



Role of ICTs in transforming Agriculture as Perceived by Tribal Farmers in Southern Rajasthan

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ABSTRACT

The role of ICT in Agriculture is of paramount importance and facilitates transfer of agricultural information. Agriculture helps in empowering the rural people by providing better access to improved agricultural technologies, effective production strategies, markets, banking and financial services etc. This article explores the role of ICT in agricultural sector. The study was conducted on southern Rajasthan covering two districts i.e. Banswara and Dungarpur. The districts were selected on the basis of the availability of maximum facilities and infrastructures to promote ICT use. The empirical data were collected personally from 160 farmers through a pre-tested structured interview schedule and analyzed using standard methodology. The study revealed direct role of ICT in providing latest technological information about agriculture and allied fields. Live shows to get the first hand agricultural information, agricultural news for quick solution of farmers' problem, scientific package of practices of crops helped in timely decision making on matters related to agriculture and plant protection measures were the major roles of ICT as perceived by the farmers of Banswara and Dungarpur districts. The findings also indicated that there was no significant perceived difference in direct role of ICT tools in transfer of agricultural technology between the farmers of Banswara and Dungarpur districts.

Key Words: Dissemination, Information, Communication Technology (ICT), Transforming, Tribal Farmers.

INTRODUCTION

The present era is the era of information and communication technologies (ICTs). There are several ICT tools used in modern day for the dissemination of information. These are radio, television, mobile phone, internet, kisan call centre, touch screen computer, information kiosk, etc., which are capable of spreading the information to masses as fast as possible with less involvement of manpower. The process of information dissemination through these ICT tools is very cost-effective and time-saving. The advent

of modern ICT tools has cut short the geographical distances of the people. The digitalization of the whole communication process from the source to the receiver by using ICT tools narrows down the physical barrier among the people throughout the world. In India, the use of various ICT tools in the dissemination of information is gaining its speed day by day through various public and private initiatives.

Information plays a vital role in empowering farmers to improve their livelihoods. Important information such as sowing, improving soils, seeking

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the best price for their produce and ways to combat pests and diseases all empower the farmer and their decision-making capabilities. Seasonal variability in weather patterns, deterioration of soil condition and sporadic climatic events such as drought, floods, pest and disease outbreaks complicate the decision-making process of the farmers and influences their information requirements. Providing such knowledge can be challenging as the information must be tailored specifically to distinct conditions. Given these challenges the arrival of ICTs is well timed.

ICTs has the abilities of reaching large number of people simultaneously, therefore have a greater role in the extension work. Extension services are required to improve agricultural productivity by providing farmers with requisite information helping them to optimize use of limited resources (Muyanga and Jayne, 2006; Singh *et al*, 2017). Worldwide agriculture has witnessed a shift in the past few decades and extension mechanism need to stay ahead and equip the farmers by enhancing their management and decision making skills (Singh *et al*. 2018; Singh *et al*, 2020a).

ICTs can broadcast the precise and authentic information at right time to the farmers so that they can utilize it and get benefits. The decision support system through ICTs facilitate farmers for planning type of crops, practising good agricultural practices for cultivating, harvesting, post harvesting and marketing their produce to get better results (USAID, 2010). Varied information is required in agriculture based on the different agro climatic regions, size of land holdings, types of crops cultivated, technology followed, market orientation, weather condition, etc. As reported by many researchers, question and answer service was perceived as the best facility by majority of the farmers to get personalized solutions to their specific agricultural problems (Meera *et al*, 2004). Keeping in view the above facts, the study was conducted with the objective the role of information and communication technology in transforming of agriculture as perceived by tribal farmers in Southern Rajasthan.

