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Utilization of Mobile Based ICT Tools by the Dairy Farmers of Satara and Pune Districts of Maharashtra

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Authors' contributions

This work was carried out in collaboration among all authors. Author KJ has collected data as a part of thesis. Author SK designed the study, developed questionnaire and interpreted data. Authors MN, AK and author AD helped in statistical analysis, and managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

This cross-sectional study was conducted to explore the extent of use of mobile based ICT tools by dairy farmers and constraints faced by them while its use. Respondents were randomly selected from two districts of western Maharashtra namely Satara and Pune and study was undertaken during June – November, 2020. A total of 120 respondents (60 each from Satara and Pune districts) were randomly selected and interviewed with the help of structured schedule. Analysis of data was done and frequency and percentage were calculated accordingly. Almost all the variables studied like age group (68.32%), family size (39.17%), land holding (48.33%), herd size (45.00%), experience (69.17%), social participation (75.84%), extension contacts (70.00%) and knowledge level (72.50%) could be grouped under medium level. Dairy farmers were mostly aware about voice calls (90.83%), whatsapp (82.50%) and financial apps for e-transaction (65%). However, they were totally unaware about use of Twitter, Skype, Instagram, Bluetooth and GIS applications. Similarly,

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most of the respondents never used video calls (73.34%), SMS facility (70.84%), and mobile for taking photographs (64.16%) related to dairy farming. Whats app found to be used on daily basis, and mobile based ICT tools were used primarily for social purposes with less involvement for its use in order to improve dairy farming activities. Major constraints faced by dairy farmers were unavailability of relevant information in local language, lack of reliable, useful and location specific contents, lack of repairing services and centers in the village. Based on the observations, it is concluded that actual utilization of mobile based ITC tools by dairy farmers is poor in terms of its use for the purpose of dairy related activities. There is need to popularized use of mobile based ICT tools and impart competence and skills in its use among the dairy farmers.

Keywords: Dairy farmers; Maharashtra; constraints; mobile based ICT tools.

1. INTRODUCTION

India is one of the largest producers of several agricultural and livestock products. At global scale, India is among the leading nations producing huge quantity of milk, pulses, jute, spices, poultry, eggs and fish [1]. As compared to the agriculture, livestock sector has shown potential and sustainability. Contribution of livestock sector in the GDP is around 4-5 per cent and this sector is a backbone of rural economy. Milk and milk products are highly nutritious, demanding and they are the largest constituent of Indian livestock sector. India is the largest milk producer globally with over 6.6 per cent annual growth and 21% of global milk production [2]. Information and communication technology (ICT) has transformed the growth of several sectors taking it to new heights including agriculture and animal husbandry. Indian dairy enterprise is largely dependent on the rural dairy farmers and therefore current knowledge, attitude and practices followed by them is crucial in the development of this sector [3]. There are wide varieties of ICT tools and mobile based ICT tools are more handy and accessible. However, effectiveness, efficacy and extent of usage of mobile based ICT tools in actual by the dairy farmers is less studied. Western Maharashtra is a progressive region and dairy co-operative sector is strongly built in this region. Pune and Satara districts are also contributing in significant milk production and therefor this study was purposively carried out on dairy farmers from these two districts. The aim of the study was to access the extent of use of various mobile based ICT tools, and constraints faced by them while its utilization.

2. METHODOLOGY

This study was conducted in Satara and Pune Districts of western Maharashtra by adopting ex-post facto research design. Western part of

Maharashtra state was purposively selected for the present study due to high milk production and animal population. A total of 60 dairy farmers were selected from each district by purposive random sampling. Respondents were purposively selected from four talukas, two each from Satara (Phaltan and Khandala) and Pune (Baramati and Purandar) districts. From each taluka, six villages were selected and from each village five respondents having more than five dairy animals were included in the study. They were interviewed with the help of structured schedule to access the use of mobile based ICT tools for dairy related activities. Data was collected through structured interview schedule, observation, interaction dialogue and detailed discussion with the dairy farmers, along with their family members. The data collected from the respondents was scored, tabulated and analyzed using suitable statistical tools i.e. frequency, percentage, arithmetic mean, standard deviation and correlation.

