow of information, continuous engagement with the farming community, multimodal information dissemination and opportunities of networking among various actors etc. However, such interventions face challenges such as handling irrelevant posts, slow rural internet connectivity, information deciphering and

utilisation. Explaining the specific purposive nature of such groups among members, removal of offenders and use of WhatsApp admin feature are some of the ways to overcome the problem of irrelevant posts. The awareness and willingness to utilise and supplement these tools in farm extension activities by various actors in the agricultural value chain can improve information sharing as well as utilisation across social media platforms.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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