Int.J.Curr.Microbiol.App.Sci (2020) Special Issue-11: 3488-3498

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Special Issue-11 pp. 3488-3498**
Journal homepage: http://www.ijcmas.com

Original Research Article

Utilization of Digital and Communication Technologies (DCTs) in Agriculture by the Farmers

A. P. Kharge*, R. P. Kadam and A. G. More

Department of Extension Education, College of Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani-431 402, M.S., India
**Corresponding author*

A B S T R A C T

The present study explored utilization of farmers towards Digital and Communication Technologies (DCTs) in agriculture. For the study Parbhani district were randomly selected from Marathwada region of Maharashtra State. Three talukas viz., Parbhani, Gangakhed and Purna from Parbhani district were selected randomly and three villages from each talukas were selected randomly. From each village fifteen respondents were selected randomly. That respondent who are using smart phone with internet facilities is available and engaged in agricultural operations. The constituting total sample size is 135. The Ex-post-facto research design was used for the study. A well structured questionnaire designed for study was used for collecting the data from respondents through personal interview method. The data collections from the respondents were edited tabulated and analyzed using suitable statistical tools like frequency, percentage, mean, standard deviation and Pearsons coefficient of correlation. The study was noticed that utilization of digital communication technologies by the farmers. This part depicts the extent of use of DCT tools, Duration of use of DCT tools and extent of purpose for use of DCT tools. The extent of use of Digital and Communication Technologies (DCT) tools by the farmers i.e. 60.00 per cent were using DCT tools medium extent, followed by low extent 20.74 per cent and rest high extent 19.26 per cent. The DCT tools used by farmers for 1 to 2 hours duration were, Smart phone 83.70 per cent, Agriculture mobile app 71.85 per cent, Television 38.51 per cent, Whatsapp and You tube 32.59 per cent, Instagram 25.92 per cent, Twitter 4.44 per cent, Computer and e-mail 2.96 per cent, Wikipedia, e-learning and Laptop 0.74 per cent. The purpose of 'plant protection measurements' by the farmers according to priority the DCT tools highly used was Television 100.00 per cent, Whatsapp 99.25 per cent, Agriculture mobile app and smart phone 97.03 per cent, You tube 96.29 per cent, Facebook 88.88 per cent, Wikipedia 78.51 per cent, Web portal 60.74 per cent, Instagram 54.07 per cent, e-learning 36.29 per cent, mobile SMS service 31.11 per cent, *etc*.

Keywords

DCT tools, utilization, extent of use, duration of use, profile of farmers

Introduction

The term Digital and Communication Technologies (DCT) can be referred as electronic and digital technologies for storing, processing, transferring of information and communication. In the present era, new avenues in the form of Digital and Communication Technology (DCT) are being used for dissemination of agricultural information. The DCT's range from simple person to person tools like email

and social media messaging to complex tools such as machine to machine remote sensing tools used in primary industries (Anonymous, 2014). Another report found that the 97 per cent of users use mobile as one of the devices to access internet. While internet users grew by 7 per cent in urban India, reaching 315 million users in 2018 and digital adoption is now being propelled by rural India, registering a 35 per cent of growth in internet users over the past year. It is now estimated that there are 251 million internet users in rural India, and this is expected to reach 290 million by the end of 2019 (Anonymous, 2019-B).

Information is a valuable input through which farmers adopt new technologies to make the farming more profitable. The application of Digital and Communication Technology (DCT) offers wider possibilities, there by strengthening transfer of technology between research and extension system and further on word transmission to the individuals.

The old ICT tools example like radio, television, video, films, slides, pictures, print media, telephone, *etc*., are being used to disseminate the information to the grassroots level users. The modern Digital and communication Technologies (DCT) tools like agriculture mobile app, mobile SMS service, e-learning, video-conferencing, e-mail, Facebook, Whatsapp, You tube, Twitter, blog, Wikipedia, web portal. Another Kisan Krishideepam, IFFCO kisan app, e-NAM, Kisan Kerala, Agri-media app, e-SAP, kisanmitra, telephone, films, slides, radio, *etc*., these tools is wireless communication technology along with powerful software which can process and integrate sound, text, video into electronic media. Apart from these other Digital and Communication Technologies (DCT) tools used, but an above tools are the prominently used by the farmers and general Indian populations.