MATERIALS AND METHODS

The present study was conducted in Dungarpur and Banswara districts of Southern Rajasthan. The districts were purposively selected based on the availability of maximum number of facility centres for promoting use of ICT. The selection of tehsils was made on the basis of availability of maximum number of facility centres for promoting use of ICTs. Two tehsils from each district were selected for the purpose of investigation. Further, selection of two gram panchayats from each selected tehsil was made based on the availability of maximum number of facility centres for promoting use of ICT in identified gram panchayats. Thus, in total eight gram panchayats were included in the study sample. Again for selection of villages, two progressive villages from each selected gram panchayats were taken for inclusion in investigation. Thus, in all sixteen villages were taken for the study purpose. For selection of respondents, only those respondents who were using at least one of the ICT tools for seeking agricultural information were selected. Total ten respondents were selected from each identified village by random sampling technique, thus, making a sample of 160 respondents for the investigation purpose. The data was collected by a pre-tested structured interview schedule through personal interview method. To measure the role of ICTs in transforming agriculture, a suitable schedule was developed. The schedule consisted of 21 statements pertaining to roles of ICTs. To measure the degree of importance of roles, the responses were recorded on a three point continuum *viz.* most important, important and least important, which were assigned 3, 2 and 1 score respectively. The recorded responses were counted and converted into mean per cent score for each role and were ranked accordingly. The mean per cent score for each role was calculated by using the formula:

$$\text{Mean per score} = \frac{\text{Score obtained by the respondents}}{\text{Maximum obtainable score}} \times 100$$

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Table 1. Role of ICTs in transformation of agriculture as perceived by tribals. n = 160

Sr. No.	Role of ICT	Banswara district		Dungarpur district		Total	
		MPS	Rank	MPS	Rank	MPS	Rank
1.	Weather forecast	55.4	VI	55.4	VII	55.4	VIII
2.	Scientific package of practices of crops	63.3	IV	62.0	V	62.7	V
3.	Market information	5.7	VII	50.4	IX	52.1	X
4.	Agricultural news	72.0	II	69.6	III	70.8	III
5.	Post harvest technology	36.2	XVII	38.3	XVI	37.3	XIX
6.	Input prices	52.0	VIII	49.6	X	50.8	XI
7.	Plant protection measures	63.3	IV	58.8	VI	61.0	VII
8.	Organic farming practices	44.5	XII	48.8	XI	46.7	XIV
9.	Value addition to farm products	34.1	XVIII	34.2	XIX	34.2	XXI
10.	Decision making on agricultural issues	59.1	V	51.7	VIII	55.2	IX
11.	Skill training	40.0	XV	37.1	XVII	38.5	XVIII
12.	Information on agricultural development programs and policies	46.6	XI	42.9	XIII	44.8	XV
13.	Latest technological information on agriculture and allied field	77.0	I	78.8	I	77.9	I
14.	Quick solution of farmers problem	68.7	III	64.6	IV	66.7	IV
15.	Live shows to get first hand agricultural information	72.0	II	72.9	II	72.5	II
16.	Qualitative and quantitative information on crops of the areas	42.9	XIII	40.4	XIV	41.7	XVI
17.	On farm communication	49.5	IX	49.6	X	49.6	XII
18.	Effective dialogues between experts and farmers for learning	48.3	X	45.4	XII	46.9	XIII
19.	Timely decision making on matters related to agriculture	59.2	V	64.6	IV	61.9	VI
20.	Profitable making of agricultural products	41.3	XIV	39.6	XV	40.4	XVII
21.	Sustainable agriculture production	37.9	XVI	36.3	XVIII	37.1	XX

MPS = Mean Per cent Score

Score obtained by the respondents

Mean percent Score = $\frac{\text{Score obtained by the respondents}}{\text{Maximum obtainable score}} \times 100$

Maximum obtainable score

To find out the difference between the respondents of Banswara and Dungarpur districts about the role of ICTs in transforming agriculture, 'Z' test was

used and results were discussed accordingly. Open-ended response instead of closed-related responses were invited from the farmers in case of identifying the benefits and problems in using ICT in Southern Rajasthan. Descriptive statistics like frequency, percentage and ranking were used to analyze the raw data.

Table 2. Difference between the respondents of Banswara and Dungarpur districts with respect to role of ICTs in agricultural transformation.

