

UTILIZATION OF ICT TOOLS AMONG DAIRY FARMERS AND ASSOCIATED SOCIO-ECONOMIC FACTORS

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ABSTRACT

Information and Communication Technology (ICT) tools have emerged as pivotal assets in modernizing agricultural and allied sectors. ICT in dairy farming has several applications, from improved market information and real-time weather updates to personalized advisory services for the farmers. The current study explored how farmers use ICT tools in dairy farming to meet their information needs and how different factors are associated with it. The research design used was ex post facto. A total of 120 dairy farmers were chosen at random from 6 villages in Chittoor district of Andhra Pradesh state, and using an interview schedule, data was gathered. The results showed that most (47.50%) of the dairy farmers belonged to the medium level of ICT tools usage, followed by (31.70%) under low and (20.80%) under high categories. ICT tools that were primarily being used in the sample area were television, followed by mobile phones for getting market information and maintaining sales records, and disease management. Farmers usage of ICT tools is significantly influenced by a combination of socioeconomic, behavioural, and psychological factors, which included education, land ownership, income, information seeking habits, extension engagement, and attitudes toward risk, innovation, and achievement. While age and experience in dairy farming were negatively correlated with the usage of ICT tools, family size appears to have no effect on usage of ICT tools among the dairy farmers.

Keywords: Chittoor, dairy farmers, ICT and Mobile phones

INTRODUCTION

Agriculture and allied sectors are regarded to be one of the crucial sectors in India's economy. Agricultural Extension has been playing an active role in giving stakeholders important and relevant information over time. With time, the method of disseminating information and transferring technology has undergone evolutionary modifications. Due to limited manpower availability and restricted time hours in the public extension system, it has become a challenge for the extension agents to fulfil the informational requirements of all stakeholders at the right time in the rural community. Information and Communication Technology (ICT) is one such paradigm in the current era that can offer timely, affordable and accurate information for the rural people (Monikha *et al.*, 2021). Information and Communication Technology (ICT) is a broad term encompassing devices, applications, and systems used to transmit, store, and process information. ICT includes computers, smartphones, the internet, software, and communication tools like video conferencing (Pandey, 2017). By integrating ICTs with traditional extension, a favourable and encouraging environment can be created for the rural farmers, with timely information and access to latest

technologies in the related fields of agriculture, by which he can take prompt decisions that can improve his standard of living and economic status. Information and Communication Technology (ICT) has proven to be an effective extension strategy for accelerating progress across multiple sectors, predominantly in agriculture (Kashem *et al.*, 2010). ICT has enabled effective knowledge exchange between researchers, extension personnel, and farmers within the agricultural community (Adegbidi, 2012 & Panda *et al.*, 2019). The new technologies provide wider reachability and enable farmers to acquire information and gain knowledge.

The term "Information and Communication Technologies" (ICTs) is the term used to refer to information technology (IT) in general, which includes all media applications and services that enable users to gain access, retrieve, save and spread digital information. ICTs makes it easier to maintain correct records, which helps with regulatory compliance and traceability. All of these benefits lead to the quality control of dairy products. (Jadhav, 2021). In a study conducted by Mallick *et al.* (2023), he revealed that among various sources of information for farmers TV news rank first as the most preferred source of information to the farmers.

Farmers can enhance many facets of their operations and decision-making on their farm through efficient usage of ICT technologies. This study aims to determine the extent and patterns of ICT tool use among dairy farmers and investigate the relationship between ICT usage and their socioeconomic characteristics.

OBJECTIVE

To study the extent and pattern of utilization of ICT tools among dairy farmers and their associated socio-economic factors.

METHODOLOGY

This research was taken in Chittoor district of Andhra

Pradesh state adopting an ex-post facto research design. Through purposive sampling, three mandals (Bangarupalem, Chandragiri and Tirupati Rural) were chosen from Chittoor district, as dairy animals population in these mandals was high. From each mandal, two villages were randomly selected and 20 dairy farmers were randomly chosen from each village for the study. This resulted in a total sample size of 120 dairy farmers (who were using at least one ICT tool) selected from 6 villages for the investigation. ICT tools utilisation by dairy farmers, illustrates the extent and usage pattern of those tools. The information was gathered through interview schedule and analysis was done by applying appropriate statistical procedures viz., frequency, percentage, mean, standard deviation and correlation analysis.