Materials and Methods

The present study was carried out in Marathwada region of Maharashtra State during the year 2019-20. The present investigation was carried out in Marathwada region for the study one district is selected randomly, i.e. Parbhani. In Parbhani district of three talukas selected randomly i.e. Parbhani, Gangakhed, and Purna. In selected talukas three villages were randomly selected, thus total nine villages were selected for the present investigation. From each selected village, fifteen (15) farmers were selected randomly. That farmer who are using smart phone with internet facilities is available and engaged in agricultural operations was selected as a respondent. Thus, 135 (Total 9 × 15 = 135) total respondents for the present study.

The utilization of digital communication technologies by the farmers, this part depicts the extent of use of DCT tools, Duration of use of DCT tools and extent of purpose for use of DCT tools. An interview schedule was prepared, so as to collect the information in line with the objectives of the study. Personal interview technique was used for data collection.

The ex-post-facto research design was used for the present study. The data collected from the selected respondent during the course of investigation was entered and tabulated in the excel worksheet and then appropriate analysis of data was made according to objectives formulated for study.

Further, the statically techniques were applied to analyze tabulated data and interpreted it to reach up to the findings.

Statistical methods to be used viz. mean, standard deviation, Karl Pearson's correlation coefficient, frequency and percentage.

Results and Discussion

Profile characteristics of farmers

The profile characteristics of farmers are presented in table 1. The results in table 1 show that, majority 58.52 per cent of the respondents belonged to middle age group, followed by 21.48 per cent were young category. The results were supported by the findings of Giridhar *et al.,* (2019). Majority 35.56 per cent of the respondents were educated up to secondary school level, followed by 30.37 per cent of the respondents were educated up to primary school level, 15.56 per cent of the respondents were educated up to college level. The results were supported by the finding of Giridhar *et al.,* (2019). Majority 61.48 per cent of the respondents belonged to category of marginal land holding, followed by 21.48 per cent of the respondents belonged to small category. The results were supported by the finding of Panda *et al.,* (2019). Majority 60.74 per cent of the respondents had medium years of farming experience, followed by 23.70 per cent of the respondents had low years of farming experience.

The results were supported by the finding of Giridhar *et al.,* (2019). Majority 58.52 per cent of the respondents belonged to medium possession of DCT tools, followed by 25.93 per cent of the respondents belonged to low possession of DCT tools. The results were supported by the finding of Naik (2018). Majority of 84.44 per cent respondents belonged to medium level of annual income; followed by 14.07 per cent were high level of annual income. The results were supported by the finding of Tomar *et al.,* (2016).

The results in table 1 show that, majority of 63.70 per cent of the respondent had not attended training, followed by 22.22 per cent of respondents were attended 1 – 2 training. The results were supported by the finding of Thangjam and Jha (2019). Majority of 60.00 per cent respondents had medium extension contact, followed by similar percentage i.e. 20.00 of the respondents had high and low extension contact.

The results were supported by the finding of Tomar *et al.,* (2016). Majority of 61.48 per cent of the respondents had medium level of innovativeness; followed by 20.74 per cent were high level of innovativeness. The results were supported by the finding of Naik (2018). Majority of 51.11 per cent of the respondents had medium level of risk orientation; followed by 25.19 per cent were high level of risk orientation. The results were supported by the finding of Verma *et al.,* (2016). Majority of 51.85 per cent of the respondents had medium level of scientific orientation; followed by 28.15 per cent were high level of scientific orientation. The results were supported by the finding of Naik (2018). Majority of 57.04 per cent of the respondents had medium level of economic orientation, followed by 25.19 per cent of the respondents had high level of economic orientation.

