P-ISSN: 2618-0723
E-ISSN: 2618-0731

NAAS Rating: 5.04
www.extensionjournal.com

International Journal of Agriculture Extension and Social Development

Volume 7; SP-Issue 10; October 2024; Page No. 24-30

Received: 15-07-2024
Accepted: 21-08-2024

Indexed Journal
Peer Reviewed Journal

Are mobile advisory and face-to-face communication effective for enhancing the capabilities of farmers-evidence from farm science centre

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DOI: https://doi.org/10.33545/26180723.2024.v7.i10Sa.1221

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Abstract

This study was conducted during the year 2020-2021.In this study, the researchers investigated the impact of mobile advisory and face-to-face communication on the capability building of farmers in the Ganjam district of Odisha, India. The farmers in this region were provided with agricultural training and information services from Krishi Vigyan Kendra (KVK) or Farm Science Centres that serve as knowledge and resource hubs for farmers and rural communities. These centers are established and funded by the Indian Council of Agricultural Research (ICAR) and are spread throughout various districts in India. This aimed to improve agricultural productivity and promote rural well-being in India. These institutions provide farmers with valuable information, guidance, and support, which can improve their agricultural practices, productivity, and overall livelihoods. To assess the impact of these services, the researchers utilized Gigler's Alternative Evaluation Framework, which applied Sen's Capabilities Approach to evaluate the indicators of economic well-being and quality of life among the farmers. Additionally, the study explored the farmers' perception of effective communication tools for information transfer and analyzed the actual usage of communication media in capability building. The findings revealed that, despite KVK's primary use of face-to-face communication and limited usage of Short Message Service (SMS), the combined impact of both communication channels resulted in enhanced capability building among farmers, improving their productivity, economic well-being, and quality of life. These approaches provide access to information, remote guidance, real-time updates, language and literacy support, cost-effectiveness, personalized support, and contextualized recommendations. By leveraging these tools, farmers can improve their agricultural practices, increase productivity, and ultimately improve their livelihoods.

Keywords: Face-to-face communication, mobile advisory, capabilities approach.

1. Introduction

The Indian government, recognizing the crucial role of agriculture in contributing to the country's GDP, has implemented various measures to enhance farmers' capabilities and boost agricultural productivity. Among these initiatives is the Krishi Vigyan Kendra (KVK) program, specifically KVK Ganjam-I under OUAT, located in Odisha's Ganjam district. Established in 1985, KVK Ganjam-I serves as one of the oldest centers in the state, aiming to provide advanced agricultural and animal husbandry technology services to uplift the farming community.

In 2018, KVK Ganjam-I emphasized the pivotal role of agricultural information in improving small-scale agricultural production. This information serves to connect increased production with profitable markets, thereby enhancing rural livelihoods, food security, and national economies. Effective communication is highlighted as essential for sustainable development, as emphasized by various studies (Olatunbosun-Alakija and Moore, 2017) [16]. The study underlines the significance of communication in mobilizing community members for effective community development (FAO 2016) [8]. Two prominent communication methods discussed are face-to-face communication and mobile-enabled information delivery mechanisms.

Face-to-face communication is deemed highly effective, especially in agricultural contexts requiring demonstrations, allowing farmers to see and understand the information (Olatunbosun-Alakija and Moore, 2017) [16]. It leverages the senses of sound and sight, enabling immediate comprehension and interpersonal understanding. On the other hand, mobile phones are recognized as emerging ICT tools with the potential to bridge knowledge gaps between

large and small farmers (Mittal, 2016; Alant *et al*., 2021; Emeana *et al*., 2020; Owusu *et al*., 2018) [12, 1, 7, 17]. Mobile communication offers two significant benefits: increased access to timely and relevant information and expanded possibilities for connectedness between people (Smith *et al*., 2011; Jain *et al*., 2015; Parmar *et al*., 2019; MANAGE, 2017) [20, 10, 18, 11].

A review of mobile case studies revealed the effectiveness of mobiles in obtaining project impact details, disseminating information, training frontline workers, facilitating interpersonal communication, and monitoring projects (Food Security Sector Humanitarian Agencies, 2015) [9]. However, challenges such as connectivity issues and limited access to charging facilities persist Mittal and Mehar (2012) [13], Mittal (2016) [12]. Amartya Sen's Capability Approach is employed as a theoretical framework, emphasizing the process of expanding real freedoms for individuals (Sen, 1999; Tewathia *et al*., 2020, Comim F 2001) [19, 21, 5]. The Capability Approach focuses on what individuals can do (capabilities) rather than what they actually do (functioning) (Boudot, Butler, and Dugal, 2013) [4]. This approach is particularly suitable for micro-level studies, analyzing individuals' ability to choose and yielding insights into human development Dasuki and Abbott (2015) [6].