RESULTS AND DISCUSSION

Extent of ICT tools usage by dairy farmers

(a) Frequency of ICT tools usage

Table 1: Frequency of ICT tools usage by the respondents

(n=120)

Sr. No	ICT tools	Frequency of Usage									
		Not used		Very rarely		Rarely		Frequently		Very frequently	
		f	%	f	%	f	%	f	%	f	%
I	Electronic gadgets										
1	Radio	16	13.30	71	59.20	30	25.00	03	2.50	0.0	0.00
2	Television	0.0	0.00	01	0.83	16	13.33	103	85.84	0.0	0.00
3	Mobile phone	01	0.83	0.0	0.00	24	20.00	91	75.84	04	3.33
4	Computer / Laptop	109	90.84	10	8.33	01	0.83	0.0	0.00	0.0	0.00
5	Information Kiosk	118	98.30	02	1.70	0.0	0.00	0.0	0.00	0.0	0.00
II	Software/ Apps										
1	YouTube	48	40.00	02	1.70	49	40.80	21	17.50	00	0.00
2	WhatsApp	51	42.50	00	0.00	18	15.00	49	40.80	02	1.70
3	SMS	11	9.17	06	5.00	38	31.67	65	54.16	00	0.00
4	Android Apps related to dairy	120	100.0	00	0.00	00	0.00	00	0.00	00	0.00
5	UPI apps	108	90.00	01	0.83	09	7.50	02	1.67	0.0	0.00
III	Networking Technologies & others										
1	Internet	49	40.83	01	0.83	52	43.34	18	15.00	0.0	0.00
2	Google Chrome	91	75.80	12	10.00	12	10.00	05	4.20	0.0	0.00
3	Kisan Call Center	98	81.67	18	15.00	04	3.33	0.0	0.00	0.0	0.00

I Electronic Gadgets

Table 1 reveals that, with respect to television, majority (65.00%) of dairy farmers watched TV frequently. Whereas 13.33% and 0.83% of them watched rarely and very rarely, respectively. Regarding mobile phone, 3.33 percent of them used mobile phones very frequently and a significant portion (75.84%) of them used mobile phones frequently followed by 20.00 percent of them used rarely. Regarding

radio, 25.00 percent of them used it rarely followed by 59.20 percent of them used very rarely and 13.30 percent of them have never used. Further, most of them never utilized information kiosk and computer/ laptop for getting dairy related information.

The most probable explanation for more respondents possessing and using television and mobile phone can be attributed to the efficacy of those tools in disseminating

dairy related advices and knowledge to the rural people. Television was well accepted among the farmers, since it has greater appeal to eyes. Additionally, a variety of programmes and news on dairy farming that are telecasted in television provides a wider range of dairy information for the farmers. Interviews with experts and successful farmers which are telecasted on television motivates the farmers to follow latest practices to excel themselves. The portability and flexibility of mobile phones is allowing the people to use them with ease. With the rise of social media, extension staff and other experts have begun using them (WhatsApp and YouTube) to disseminate dairy-related information, fostering farmers believe in the accuracy and reliability of this information. The utilization of radio was very limited and seen majorly among elderly farmers and not among young and middle-aged dairy farmers because middle-aged and younger farmers are often preferring digital platforms for information, finding them more interactive and timelier. Most of the respondents were not using computer/ laptop and information kiosk owing to its high cost, no proper access and lack of expertise and abilities in using it. The previous results are consistent with the outcomes of Sinha *et al.* (2018; Vegad *et al.*, 2021), which showed that 82.00 percent of the sample owned smart phone.

II Software/ Apps

Pertaining to YouTube, 17.50 percent of the sample have been using YouTube frequently and 40.80 percent of them used it rarely for gaining dairy related knowledge. While 40.00 percent of them had never used YouTube for gaining knowledge. In relation to WhatsApp, 1.70 percent used it very frequently and 40.80 percent of used WhatsApp frequently for getting information and 42.50 percent of them never utilized WhatsApp for dairy information purpose. Regarding SMS, majority (54.16%) used this app frequently for getting weather related information, market related

information and maintaining record of their milk sales followed by 31.67 percent of dairy farmers were using rarely. Further, payment apps were used to a little extent in their dairy business. None of them had used dairy apps. The probable logic for why dairy farmers were use YouTube might be to watch videos on latest and successful dairy practices because it is easy to learn by seeing. The main utility of WhatsApp was to share dairy information through messages and sharing pictures related to dairy farming queries and medicines to be purchased. The main reason for dairy apps were not at all used by the sample was apps are primarily text based, not in their regional language and not updated regularly.

III Networking technologies & others

Nearly 15.00 percent of farmers have been using internet frequently followed by 43.34 percent of them used it rarely and 40.83 percent of them never used internet. Whereas the usage of google chrome and Kisan Call Centre was very less among the sample for getting dairy information. The possible explanation for minimal usage of internet might be lack of digital literacy and digital skills among the farmers in browsing the search engine. Some farmers perceived the information provided by Kisan Call Centres are not addressing their specific needs or situations.