The results were supported by the finding of Naik (2018). Majority of 63.70 per cent of the respondents had medium awareness; followed by 18.52 per cent were high awareness. The results were supported by the finding of Devaraj and Ravichandran (2014).

To study the utilization of digital communication technologies by the farmers

This section includes utilization of digital communication technologies by the farmers. This part depicts the extent of use of DCT tools (table 2), Duration of use of DCT tools (table 3), and extent of purpose for use of DCT tools (table 4).

Extent of use of Digital and Communication Technologies (DCT) tools by the farmers

Extent of use of DCTs tools was operationalized as frequency of use of Digital and Communication Technologies (DCTs) tools by the farmers for obtaining information on different areas related to agriculture. The table 2 indicates the extent of use of Digital and Communication Technologies (DCT) tools by the farmers. It is clear that half of the farmers i.e. 60.00 per cent were using DCT tools medium extent, followed by low extent 20.74 per cent and rest high extent 19.26 per cent. The probable reason behind that majority of farmers is educated up to secondary school level, marginal land holding and medium level of annual income.

In addition to this lack of uninterrupted power supply, inadequate internet facilities, lack of awareness about DCT tools, less exposure towards DCT, lack of training as most of farmers are belonged to middle age group.

Duration of use of Digital and Communication Technologies (DCT) tools by the farmers.

It refers to the duration of use of Digital and Communication Technologies (DCT) tools for various purposes which utilized by the farmers. The information regarding the duration of use of DCT tools by the farmers were collected, tabulated and analyzed.

The table 3 revealed that DCT tools used by farmers regarding hours per day with duration of 30 min in order to priority were, e-mail 65.18 per cent, Wikipedia and Web portal 48.41 per cent, mobile SMS service 31.85 per cent, e-learning 21.48 per cent, Instagram 11.11 per cent, Blog 7.40 per cent, Twitter 6.66 per cent, Video-conferencing, Laptop and Facebook 5.18 per cent, Computer 2.96 per cent, Agriculture Mobile Apps 2.22 per cent, Smart Phone and Information kiosk machine 1.48 per cent.

The DCT tools used by farmers for 30 min. to 1 hours duration were, Wikipedia 34.07 per cent, Agriculture Mobile App 20.00 per cent, Facebook 16.29 per cent, Twitter 15.55 per cent, e-mail 14.81 per cent, Instagram 14.07 per cent, Television and Computer 8.88 per cent, Laptop 5.18 per cent, Smart phone 4.44 per cent, You tube 2.96 per cent, Blog 2.22 per cent, mobile SMS service 1.48 per cent.

The DCT tools used by farmers for 1 to 2 hours in order to priority were, Smart phone 83.70 per cent, Agriculture mobile app 71.85 per cent, Television 38.51 per cent, Whatsapp and You tube 32.59 per cent, Instagram 25.92 per cent, Twitter 4.44 per cent, Computer and e-mail 2.96 per cent, Wikipedia, e-learning and Laptop 0.74 per cent. The DCT tools used by farmers for 2 to 3 hours in order to priority were, Whatsapp 67.40 per cent, You tube 62.96 per cent, Television 52.59 per cent, Smart phone 10.37 per cent, Facebook 5.92 per cent, Agriculture mobile app 4.44 per cent, Instagram 3.7 per cent.

The transfer of agricultural technology is depends on the communication media and Digital and Communication Technologies (DCTs) tools. Smart phone, Agriculture Mobile App, Whatsapp, You tube, Facebook, television considered as best means of communication as well as technology transfer.

These tools is duration of utilization is more than others tools. Some DCT tools like Computer, Laptop, Information Kiosk Machine, Video-conferencing, *etc*. are less used by the respondents due to lack of training, low level of education and lack of awareness.