3. RESULTS AND DISCUSSION

In the present study socio- economic profile, knowledge level, extent of use, and constraints faced by dairy farmers while using mobile based ICT tools were evaluated. It was revealed that, majority of dairy farmers falls under middle age group (68.32%), literate, and having medium family size (39.17%). Most of them were categorized under high annual income group (81.67%), holding semi medium land (48.33%), medium herd size (45.00%), and medium level of experience (69.17%) of dairy farming. Milk production was also under medium category (51.67%), with medium levels of social participation (75.84%), extension contacts (70.00%) and knowledge (72.50%). Distribution of respondents on the basis of personal characteristics are detailed in Table 1. Similar observations were also made by previous researchers while studying the use of ICT tools

by the dairy farmers. A study from Nagaur district in Rajasthan on utilization pattern of smart phone among the farmers revealed that, 74.54 per cent farmers belonged to middle age group while 16.36 per cent farmer fall under old age category [4]. Similarly, findings of Tomar et al. [5] also showed that, majority of respondents (69.17%) belonged to middle age group. Involvement of majority of literate farmers in dairy farming has also been observed by other researchers [6,7]. Dairy farming is usually done along with agricultural farming and is considered as additional source of income. Most of the farmers under this study has adopted the same pattern. Present observations are well supported by previous studies similar in this regards [8,4]. They have also observed that, most of the respondents follow dairy farming as a subsidiary occupation. It was observed that, most of the dairy farmers were members of milk co-operative societies, self-help groups and Gram Panchayat. Present observations are in tune with the findings of De et al. [9] wherein they found that, most of the respondents (78.41%) had membership of one organization. The extension contact of the dairy farmers were also measured and it was revealed that, maximum dairy farmers had medium level of extension contacts (70.00%).

Altogether, extent of use of twenty four mobile based ICT tools and its utilization for dairy farming was analyzed during this study. It was observed that, dairy farmers were mostly aware about voice calls (90.83%), whatsapp (82.50%) and paytm/bhim apps (65%) for e-transaction. All the respondents were completely unaware of Twitter, Skype, Instagram, Bluetooth and GIS applications. Over 95 per cent of the respondents didn't used notebook, file transfer facility, memory card, e-literatures related to dairy farming, multimedia, video recorder facility, mobile applications on dairy farming, Facebook, e-mail etc. to acquire information regarding dairy related activities. Similarly, great percentage of respondents never used video calls (73.34%), SMS facility (70.84%), and mobile for taking photographs (64.16%) related to dairy farming (Table 2).

The response of dairy farmers towards extent of use of mobile based ICT tools in receiving dairy husbandry information was obtained on four-point continuum i.e. daily, weekly, monthly and never (Table 3). Present study revealed that, most of the farmers were daily using Whatsapp (72.50%) followed by voice calls (64.16%) and paytm/bhim app (34.16%). None of the dairy

farmers used memory card, file transfer, Notebook, Calendar, GIS, Multimedia on mobile, E-literature/ e-books/ e-bulletin/ e-leaflet, Video recorder, Bluetooth, Twitter, Instagram, Skype, Mobile applications on daily basis. Weekly use of mobile for taking photographs, financial transactions through paytm/bhim app (22.50%), video calls (14.16%), SMS (10.33%), Internet-Retrieving different internet sites (10.00%), Whatsapp (9.16%), YouTube (7.50%), etc. was lower. While none of the dairy farmers used Memory card, File transfer, Notebook, Calendar, GIS, Video recorder, Bluetooth, Skype, Twitter, Instagram on weekly basis. On monthly basis, dairy farmers were hardly using calendar (14.16%), E-mail (7.50%), Mobile applications (6.66%), Internet-Retrieving different internet sites (5.83%), SMS and YouTube (5.00%), E-literature/ e-books/ e-bulletin/ e-leaflet, Video calls (3.33%), Memory card (2.50%), Voice calls (1.67%), Facebook etc. Cent percent dairy farmers never used Skype, GPS, Twitter, and Instagram. Most of the dairy farmers use mobile based ICT tools primarily for social purposes with less involvement for its use in order to improve dairy farming activities.

Our findings are also in consistent to some of the previous studies carried out in India. Sinha et al. [10] noted similar findings wherein, about 40% respondents found to have access to the internet using owned laptop, mobile and computer. Comparable findings were also noted by Mutunga et al. [11] wherein, most of the (38.4%) respondents used their phones to send and receive both text and voice messages. Parallel findings were also revealed in the study of Kailash et al. [4]. Their findings were from Rajasthan and it was observed that, most of the respondents were internet users (29.09%) followed by what's app (27.27%), facebook (19.09%), newsletter (18.18%), farm publication and online video (13.63%), e-mail (10%) and twitter (4.54%). Use of internet through mobile phone is increasing day by day among young farmers for searching the diverse information on new technologies due to increased awareness about ICT tools. Prasad and Pradhan [7] observed that, majority of the respondents (98%) were using mobile phones daily, followed by 2 per cent of them using weekly. Regarding utilization of internet, majority of the respondents used it fortnightly (49%), followed by daily (40%) and (1%) weekly and 10 per cent of the respondents had a basic mobile phone with no internet connectivity. Findings of Agha et al. [12] are highly significant and related to the present