KVK Ganjam-I, situated in Bhanjanagar, primarily utilizes face-to-face communication for training programs covering various agricultural topics. Additionally, the center employs on-farm demonstrations and SMS updates in Odia and English to provide daily agricultural information to farmers. The study acknowledges the critical role of communication medium choice and content in determining effectiveness. SMS communication is ideal for disseminating brief information to a large audience rapidly, while face-to-face communication offers practical explanations and opportunities for clarification, leading to better reception. Despite the higher cost of face-to-face communication, its effectiveness is underscored. The study adapts Gigler's Alternative Evaluation Framework, focusing on the impact of communication media on capability building for improved productivity. Functionality is defined as development, operationalized as economic well-being and quality of life, analyzed through indicators aligned with HDI and MDG principles.

1.1 Objectives

1. To study the socio-economic characteristics of the respondents and their perception towards different communication channels
2. To study the effectiveness of different communication channels for agricultural knowledge transfer

2. Methodology

In this pilot study, the researchers selected a sample size of 100 farmers from the district of Ganjam, which constituted 10% of the total farmers who accessed information from KVK, Ganjam-I. The participants were chosen using a stratified random sampling method. The researchers employed mixed methods to collect the data, which included structured questionnaires to obtain demographic details, communication access details, communication access through KVK, and KVK's impact on knowledge and productivity. Additionally, focus group discussions were conducted in three locations, namely Bhanjanagar, Jagannathprasad & Surada blocks, with seven farmers in each group. The data collected was analyzed using IBM SPSS Statistics-version 24. Pearson's chi-square tests were used to determine the associations between some of the variables. The data was interpreted and analyzed using a simple descriptive narrative approach.

3. Results and Discussion

3.1 Face-to-face communication and mobile advisory

The researchers selected a sample size of 100 farmers from the Ganjam district, constituting 10% of the total farmers who accessed information from KVK. The participants were chosen using a stratified random sampling method. The data was collected using mixed methods, including structured questionnaires and focus group discussions, which were held in three locations-Bhanjanagar, Jagannathprasad & Surada. The collected data was analyzed using IBM SPSS Statistics-version 24, which included Pearson's chi-square tests to determine variable associations.

All the participants were familiar with the services provided by KVK and were associated with the center in some capacity. Nearly all of the farmers (96%) had participated in training programmes provided by KVK, while only 4% accessed KVK services for purchasing seeds for animal fodder. Moreover, 30% of the farmers used SMS to access information, while only 4% had tried reaching Kisan Call Centre helpline. Among the farmers who attended training programmes, 52% preferred face-to-face training programmes or workshops once every three months. The researchers chose to study the mobile advisory and face-to-face interaction mediums used by KVK to transfer agricultural information. One farmer among the participants was a resource person for the Government's television channel on farming.

Table 1: Perception on effective communication channel

Socio economic category	Values	Perception of the participants on effective communication channel for agricultural knowledge transfer			
		Both (%)	Face-to-face interaction (%)	Mobile advisory	Significance
Age	20-39	80.0	13.3	6.7	0.024*
	40-59	50.0	50.0	-	
	60 and above	27.3	72.7	-	
	Total	54.0	44.0	2.0	
Gender	Male	51.4	48.6	-	0.155
	Female	61.5	30.8	7.7	
	Total	54.0	44.0	2.0	
Education	Graduation	60.9	34.8	2.0	0.002*

	Higher Secondary	33.3	66.7	-	
	High School	100.0	-	-	
	Middle School	20.0	80.0	-	
	Primary School	-	100.0	-	
	Total	54.0	44.0	2.0	
Household Income	Marginal Income (≤150000)	58.3	41.7	-	0.00*
	Low Income (≤300000)	93.3	6.7	-	
	Medium Income (≤450000)	85.7	-	14.3	
	High Income (≤600000)	-	100.0	-	
	Total	54.0	44.0	2.0	
Land holding	Landless	80.0	-	20.0	0.001*
	Marginal farmers	73.9	26.1	-	
	Small farmers	27.3	72.7	-	
	Large farmers	27.3	72.7	-	
	Total	5.0	44.0	2.0	

The findings of the study are presented in Table 1, which displays the results of the cross-tabulation and chi-square test of significance between socio-economic factors and participants' perception of effective communication for agricultural knowledge transfer. Participants between the ages of 20 and 39 generally perceived that using both face-to-face and mobile advisory mediums together would be effective, while 75% of farmers aged 60 and above and 50% of farmers aged 40-59 perceived that face-to-face communication was more effective. The chi-square test showed that age had a significant relationship with perception of effective communication (p=0.024, which is less than 0.05). Gender did not affect the perception of effective communication channel, as shown in Table 1. However, education had an impact on the perception of the effectiveness of the communication media, with more educated farmers perceiving that both face-to-face and mobile advisory mediums together would be effective. Farmers with lower education levels perceived that face-to-face communication was more effective.