Extent of purpose for use of Digital and Communication Technologies (DCT) tools

It refers to the purpose of use of Digital and communication Technologies (DCT) tools for various purposes which utilized by the farmers. The purpose were classified into six category such as, purchase farm inputs, extension advisory services, marketing general information, read weather condition, general agriculture news and plant protection measurement.

The table 4 revealed that for the purpose of 'purchase farm input' by the farmers according to priority the DCT tools highly used was e-mail 81.48 per cent, Smart Phone 77.77 per cent, Whatsapp 68.88 per cent, Television 16.29 per cent, Agriculture mobile app 11.85 per cent, Facebook 4.44 per cent, You tube 3.70 per cent, Web portal 2.22 per cent, Computer and Wikipedia 1.48 per cent, Laptop, Mobile SMS service and Instagram 0.74 per cent.

The probable reason might be that for the purpose of 'purchase farm input', farmers were highly used DCT tools like Smart phone due to farmers get the right information about farm input availability and price within few minutes, contact with sellers are found in cities market. There are many local agricultural Whatsapp group provides timely information about farm inputs. The other DCT tools like Television, You tube and Mobile App's that a platform helps provide right market price information.

The purpose of 'extension advisory service' by the farmers according to priority the DCT tools highly used was Whatsapp 91.85 per cent, Television 89.62 per cent, You tube 84.44 per cent, Facebook 83.70 per cent, Agriculture Mobile app 73.33 per cent, Smart phone 72.59 per cent, Web portal 21.48 per cent, Wikipedia 20.74 per cent, e-learning 14.07 per cent, Instagram 10.37 per cent, Mobile SMS service and Blog 5.18 per cent, Computer 4.44 per cent, Twitter 3.70 per cent, Laptop and Video conferencing 1.48 per cent, e-mail 0.74 per cent.

The probable reason behind that for the purpose of 'extension advisory service' farmers were highly used Whatsapp, Television, You tube, Facebook, *etc*. tools because easily getting the extension advice about agricultural operations.

The purpose of 'marketing general information' by the farmers according to priority the DCT tools highly used was Whatsapp 65.18 per cent, e-mail 51.85 per cent, Smart phone 51.11 per cent, Television 48.81 per cent, Agriculture Mobile App 29.62 per cent, You tube 19.25 per cent, Facebook 14.07 per cent, Mobile SMS service 2.22 per cent, Web portal 1.48 per cent, Computer, Laptop, Instagram and Twitter 0.74 per cent.

The probable reason might be that farmers need timely information about agricultural marketing is fulfill by the use of DCT tools like Whatsapp, personal e-mail, Television and Agricultural Mobile App i.e. e-NAM.

The purpose of 'read weather condition' by the farmers according to priority the DCT tools highly used was Whatsapp 85.11 per cent, Television 75.55 per cent, Smart phone 71.11 per cent, Agriculture mobile app 52.69 per cent, Facebook 27.40 per cent, mobile SMS service 22.96 per cent, You tube 17.77 per cent, Computer 2.96 per cent, Laptop 2.22 per cent, Web portal 1.48 per cent, e-learning, e-mail and Wikipedia 0.74 per cent.

The reason behind that daily weather information is easily available to farmers in digital platforms like agro-met Whatsapp group, daily news on Television, weather app on Smart phone, *etc.*