Table 1. Distribution of respondents on the basis of personal characteristics (N = 120)

Sr. No.	Variable	Category	Frequency	Percentage
1	Age	Young age (<25 years)	19	15.84
		Middle age (25-47 years)	82	68.32
		Old age (>47 years).	19	15.84
2	Education	Illiterate	00	00.00
		Primary	02	01.66
		Secondary	47	39.17
		Higher secondary	36	30.00
		Graduation	35	29.17
3	Occupation	Main	23	19.17
		Subsidiary	97	80.83
4	Family Size	Small family size	32	26.66
		Medium family size	47	39.17
		Large family size	41	34.17
5	Annual Income	Low (Up to Rs.50,000)	02	01.66
		Medium (Rs.50,001 to 1,00,000)	20	16.67
		High (Above Rs.1,00,000)	98	81.67
6	Land Size	Landless	05	04.17
		Marginal	10	08.33
		Small	33	27.50
		Semi-medium	58	48.33
		Medium	11	09.17
		Large	03	02.50
7	Herd Size	Small (up to 2 animals)	25	20.83
		Medium (3-4 animals)	54	45.00
		Large (above 5 animals)	41	34.17
8	Experience in dairy farming	Low (< 6 years)	18	15.00
		Medium (6 -18 years)	83	69.17
		High (> 18 years)	19	15.83
9	Milk Production	Low (Up to 8 litres)	27	22.50
		Medium (9-13 litres)	62	51.67
		High (Above 14 litres)	31	25.83
10	Social Participation	No member of any organization	29	24.16
		Member of organization	91	75.84
		Office bearer	00	00.00
11	Extension Contact	Low (<16)	21	17.50
		Medium (16-23)	84	70.00

Sr. No.	Variable	Category	Frequency	Percentage
12	Knowledge level of dairy farmers towards use of mobile based ICT tools	High (above 23)	15	12.50
		Low	16	13.34
		Medium	87	72.50
		High	17	14.16

Table 2. Use of mobile based ICT tools for dairy farming (N = 120)

Sr. No	ICT tools	Yes		No	
		F	%	F	%
1.	Mobile applications	12	10.00	108	90.00
2.	SMS	35	29.16	85	70.84
3.	Voice calls	109	90.83	11	09.17
4.	Video calls	32	26.66	88	73.34
5.	Internet- Retrieving different internet sites	28	23.33	92	76.67
6.	E-mail	14	11.66	106	88.34
7.	Whatsapp	99	82.50	21	17.50
8.	Facebook	13	10.83	107	89.16
9.	Twitter	00	00.00	120	100
10.	Instagram	00	00.00	120	100
11.	Youtube	17	14.16	103	85.83
12.	Skype	00	0.00	120	100
13.	Paytm / Bhim app / any other	78	65.00	42	35.00
14.	Multimedia on mobile	07	05.83	113	94.16
15.	E-literature/ e-books/ e-bulletin/ e-leaflet	05	04.16	115	95.83
16.	Video recorder	08	06.66	112	93.33
17.	Taking photographs	43	35.83	77	64.16
18.	Bluetooth	00	0.00	120	100
19.	Wi-Fi connectivity	18	15.00	102	85.00
20.	Geographical information system(GIS)	00	00.00	120	100
21.	Global positioning system(GPS)	09	07.50	111	92.50
22.	Memory card	03	02.50	117	97.50
23.	File transfer	02	01.66	118	98.33
24.	Notebook	01	00.83	119	99.16
25.	Calendar	23	19.16	97	80.83