Household income also played a significant role in participants' perception, with farmers who had higher incomes stating that face-to-face communication was more effective, while farmers with lower incomes perceived that both communication mediums were effective. Furthermore, landholdings were significantly associated with perception, as small and large farmers mostly perceived that face-to-face communication was effective. In contrast, marginal farmers who did not possess land or practiced roof gardening perceived that both mediums were effective.

Table 2: Socio-economic characteristics and medium of communication

Socioeconomic category	**Values**	**You accessed information from KVK more through**			
		Both (%)	**Face-to-face interaction (%)**	**Mobile advisory**	**Significance**
Age	20-39	46.7	20.0	33.30	
	40-59	16.7	83.30	-	
	60 and above	-	100.00	-	
	Total	22.0	68.0	10.0	0*
Gender	Male	5.40	81.10	13.50	
	Female	69.20	30.80	-	
	Total	22.0	68.0	10.0	0*
Education	Graduation	8.7	78.3	13.0	
	Higher Secondary	33.3	66.7	-	
	High School	72.7	9.1	18.2	
	Middle School	-	100	-	
	Primary School	-	100	-	
	Total	22.0	68.0	10.0	0*
Household Income	Marginal Income (<150000)	-	58.3	41.7	
	Low Income (<300000)	53.3	46.7	-	
	Medium Income (<450000)	42.9	57.1	-	
	High Income (<600000)	-	100.0	-	
	Total	22.0	68.0	10.0	0*
Land holding	Landless		80.0	-	
	Marginal farmers		39.1	21.7	
	Small farmers		90.9	-	
	Large farmers		100.0	-	
	Total		68.0	10.0	0.07*

*p<0.05

A chi-square test and cross-tabulation were conducted to examine the relationship between socio-economic factors and the methods used by farmers to receive agricultural information from KVK. The results showed that all the characteristics tested were significantly related with a p-value below 0.05. Table 2 demonstrates that the majority of farmers received information through face-to-face communication, although both mediums were utilized to a

reasonable extent. Interestingly, gender also showed significant association, with female farmers accessing both mediums while male farmers mostly received information through face-to-face communication.

3.2 Knowledge transferred through mobile advisory

According to the data, 90% of farmers accessed agricultural information from KVK through face-to-face communication, while 36% accessed it through SMS and 22% used both media. 62% of farmers did not have any difficulty in accessing mobile phones for information, while 38% faced difficulties. Among those who had difficulty accessing mobile phones, 22% cited difficulty in reading English and 14% cited difficulty in using smartphones. This difficulty was mainly reported by male farmers aged 60 and above.

Table 3 depicts the demand and actual receipt of SMS-based agricultural information. The data revealed that the need for SMS-based information on all topics was high. However, 12% said that they never received any SMS or were unaware of the process to obtain information through SMS.

Table 3: Type of SMS needed and accessed

Sl. No.	Information for SMS	Need (%)	Accessed or received (%)
1.	Assistance during each stage of your plantation or animal or fish farming	46	24
2.	Tips for disease identification and remedy	88	40
3.	Update on day-to-day information (about crops and plantation, poultry, animal husbandry)	80	12
4.	None	2	12

Among farmers who accessed information through SMS, 10% specified the topics they received updates on. Of those, 80% reported receiving updates on technical implement, new diseases, and weather updates, while 20% accessed information on new diseases and techniques. During the focus group discussions, farmers expressed that receiving information via mobile advisory on day-to-day updates and disease prevention tips would be more useful. Additionally, the schedule data showed that most respondents desired information on new diseases, while only a few requested information on research findings and weather updates.

3.3 Knowledge transferred by face-to-face communication

KVK organized training programmes, workshops, and consultations to communicate with farmers through face-to-face communication. The information dissemination areas through these programmes are shown in Table 4. According to the study, 94% of the farmers reported receiving consultations from KVK. Among them, 20% said they received regular consultations, 58% said consultations were irregular, and 16% said they accessed the service rarely despite KVK providing consultations.