Table.1 Profile Characteristics of the respondents

Sr. No.		Respondents (n=135)	
		Number	**Percentage**
1	**Age**		
	Young (Below 33 years)	29	21.48
	Middle (34 to 55 years)	79	58.52
	Old (Above 56 years)	27	20.00
2	**Education**		
	Illiterate	6	4.44
	Can read and write only	0	0
	Primary school level	41	30.37
	Secondary school level	48	35.56
	Higher secondary education	19	14.07
	College level	21	15.56
3	**Land holding**		
	Marginal (Below 1.00 ha)	83	61.48
	Small (1.01 to 2.00 ha)	29	21.48
	Semi Medium (2.01 to 4.00 ha)	18	13.33
	Medium (4.01 to 10.00 ha)	5	3.70
	Large (Above 10.00 ha)	0	0
4	**Farming experience**		
	Low (Below 10 years)	32	23.70
	Medium (11 - 32 years)	82	60.74
	High (33 and above)	21	15.56
5	**Possession of DCT tools**		
	Low (Below 8)	35	25.93
	Medium (9 to 12)	79	58.52
	High (Above 13)	21	15.55
6	**Annual income**		
	Low (Below Rs. 12,275)	2	1.48
	Medium (Rs. 12,276 to 2,94,169)	114	84.44
	High (Above Rs. 2,94,170)	19	14.07
7	**Training undergone**		
	No trainings	86	63.70
	1 – 2 trainings	30	22.22
	3 – 4 trainings	15	11.11
	More than 4 training	4	2.96
8	**Extension contact**		
	Low (Below 23)	27	20.00
	Medium (24 - 39)	81	60.00
	High (Above 40)	27	20.00
9	**Innovativeness**		
	Low (Below 8)	24	17.78
	Medium (9 - 11)	83	61.48

	High (Above 24)	28	20.74
10	**Risk orientation**		
	Low (Below 19)	32	23.70
	Medium (20 - 23)	69	51.11
	High (Above 24)	34	25.19
11	**Scientific orientation**		
	Low (Below 21)	27	20
	Medium (22 - 25)	70	51.85
	High (Above 26)	38	28.15
12	**Economic orientation**		
	Low (Below 20)	24	17.78
	Medium (21 – 24)	77	57.04
	High (Above 25)	34	25.19
13	**Awareness**		
	Low (Below 11)	24	17.78
	Medium (12 – 18)	86	63.70
	High (Above 19)	25	18.52

Table.2 Distribution of respondents according to extent of use of Digital and Communication Technologies (DCT) tools.

Sr. No.	**Category**	**Respondents (n=135)**	
		Frequency	**Percentage**
1	Low (Below 13)	28	20.74
2	Medium (14 – 18)	81	60.00
3	High (Above 19)	26	19.26
Mean = 16			**S.D. = 3.236**

Table.3 Distribution of respondents according to duration of use of DCTs tools by the farmers.

Sr. No.	DCT Tools	II) Utilization of DCT Tools in hours per Day (Duration)			
		30 min	30 min to 1 hrs	1 to 2 hrs	2 to 3 hrs
1	Agriculture Mobile App	3 (2.22%)	27 (20.00%)	97 (71.85%)	6 (4.44%)
2	Television	-	12 (8.88%)	52 (38.51%)	71 (52.59%)
3	Computer	4 (2.96%)	12 (8.88%)	4 (2.96 %)	-
4	Laptop	7 (5.18%)	7 (5.18%)	1 (0.74%)	-
5	Smart Phone	2 (1.48%)	6 (4.44%)	113 (83.7%)	14 (10.37%)
6	Information Kiosk Machine	2 (1.48%)	-	-	-
7	Mobile SMS Service	43 (31.85%)	2 (1.48%)	-	-
8	e-learning	29 (21.48%)	16 (11.85%)	1 (0.74%)	-
9	Video conferencing	7 (5.18%)	-	-	-
10	e-mail	88 (65.18%)	20 (14.81%)	4 (2.96%)	-
11	Facebook	7 (5.18%)	22 (16.29%)	81 (60%)	8 (5.92%)
12	Whatsapp	-	-	44 (32.59%)	91 (67.4%)
13	You tube	-	4 (2.96%)	44 (32.59%)	85 (62.96%)
14	Instagram	15 (11.11%)	19 (14.07%)	35 (25.92%)	5 (3.7%)
15	Twitter	9 (6.66%)	21 (15.55%)	6 (4.44%)	-
16	Blog	10 (7.40%)	3 (2.22%)	-	-
17	Wikipedia	65 (48.14%)	46 (34.07%)	1 (0.74%)	-
18	Web Portal	65 (48.14%)	24 (17.77%)	-	-

Table.4 Distribution of respondents according to their extent of purpose for use of DCTs tools by the farmers.