Sr. No.	Category of respondent	Mean	S.D.	'Z' Value
1	Banswara district	33.54	5.58	0.839 ^{NS}
2	Dungarpur district	32.73	6.62	

NS: Non Significant

RESULTS AND DISCUSSION

Role of ICTs in transforming agriculture as perceived by tribal farmers

The results (Table 1) revealed that important roles of ICTs as perceived by tribal farmers in a chronological order. The latest technological information on agriculture and allied field was perceived as major role by 78% of the respondents in both the districts and was accorded with 1st rank with mean percent score (MPS) of (77% and 78.7%). The statement 'Live shows to get first hand agricultural information' was perceived as another major role of ICTs by (73%) of the respondents and was accorded 2nd rank. Similarly, agricultural news, quick solution of farmers problem, scientific package of practices of crops and timely decision making on matters related to agriculture showed most important direct roles with MPS of 70.8, 66.7, 62.7, and 61.9 and were placed at 3rd, 4th, 5th and 6thrank respectively.

The other significant roles of ICT as expressed by tribals were; plant protection measures (61.0%), weather forecast (55.4%), decision making on agricultural issues (55.2%), market information (52.1%), input prices (50.8%), on farm communication (49.6%), effective dialogues between experts and farmers for learning (46.9%) and organic farming practices (46.7%) and these were ranked 7th, 8th, 9th, 10th 11th, 12th, 13th and 14th respectively.

The roles which were expressed with little less importance were; information on agricultural development programs and policies (44.8%), qualitative and quantitative information on crops

of the areas (41.7%), profitable marketing of agricultural products (40.4%), skill training (38.5%), Post harvest technology (37.3%), Sustainable agriculture production (37.1%), and Value addition to farm products (34.2%) thus were placed at 15th, 16th, 17th, 18th, 19th, 20th and 21st respectively. The present findings were in line with the findings of Chhachhar *et al* (2008), Dhaka and Chayal (2010) and Chandra *et al* (2018).

Difference between the respondents of Banswara and Dungarpur districts with respect to perceived roles of ICT in transforming agriculture by tribals

Perusal of data (Table 2) show that calculated 'Z' value 0.839 was found to be less than the tabulated value. So the null hypothesis (NH₀₁) "There was no difference between the respondents of Banswara and Dungarpur districts regarding perceived roles of ICTs in agricultural transformation was accepted and research hypothesis (RH₁) was rejected. From the above results, it could be concluded that there was no significant difference in role of ICT among the respondents of Banswara and Dungarpur districts, as perceived by them. It means that respondents of both the districts expressed more or less similar roles played by ICTs in agricultural transformation in the study area.

Further, analysis of table revealed that non-significant difference was observed between the districts with respect to the roles of ICT. The mean value of the respondents of Banswara district about role of ICTs was little higher than the respondents of Dungarpur district, which indicates that farmers of Banswara district had perceived relatively more

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Table 3. Benefits of using ICTs as perceived by the tribal farmers.

n=160

Sr. No.	Benefits of Using ICT tools	Frequency	Per centage	Ranking
1	Easy access to information	147	91.87	I
2	Reliable and timely information	138	86.25	II
3	Time saving	127	79.38	III
4	Cost effective	121	75.63	IV
5	Timeliness in getting information	119	74.38	V
6	More coverage of subject matter	114	71.25	VI
7	Helping in making correct decisions	107	66.88	VII

roles played by ICT than the farmers of Dungarpur district. It might be due to the fact the farmers of Banswara district were more aware and explored the benefits of ICT more than the farmers of Dungarpur district. The present findings were in contradictory to the findings of Dhaka and Chayal (2010).

Benefits of ICTs as perceived by the tribal farmers

The benefits of using ICTs as perceived by the tribal farmers were identified as per order of merit (Table 3) and these were; easy access to information, cost-effective, timeliness in getting information, more coverage of subject matter, help in making correct decisions, time saving and reliable and timely information. ICT reduces the physical barrier of distance and helps in communicating the message in less time and cost without the involvement of huge manpower. The messages were mostly multimedia messages covering more subject matter in a very lucid manner which attracts the every sense of the receivers. The timely information on weather and market helps the farmers to decide their activities accordingly to minimize the losses and harvest as much profit as possible.