Table 4: Themes for trainings and consultation for knowledge transfer

Sl. No.	Area in which knowledge was transferred	Farmers who accessed information (%)
1.	Crop production	96
2.	Crop Protection	76
3.	Crop Improvement	74
4.	Disease Management	72
5.	Soil Type	70
6.	Irrigation	50
7.	Organic Farming	60
8.	Sustainable agriculture	52
9.	Indigenous Technical Knowledge	32
10.	Goat Farming	4

3.4 Capability building and productivity

Training programmes, workshops, and consultations were conducted by KVK through face-to-face communication. Table 4 illustrates the areas in which farmers received information from these programmes. Results from the study indicated that 94% of the farmers reported receiving consultations from KVK. Among them, 20% stated that they received regular consultations, 58% reported that consultations were irregular, while 16% revealed that they accessed the service very rarely.

According to the farmers who accessed information from KVK, their productivity increased. Specifically, 38% stated that marketing was easy due to the WhatsApp groups created by KVK, 34% said that on-farm demonstrations had contributed to their increased productivity, 36% attributed it to field trials, 46% to the use of new technology or implement, and 50% due to soil testing to determine appropriate plantations for improved productivity. Moreover, 6% of the farmers mentioned that attending training programmes provided by KVK helped them gain knowledge on the smart usage of land without deteriorating its fertility. These farmers received sufficient training on all types of farming, from animal farming to vegetables and home products like mushroom farming and pickle making. They only required updates on diseases and day-to-day information through mobile communication.

Sweet Corn demonstrations and trials were conducted by KVK in some villages, and 24% of the farmers who tried the method reported high productivity during that season. In general, 14% of farmers stated that they gained knowledge on production and protection, which increased their productivity. Training on water management also facilitated many farmers, and 12% of them revealed that they had even started roof gardening after learning water management techniques. This resulted in improved productivity, and they also used the built area space for roof gardening, gaining

moderate profits. Regarding implement usage, 42% of the farmers purchased basic implement that eased their work and improved productivity. Some of the implement bought included a dal machine, drum seeder, and weed cutter. Additionally, KVK trained farmers on producing organic fertilizers, and 68% of them reported that using organic techniques, such as biodegradable waste as fertilizers, reduced the use of chemical fertilizers. Consequently, they earned more profit due to the lower cost of production. Also, 16% of the farmers practiced organic vegetable farming, which resulted in high demand in the nearby city Berhampur and Bhubaneswar, leading to more profit.

Almost all the farmers reported that they gained confidence after KVK's communication intervention through face-to-face communication and mobile advisory. Among these farmers, 84% stated that they farmed with more innovation and new techniques after KVK's intervention. When asked if their economic condition had improved after accessing information from KVK, 52% reported that it had improved, and 34% believed that it might have improved. There was no increase in land possession for farming, and 70% of the farmers stated that they possessed the same area of land for farming, while 16% did not provide any information regarding land possession.

Table 5: Quality of life of farmers

Sl. No.	Questions to farmers to assess the quality of life	Sufficient or as expected or yes (%)
1.	Do you have good water supply to your residence?	98
2.	Do you have good water supply to your farm?	80
3.	Do you have electricity at home?	98
4.	Do you have a toilet at home?	98
5.	Has your income increased as you expected?	60
6.	Do you save money?	78
7.	Is it easy to get loan for your farming?	62
8.	Is KVK helping you to access information on loan?	86
9.	Has your lifestyle improved?	70
10.	Has your status in society gone up?	60
11.	Have you taken up any leadership position in your community?	44
12.	Do you engage with your community regularly?	92
13.	Do you engage women in production at all levels?	82
14.	Do you have any problem on accessing medical facilities for you and your family?	30
15.	Do you think that you and your family are well nourished?	48
16.	Are you or your family affected by any communicable diseases often (tuberculosis, malaria, HIV/AIDS, etc)	32
17.	Are you educating your children?	88
18.	Do you have any problem on accessing equipment for your farming?	6
19.	Do you have any problem on accessing seeds?	6
20.	Do you have any problem on accessing fertilizers?	6
21.	Do you have any problem on accessing pesticides?	4
22.	Do you have problem on accessing animal fodder?	2
23.	Do you have problem on accessing treatment or medicines for animals?	8

The information presented in Table 5 was gathered from the points discussed in the focus group sessions. The results showed that the farmers who participated in this study had access to basic amenities such as good water supply for their homes and farmland, electricity for their residences, and toilets. When asked if their incomes had increased after accessing information from KVK, the majority of farmers responded positively and noted that they were able to save money. Additionally, KVK helped farmers access information about loans. Many farmers reported that their lifestyles had improved, and their status in society had increased. Some had even taken up leadership positions in their communities, while others engaged regularly with their community. Notably, women were involved at all levels of farming, and there was no gender discrimination. The study also revealed that the level of education awareness among the farmers was high, and almost everyone sent their children to school. The 12% who responded negatively were either unmarried, had very young children, or were over 60 or their children were already adults.