Sr. No.	DCT Tools	III) Purpose of Utilization					
		Purchase Farm Input	Extension Advisory Services	Marketing General information	Read weather Condition	General Agriculture News	Plant protection Measurements
1	Agriculture Mobile App	16 (11.85%)	99 (73.33%)	40 (29.62%)	71 (52.69%)	132 (97.77%)	131 (97.03%)
2	Television	22 (16.29%)	121 (89.62%)	66 (48.88%)	102 (75.55%)	135 (100%)	135 (100%)
3	Computer	2 (1.48%)	6 (4.44%)	1 (0.74%)	4 (2.96%)	15 (11.11%)	16 (11.85%)
4	Laptop	1 (0.74%)	2 (1.48%)	1 (0.74%)	3(2.22%)	12 (8.88%)	8 (5.92%)
5	Smart Phone	105 (77.77%)	98 (72.59%)	69 (51.11%)	96 (71.11%)	129 (95.55%)	131 (97.03%)
6	Information Kiosk Machine	-	-	-	-	-	1 (0.74%)
7	Mobile SMS service	1 (0.74%)	7 (5.18%)	3 (2.22%)	31 (22.96%)	4 (2.96%)	42 (31.11%)
8	e-learning	-	19 (14.07%)	-	1 (0.74%)	13 (9.62%)	49 (36.29%)
9	Video conferencing	-	2 (1.48%)	-	-	1 (0.74%)	2 (1.48%)
10	e-mail	110 (81.48%)	1 (0.74%)	70 (51.85%)	1 (0.74%)	1 (0.74%)	1 (0.74%)
11	Facebook	6 (4.44%)	113 (83.70%)	19 (14.07%)	37 (27.4%)	119 (88.14%)	120 (88.88%)
12	Whatsapp	93 (68.88%)	124 (91.85%)	88 (65.18%)	115 (85.18%)	135 (100%)	134 (99.25%)
13	You tube	5 (3.70%)	114(84.44%)	26 (19.25%)	24 (17.77%)	128(94.81%)	130 (96.29 %)
14	Instagram	1 (0.74%)	14 (10.37%)	1 (0.74%)	-	24 (17.77%)	73 (54.07%)
15	Twitter	-	5 (3.7%)	1 (0.74%)	-	30 (22.22%)	35 (25.92%)
16	Blog	-	7 (5.18%)	-	-	11 (8.14%)	14 (10.37%)
17	Wikipedia	2 (1.48%)	28 (20.74%)	-	1 (0.74%)	27 (20%)	106 (78.51%)
18	Web Portal	3 (2.22%)	29 (21.48%)	2 (1.48%)	2 (1.48%)	72 (53.33%)	82 (60.74 %)

The purpose of 'general agriculture news' by the farmers according to priority the DCT tools highly used was Television and Whatsapp is 100.00 per cent, Agriculture mobile app 97.77 per cent, smart phone 95.55 per cent, You tube 94.81 per cent, Facebook 88.14 per cent, Web portal 53.33 per cent, Twitter 22.22 per cent, Wikipedia 20.00 per cent, Instagram 17.77 per cent, Computer 11.11 per cent, e-learning 9.62 per cent, Laptop 8.88 per cent, Blog 8.14 per cent, mobile SMS service 2.96 per cent, video-conferencing and e-mail 0.74 per cent.

The reason behind that farmer can easily watch the daily happenings in the field of agriculture on Television, You tube, Whatsapp, *etc*.

The purpose of 'plant protection measurements' by the farmers according to priority the DCT tools highly used was Television 100.00 per cent, Whatsapp 99.25 per cent, Agriculture mobile app and smart phone 97.03 per cent, You tube 96.29 per cent, Facebook 88.88 per cent, Wikipedia 78.51 per cent, Web portal 60.74 per cent, Instagram 54.07 per cent, e-learning 36.29 per cent, mobile SMS service 31.11 per cent, Twitter 25.92 per cent, Computer 11.82 per cent, Blog 10.37 per cent, Laptop 5.92 per cent, Video-conferencing 1.48 per cent, Information Kiosk machine and e-mail 0.74 per cent.