(b) Usage pattern of ICT tools among dairy farmers

The dairy farmers utilized ICT tools for obtaining dairy information and meeting their requirements related to dairy farming. Table 2 indicates the different areas of information for which farmers were using ICT tools. The different areas were price information and sales records (2.15), followed by disease management (1.39), feed management (1.23), payment (1.15) and vaccination (1.13) which have been ranked as I, II, III, IV and V respectively determined by their mean score.

Table 2: Usage pattern of ICT tools for specific information

(n=120)

Sr. No	Area of Information	Always		Sometimes		Never		Mean Score	Rank
1	Feed Management	00	0.00	27	22.50	93	77.50	1.23	I
2	Disease Management	00	0.00	47	39.17	73	60.83	1.39	II
3	Price information and maintaining sales records	26	21.67	86	71.67	08	6.67	2.15	III
4	Vaccination	00	0.00	15	12.50	105	87.50	1.13	V
5	Payment receipts	02	1.67	14	11.67	104	86.67	1.15	IV

Overall Extent of ICT tools usage by the respondents

Table 3 indicates the overall distribution of the respondents regarding the extent of ICT tools usage. The results revealed that around half (47.50%) of the dairy farmers

belonged to medium level of usage, followed by nearly one-third (31.70%) were under low usage level and more than one-fifth (20.80%) belonged to high usage level. The above results show the trend that most farmers belonged to medium

Table 3: Distribution of the respondents according to their extent of ICT tools usage (n=120)

Sr. No	Category	Total dairy farmers	
		frequency	Percentage
1	Low (<12.40)	38	31.70
2	Medium (12.40 - 16.52)	57	47.50
3	High (>16.52)	25	20.80

usage level following that low and high usage level of ICT tools. Similar trend was reported by Samadder *et al.* (2024). The possible interpretation for the above trend might be most farmers used ICT tools only when they require information. It is also due to limited awareness about different ICT tools and no skills in using different ICT tools, majority are under medium category. The usage of ICT tools can be improved among dairy farmers by providing them with need-based information and by organising awareness campaigns and training programmes which helps in educating farmers how to get information using different ICT tools. According to study findings of Syiem *et al.* (2015), majority possessed television and radio in addition to mobile phones. The ICT that is utilized frequently was mobile phone. Mobile phones were used by farmers to communicate with each other, to market their produce, to acquire agricultural warnings, and to talk with experts and department staff in real time.

Table 4: Relationship between independent variables and Extent of ICT tools usage by the respondents (n=120)

Sr. No	Independent variables	Total dairy farmers
		r value
X ₁	Age	-0.385**
X ₂	Education	0.597**
X ₃	Family size	0.056 ^{NS}
X ₄	Experience in dairy farming	-0.303**
X ₅	Land holding	0.245**
X ₆	Annual family income	0.197*
X ₇	Extension participation	0.210*
X ₈	Information seeking behaviour	0.250**
X ₉	Economic orientation	0.489**
X ₁₀	Scientific orientation	0.379**
X ₁₁	Risk orientation	0.355**
X ₁₂	Innovative proneness	0.358**
X ₁₃	Achievement motivation	0.264**

**Correlation is significant at 0.01 level

*Correlation is significant at 0.05 level

Age Vs Extent of ICT tools usage

Age had negative and statistically significant (-0.385**) relation with extent of ICT tools usage. It was identified that the more the person’s age, he has stronger feeling towards traditional means of communication than new technological advancements. It is common that old people lack skills in using latest ICT tools as they would not be aware of how to use the modern tools. The findings are in line with the results of Kafura *et al.* (2016).

Education Vs Extent of ICT tools usage

Education had positively significant (0.597**) correlation with extent of ICT tools usage. Higher the education level, more the knowledge regarding ICTs and greater the use. When a farmer is educated, he learns to understand and develop knowledge and technical expertise in using ICT tools. Through education, dairy farmers become aware about different ICT tools and which ICT technology is most suited for a particular purpose, which consequently leads to increased use of it. The result is in consonance with the findings of Suriyapriya *et al.* (2019) and Pratik and Vinaya (2022).

Family size Vs Extent of ICT tools usage

Table 4 indicated non-significant but positive correlation (0.056^{NS}) between family size and extent of ICT tools usage. This may be interpreted as size of family has no influence on Extent of ICT tools usage among dairy farmers. Similar results were reported by Babu *et al.* (2012).

Experience in dairy farming Vs Extent of ICT tools usage

Experience in dairy farming had negatively significant (-0.303**) correlation with extent of ICT tools usage. It can be discussed as farmers belonging to older age will be having more experience in dairy farming and they are greatly oriented to traditional way of communication rather than ICTs because of insufficient awareness and skills in utilizing ICTs.