Overall the respondents expressed a desire to access the Kisan Call centre helpline but reported that they were unable to reach it most of the time. Gender discrimination was not observed, and both male and female farmers equally participated in all activities. Female farmers were well-educated and comfortable using mobile phones, and most messages were read and shared with male members of their household. The farmers' age and education levels influenced their communication preferences; young and educated farmers preferred both mobile and face-to-face communication, while those aged 60 and above with only primary education showed little interest in accessing SMS messages via mobile phones. The data indicated that farmers aged 60 and above with higher income and landholdings preferred face-to-face communication as they were not "digital natives." Most farmers who received farm-related information from KVK accessed it through face-to-face communication and expressed satisfaction with the demonstrative trials and training provided. Only a small number of respondents accessed information through mobile advisory services. Farmers found it easier to grasp information visually and practically rather than through SMS or mobile applications. Furthermore, when a trial or demonstration was conducted in a farmer's field, other farmers in the village could observe the output, making it easier for government officials to promote new technologies

or techniques for increased production (National Institute of Labour Economics Research and Development, 2015; Behera *et al*. 2015) [2].

According to the focus group discussions, human development was highly valued by many farmers (Odongo, 2013) [14]. While economic prosperity was a priority, knowledge acquisition, community leadership, and education for their children were considered more important. Farmers who participated in KVK's training programmes, demonstrations, and trials adopted the taught techniques and technologies, resulting in increased productivity for the crops they were growing. The success of the knowledge delivery approach through face-to-face interaction was evident, with farmers citing the sweet corn trial as an example. Farmers who received information from their peers attending the training programmes also reported increased yields. The farmers relied on traditional knowledge to predict weather conditions. Some farmers managed to produce multiple crops with less water, while others used organic fertilizers to grow greens and marketed them as organic to gain more profit. KVK's face-to-face trainings helped farmers acquire marketing skills, enabling them to take advantage of the district's proximity to Berhampur and Bhubaneswar's large market. Most farmers in the area were well-versed in water management and conservation, and the district's abundant ponds, lakes, and rivers enabled them to choose horticulture over paddy as it was more profitable and had a readily available market in Berhampur and Bhubaneswar.

4. Conclusion

The study showed that face-to-face communication and mobile advisory positively impacted knowledge transfer and capability building, enhancing farmers' productivity and economic wellbeing. However, a digital divide was noted among farmers aged 60 and above in their communication preferences. The research highlighted the importance of season-specific trainings in Ganjam, offering efficient solutions to local issues. Currently using a diffusion method, the KVK in Ganjam could benefit from a more effective bottom-up approach, involving regular meetings and village representatives to improve impact on farmers' economic wellbeing and quality of life.

5. Recommendations / policy implications

1. **Tailored Communication Strategies:** Developing communication strategies are important that can cater to the diverse preferences of farmers based on age, education, and technological familiarity, including both digital and face-to-face channels.
2. **Strengthen Face-to-Face Engagement:** Recognizing the efficacy of face-to-face communication holds good particularly for older farmers and those with limited digital literacy. Invest in initiatives that facilitate direct engagement such as field demonstrations and training sessions.
3. **Promote Peer Learning:** Encouraging knowledge sharing among farmers through peer learning networks, leveraging the success observed when farmers receive information from their peers during training programs.
4. **Support Traditional Knowledge:** Recognizing and supporting the valuable traditional knowledge possessed by farmers are necessary, particularly in areas such as weather prediction and sustainable farming practices.
5. **Empower Farmers with Marketing Skills:** Providing training and resources is essential to enhance farmers' marketing skills, enabling them to effectively market their produce and capitalize on local market opportunities.

6. Acknowledgement

The authors express their gratitude to OUAT and ICAR-ATARI, Kolkata, Zone-V for their invaluable financial, technical, and administrative assistance extended to the KVKs within this zone. Special appreciation is also extended to the respondent farmers whose generous contribution of time greatly enriched this study.

Conflict of Interest

We the authors declare that there are no conflicts of interest

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