The reason behind those needy farmers easy crop pest and diseases control information is available on digital platforms like television, Whatsapp, agricultural mobile app, You tube, Facebook, *etc*. The results of present study shows that majority of farmer middle age category, majority of farmer were educated up to secondary school level, majority farmers possessed marginal land holding, majority of farmer were medium farming experience, majority of farmer were medium level of possession of DCT tools, majority of farmer were medium level of annual income, majority of farmer were not attended any training, majority of farmer were medium extension contact, majority of farmer were medium level of innovativeness, majority of farmer were medium level of risk orientation, majority of farmer were medium level of scientific orientation, majority of farmer were medium level of economic orientation, majority of farmer were medium awareness about Digital and Communication Technology (DCT).The extent of use of Digital and Communication Technologies (DCT) tools by the farmers i.e. 60.00 per cent were using DCT tools medium extent, followed by low extent 20.74 per cent and rest high extent 19.26 per cent. The transfer of agricultural technology is depends on the communication media and the Digital and Communication Technologies (DCTs) tools. Smart phone, Agriculture Mobile App, Whatsapp, You tube, Facebook, television considered as best means of communication as well as technology transfer. The Digital and communication Technologies (DCT) tools for various purposes which utilized by the farmers. Farmers most prefer the tools like Whatsapp, agricultural mobile app, smart phone, Facebook, You tube, etc. which is commonly used for all purposes.

References

Anonymous, 2014. SMEs and digital communication techniques: a qualitative market research report prepared for the ACMA by Gfk Australia. Australian Communications and Media Authority Australian Communication and Media Authority.

Anonymous, 2019-B. Internet users in India to reach 627 million in 2019, retrieved from htteps://economictimes.indiatimes.com/tech/internet/internetusersinindiator

each27-million-in-2019-report/articleshow/68288868.cms on 18.04.2019.

Devaraj and Ravichandran, P. 2014. A Study on the role of information and mass media communication technology among farming community of Mandya District, Karnataka State. *Journal of Advances in Library and Information Science*, 3(1): 43-46.

Giridhar, K. A., Devendrappa, S. and M. P. Potdar. 2019. A detailed study of profile of famers using mobile phones services. *Journal of Pharmacognosy and Phytochemistry*,8(6): 461-465.

Naik, B. Jasawanth. 2018. A Study on ICT Tools Usage by the Farmers in Anatapur District of Andhra Pradesh. *M. Sc. (Agri.) Thesis,* Acharya N. G. Ranga Agricultural University, Guntur, Andhra Pradesh.

Panda, S., S. Modak, L. Devi, L. Das, P. K. Pal and M. S. Nain. 2019. Access and Usage of Information and Communication Technology (ICT) to Accelerate Farmers Income. *Journal of Community Mobilization and Sustainable Development*, 14(1): 200-205.

Thangjam B. and K. K. Jha. 2019. Socio-Economic Correlates and Information Sources utilization by Paddy farmers in bishnupur District, Manipur. *Int.J.Curr.Microbiol.App.Sci*, 8(10): 1652-1659.

Tomar, A., Bhardwaj, N., Verma, A. P and Sawant, M. N. 2016. Association between Socio Demographic Profile and Extent of Use of ICT among Farmers, *International Journal of Agricultural Science and Research*, 6(6): 163-168.

Verma, A. P., Ansari, M. A., Rajan, R., Archana, B., Rupan, R and Diksha, P. 2016. Farmers Attitude towards e-choupal: A Critical Investigation in Gonda District of Uttar Pradesh, *International Journal of Agriculture Sciences*, 8(49): 2076-2078.