Land holding Vs Extent of ICT tools usage

Land holding had positively significant (0.245**) correlation with extent of ICT tools usage. Since farmer practicing both agriculture and dairy farming tries to know much about the technologies which can benefit him in meeting his information requirements. Most farmers practiced combined agriculture and animal husbandry (Patil *et al.*, 2021). Therefore, to obtain information on both agriculture and dairy farming farmers are using ICT tools. The result is in line with the findings of Suriyapriya *et al.* (2019).

Annual Income Vs Extent of ICT tools usage

Annual Income had positively significant (0.197*) correlation with extent of ICT tools usage. This is because higher income encourages dairy farmers to purchase latest ICT tools and facilitates them to utilize ICTs to obtain latest news. The result is in confirmatory with the findings of Mukerjee *et al.* (2021).

Extension participation Vs Extent of ICT tools usage

Extension participation had positively statistically significant correlation (0.210*) with extent of ICT tools usage. The participation of respondents in various extension activities like trainings on skill development on using ICTs etc. and allow farmers to interact with the extension agents and other officers present over there, by which they gain technical know-how regarding various ICT tools and also learn about the correct usage of ICTs for obtaining information.

Information seeking behaviour Vs Extent of ICT tools usage

It had positively statistically significant (0.250**) correlation with extent of ICT tools usage. The probable explanation for this is more the person has enthusiasm to seek information from others, the more he can gain knowledge on any aspect including ICTs. Now a days electronic media is a great source for obtaining information, which can be accessed through ICT tools.

Economic orientation Vs Extent of ICT tools usage

Economic orientation had positively significant (0.489**) correlation with extent of ICT tools usage. This can be attributed to the logic that dairy farmers with a stronger economic focus strive to maximize earnings with minimal resources. This is possible by learning and using latest technologies like ICTs which are cost and time effective to obtain information. The result supports the findings of Khodifad and Solanki (2023).

Scientific orientation Vs Extent of ICT tools usage

Scientific orientation had positively significant (0.379**) correlation with extent of ICT tools usage. This is due to dairy farmers with a greater scientific orientation will have a positive attitude towards the latest technologies, such as ICTs and will try to understand them better, which are the modified versions of traditional extension methods. Farmers use ICT tools to learn about different scientific practices. The findings are in consistent with the finding of Patil *et al.* (2021).

Risk orientation Vs Extent of ICT tools usage

Risk orientation had positively significant (0.355**) correlation with ICT tools usage. This relation is because farmers with higher orientation of risk would be much ahead of other farmers in exploiting the potentiality of latest advancements like ICTs which enables them to take decision to adopt latest innovations.

correlation with ICT tools usage. This relation is because farmers with higher orientation of risk would be much ahead of other farmers in exploiting the potentiality of latest advancements like ICTs which enables them to take decision to adopt latest innovations.

Innovative proneness Vs Extent of ICT tools usage

Innovative proneness had positively significant (0.358**) correlation with extent of ICT tools usage. Innovative dairy farmers are those who accept change and take decisions to adopt innovations. They are open to new technologies that boosts productivity and efficiency. Similar findings were reported by Suriyapriya *et al.* (2019).

Achievement motivation Vs Extent of ICT tools usage

It had positively significant (0.264**) correlation with ICT tools usage. It is clear that every dairy farmer aspires to greater success from his dairy farming, and this is possible through timely information obtained through ICTs. The farmer takes decisions that enables him to complete the task in desired way which is possible by using modern technologies like ICT tools. The results are in line with the findings of Shivappa (2014).

CONCLUSION

The research strongly revealed that vast majority of farmers have been utilising television, mobile phone, SMS and WhatsApp. The usage of other ICTs viz., internet, kiosk, computers should be increased by establishing them at local level. Thus, raising farmer awareness and teaching them how to utilize different ICT tools will lead to a rise in their ICTs usage. Farmers should be educated on using mobile, internet and kiosks effectively. Establishment of different ICTs at RBKs, village panchayat office and provision of proper training and awareness campaigns will promote their knowledge and skills which enhances the usage of ICTs among farmers. Farmers usage of ICT tools is significantly influenced by multiple factors including education, land holding, annual income, information seeking behaviour, extension participation, economic orientation, scientific orientation, risk orientation, innovative proneness and achievement motivation. While age and experience in dairy farming are negatively impacting ICTs usage, family size appears unrelated to ICTs usage by farmers. Based on this research results, efforts to expand ICT utilization in the dairy sector should prioritize factors positively impacting the ICT tools usage. Therefore, policies should prioritize local-level digital literacy programs, awareness campaigns and infrastructure development to boost ICT adoption among farmers, thereby improving their knowledge and also productivity.

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CONFLICT OF INTEREST

All authors declared that they have no conflict of interest.

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