Table 3. Extent of use of mobile based ICT tools by dairy farmers

Sr. No.	Mobile based ICT tools	Daily		Weekly		Monthly		Never	
		F	%	F	%	F	%	F	%
1.	Mobile applications	00	00	04	03.33	08	06.66	108	90.00
2.	SMS	16	13.33	13	10.33	06	05.00	85	70.84
3.	Voice calls	77	64.16	36	30.00	02	01.67	11	09.17
4.	Video calls	11	09.16	17	14.16	04	03.33	88	73.33
5.	Retrieving internet sites	09	07.50	12	10.00	07	05.83	92	76.66
6.	E-mail	02	01.66	03	02.50	09	07.50	106	88.33
7.	Whatsapp	87	72.50	11	09.16	01	00.83	21	17.50
8.	Facebook	07	05.83	04	03.33	02	01.66	107	89.16
9.	Twitter	00	00.00	00	00.00	00	00.00	120	100
11.	Instagram	00	00.00	00	00.00	00	00.00	120	100
10.	Youtube	02	01.66	09	07.50	06	05.00	103	85.83
11.	Skype	00	00.00	00	00.00	00	0.00	120	100
12.	Paytm / Bhim app / any other	41	34.16	27	22.50	10	08.33	42	35.00
13.	Multimedia on mobile	00	00.00	05	04.16	02	01.66	113	94.16
14.	E-literature/ e-books/ etc.	00	00.00	01	00.83	04	03.33	115	95.83
15.	Video recorder	00	00.00	00	00.00	08	06.66	112	93.33
16.	Taking photographs	02	01.66	27	22.50	14	11.66	77	64.16
17.	Bluetooth	00	0.00	00	0.00	00	0.00	120	100
18.	Wi-Fi connectivity	07	05.83	06	05.00	05	04.16	102	85.00
19.	GIS	00	00.00	00	00.00	00	00.00	120	100
20.	GPS	02	01.67	06	05.00	01	00.83	111	92.50
21.	Memory card	00	00.00	00	00.00	03	02.50	117	97.50
22.	File transfer	00	00.00	00	00.00	02	01.66	118	98.33
23.	Notebook	00	00.00	00	00.00	01	00.83	119	99.16
24.	Calendar	00	00.00	06	05.00	17	14.16	97	80.83

Table 4. Constraints faced by dairy farmers towards use of mobile based ICT tools

Sr. No	Statements	F	%	Rank
1.	Unavailability of relevant information in local language	87	72.50	I
2.	Lack of reliable, useful and location specific content	84	70.00	II
3.	Lack of repairing services and centers in village	82	68.33	III
4.	Lack of awareness about different mobile phone based ICT tools	72	60.00	IV
5.	Lack of time	69	57.50	V
6.	Inadequate literacy skills to use mobile based ICTs tools	62	51.66	VI
7.	Internet affordability and high maintenance cost	53	44.16	VII
8.	Security concern are main barrier	54	45.00	VIII
9.	Lack of training and practical exposure	44	36.67	IX
10.	Inadequate service related to network coverage, speed poor/ low network connectivity	41	34.17	X
11.	Complex technology	39	32.50	XI
12.	Financial problem/High cost of ICTs	23	19.17	XII

study. Whatsapp found to be most frequently used tool by the farmers. Secondly, usage of facebook, You Tube, Google+ and twitter fall in the range of 12- 58%.

Number of constraints were identified during the study with reference to the use of mobile based ICT tools by dairy farmers (Table 4). Unavailability of relevant information in local language (72.50%), lack of reliable, useful and location specific contents (70%), lack of repairing services and centers in village (68.33%), lack of awareness about different mobile phone based ICT tools (60%), lack of time (57.50%), inadequate literacy skills to use mobile based ICTs tools (51.66%), internet affordability and high maintenance cost (44.16%), security concern (45.00%) were the subsidiary constraints confronted by dairy farmers. Lack of training and practical exposure (36.67%), inadequate services related to network coverage and speed (34.17%), complex technology (32.50%) and high cost of ICT tools (19.17%) were the minimum constraint faced by the respondents. Related findings were reported by Sinha et al. [10] wherein they noted that, difficulty in reading the screen text, time constraints, poor utilization skill, hiked internet cost, difficulty in understanding the language were the foremost constraints faced by the respondents. Similar observations were recorded by Yadav et al. [13] wherein they conducted study in Bhilwara district of Rajasthan and reported that, improper service of network provider, difficulty to find relevant information, inadequate skill in using tools, unsuitable and incomprehensible information etc. as key constraints perceived by the farmers. Based on the findings, it was revealed that there must be specialized training programs for farmers on how to use mobile based ICT tools integrated with dairy farming activities.

4. CONCLUSION

Information and utilization of mobile based ICT tools by the dairy farmers included in this study for the purpose of dairy related activities seems to be poorly adopted and mobile based ICT tools are mostly used for social contacts. Several constraints are encountered by the dairy farmers while using mobile based ICT tools. There is need to create awareness, impart skill, competence and effectiveness of mobile based ICT tools for improvement in dairy business at farmer's level.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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