The above findings of the study regarding the benefits of using ICT tools as perceived by the farmers were in conformity with the findings of Dhaka and Chayal (2010), Shandhu *et al.* (2012) and Chandra *et al.* (2018). The promise of ICTs in agricultural extension is that they can energize the collection, processing, and transmission of data, resulting in a faster extension of quality information

to more farmers in a bottom-up and interactive channel of communication (Singh, 2011).

Problems encountered by tribals in using ICTs

A perusal of data (Table 4) shows that majority of the farmers perceived high price of ICT tools as the main problem in using ICT services (85.63%), followed by lack of awareness of using ICT tools (80.63%), poor finance (79.38%), language barrier in comprehending ICT directed messages (76.88%), lack of skill in handling ICT tools (75%), low ICT literacy (72.50%), low network connectivity (70.63%), irregular power supply (67.50%), lack of confidence in operating ICTs (65.63%), insufficient ICT infrastructure (61.88%), lack of location-specific information (60%), and negative attitude towards ICTs (56.88%). ICT is not a new thing to the younger generation but it is a new thing to the older farmers who used to be habituated in traditional transfer of technology processes. They are not very much aware of using modern ICT tools. The proper use of ICT tools requires training which was found to be lacking on the farmer's part and this resulted in the lack of skill in using ICT tools. Sometimes ICT messages are sent in English and scientific languages which are hard to comprehend by the farmers. The messages which are spread by radio and television are sometimes very much general in nature which are not applicable to the local situation. Sometimes the poor farmer cannot afford to buy a good quality radio/television/mobile phone due to its high price. The common internet facility like village kiosks/ village cyber café is very

Table 4. Problems encountered by tribals in using ICT tools.**n=160**

Sr. No.	Problems of Using ICT tools	Frequency	Per centage	Ranking
1	High price of ICT tools	137	85.63	I
2	Lack of awareness of using ICT tools	129	80.63	II
3	Poor Finance	127	79.38	III
4	Language barrier	123	76.88	IV
5	Lack of skill in handling ICT tools	120	75.00	V
6	Low ICT literacy	116	72.50	VI
7	Low Network connectivity	113	70.63	VII
8	Irregular/ Erratic power supply	108	67.50	VIII
9	Lack of confidence in operating ICTs	105	65.63	IX
10	Insufficient ICT infrastructure	99	61.88	X
11	Lack of location specific information	96	60.00	XI
12	Negative attitude towards ICTs	91	56.88	XII

rare to find at hill villages. There are a huge signal and tower problem reported in villages which are geographically isolated. The problem in catching signal and tower makes the ICT tools like radio, television, and mobile inoperative in those villages.

The above findings of the study regarding the problems of using ICT tools as perceived by the farmers were in line with the findings of Singh *et al* (2008), Dhaka and Chayal (2010), Sharma *et al* (2014) and Chandra *et al* (2018) who reported in their study that role of helpline services in technology dissemination was poor connectivity, lack of awareness among farmers and incomprehensible technical information provided through helpline services were perceived as constraints in effective on-line information dissemination to the farmers.

CONCLUSION

The results of the study concluded that the role of ICTs in transformation agriculture is tremendous as expressed by tribal respondents. The farmers perceived latest technological information and observed live shows to get the first hand information. Further another role perceived by tribals was agricultural news which fulfilled their information need. Considering the significant roles played by ICTs, it is suggested that the use of ICTs be promoted in the study area so as to minimize the

information gap and to fulfil the information needs of the farmers.

It was further inferred that easy access to information is the main benefits of using ICT tools and reliable & timely information and high price of ICT tools and lack of awareness is the major problems of using ICT tools as perceived by the farmers of Banswara and Dungarpur districts.

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