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Impact of information and communication technology (ICT) on adoption of improved dairy technology for enhancing income in Agra district-A case study

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Abstract

Adoptions of improved technologies and production practices are important drivers of agricultural development in low-income countries like India. Animal husbandry and dairying is not adjunct to the crop-mix of Indian arm any more. It is an integral part of the total farming enterprise-mix. Thus, to state that dairy cattle constitute the backbone of the livestock wealth of our country would not be an exaggeration. In dairying, rural masses and specially omen get job opportunities generating additional employment and income. Use of modern technology is indispensable in income. As regards the various components of modern information technology in dairying indicates that cross breeding in cattle is adopted by 46.67% of the total sample households which is one of the main modern technology for cattle development. The average net income per household per annum obtained by the modern cattle keepers was Rs. 25,126.45 while it was about Rs.15,995.10 by traditional cattle keepers. It may be concluded that ICT had a considerable positive impact on the dairy incomes of the modern cattle keepers adopted modern dairy technology.

Keywords: Livestock, dairying, cross breeding, dairy technology, household

Introduction

Information and Communication Technology (ICT) can revolutionize Indian farming sector and can benefit all farmers including small landholders. Agriculture is the most important sector with the majority of the rural population in India depending on it. The traditional approaches of agriculture being adapted, has numerous challenges in terms of production, marketing, profit etc. The challenges of the traditional agriculture are addressed significantly by using Information and Communication Technologies (ICT) that play an important role in uplifting the livelihoods of the rural small landholder farmers. ICT helps in growing demand for new approaches. It also helps in empowering the rural people by providing better access to natural resources, improved agricultural technologies, effective production strategies, markets, banking and financial services etc.

Information and Communication Technology (ICT) can play a significant role in achieving such a transformation as it consists of three main technologies. They are: Computer Technology, Communication Technology and Information Management Technology. These technologies are applied for processing, exchanging and managing data, information and knowledge. Recent developments in information and communications technology (ICT) offer a great opportunity to facilitate the flow of information and technology services delivery especially to the farmers *(Maningas, 2006)* It is comprehensible that on the one hand agriculture is becoming highly science driven and knowledge intensive, but on the other hand the existing public extension system, has become less effective, more time consuming and costly and fails to meet the expectations of those involved in agricultural production *(Mruthunjaya and Adhiguru, 2005).* The extensive use of modern information technology needs to be promoted for communication between researchers, extension workers and farmers to transfer technologies and information in a cost-effective manner. In agricultural extension ICT has many potential applications. It can bring new information services to rural areas where farmers, as

users, will have much greater control than before over current information channels. So, the use of ICT is an important pillar of agriculture extension and in the current scenario of a rapidly changing world, has been recognized as an essential mechanism for delivering knowledge (information) and advice as an input for modern farming *(Jones, 1997).*

Our country is an agriculture dominated country. The credit for providing food grains to the increasing population goes to modern technique in Agriculture and information technology and communication. Beside agriculture, the contribution of other industries like animal husbandry and dairy is not less important. In dairying rural masses and specially woman get job opportunities generating additional income. Use of modern technology is indispensable for further dairy development and increase in income. Although majority of cattle keepers are still adhering to hold techniques modern technology can be observed in dairying also through I T C.

Being the world's largest milk producer, it is essential to apply the ICT (Information and Communications Technology) platform to the dairy industry on a large scale. The Indian dairy sector is going through turbulence and this is mainly due to lack of non-application of the current trends such as the Business Intelligence (BI) and Business Analytics (BA) and Data Science in the ICT sector. Reasons that could be attributed to are size of the industry, scale of operations, and number of stakeholders and it is capital intensive *(Reddy,2018).*

This study aims to assess the adoption of information and communication technology initiatives in promoting improved dairy technology for enhancing production and incomes of the dairy farmers.

Methodology

The present study is confined to rural areas of Agra district and based on the "descriptive" type of research design in which "Ex-post facto" planning stage and specific objectives were set for the inquiry. A multi stage stratified random sampling was adopted to select the ultimate sample. At stage first, three blocks viz. Bah, Fatehpur Sikri and Etmadpur and from each block five villages were selected randomly. A complete enumeration of various types of households in the sample villages was done. The progressive households (adopting at least one IC technology) were further classified into land less, small, medium and large farmers. A pre-determined number of 300 such households were thus randomly selected by PPS method. Correlation analysis was done to determine the association between the socio-economic characteristics of households with the level of adoption of information technology.

Results and Discussion

Adoption of information and communication technology in animal husbandry and dairying

The various components of modern technology in dairying are shown in Table 1 indicate that cross breeding in cattle adopted by nearly 47 per cent of the total sample households keeping cross bred cows which are one of the main technologies for cattle development. Clean milk production and balanced feeding are another two scientific measures practiced by about 46% and 49% respectively. However, upgrading in buffaloes, veterinary care of animals, processing of milk and adoption of livestock are also attracting the attention of cattle keepers but it is not up to the mark and a lot requires to be done. It may be emphasized that cross bred cattle owners are comparatively more enlightened having ICT initiatives and trying to adopt the other scientific measure and practices. For assessing the impact of ICT initiatives 140 cattle owners were treated as modern cattle

Table 1: Adoption of ICT in Animal husbandry and Dairying

Items	Sample household				Overall
	Landless	Small	Medium	Large	
Breeding in cattle(crossbreed cows)	35(39.33)	42(46.15)	34(50.00)	29(55.75)	140(46.67)
Upgrading of buffaloes(Improves buffaloes)	23(25.85)	31(34.06)	25(36.75)	24(46.15)	103(34.33)
Balance cattle feeding	40(44.95)	46(50.55)	32(47.05)	21(40.38)	139(46.33)
Clean milk production	42(47.20)	48(52.75)	33(48.52)	23(44.23)	146(48.67)
Veterinary care	31(34.83)	39(42.85)	28(41.17)	30(57.70)	128(42.67)
Processing of milk	14(15.73)	15(16.48)	24(35.29)	26(50.00)	79(26.33)
Adoption of livestock	15(16.85)	23(25.27)	21(30.88)	15(28.85)	74(24.66)

Figures in parenthesis indicate percentage to total

Table 2: Per household income from dairy enterprise

Category of cattle holding	Gross income	Net income	Return to dairy farm resources	Family labour income
Modern cattle keeper				
Landless (35)	54208.10	20588.00	25837.00	29501.90
Small (42)	69367.15	25790.25	32935.25	32617.95
Medium (34)	71694.40	26359.85	34308.80	33273.75
Large (29)	82996.50	28196.50	36320.00	34271.40
Overall (140)	68965.80	25126.45	32192.40	32340.60
Traditional cattle keeper				
Landless (41)	36817.75	12668.45	16981.95	17699.45
Small (50)	44756.60	14392.50	19527.90	20151.55
Medium (39)	56456.25	17330.50	22937.45	22363.10
Large (30)	76285.20	21476.35	29958.00	25522.20
Overall (160)	51486.40	15995.10	21662.20	21069.25

keepers and the remaining 160 as traditional cattle keepers.

Dairy income

With a view to examine the impact of information and communication technology on incomes and test the feasibility of dairy enterprise, gross income, net income, return to fixed dairy farm resources and family labour income during the year were worked out for different categories of farm of modern and traditional cattle keepers (Table 2). The gross income, net income, return to dairy farm resources and family labour income had a positive correlation with the size of farm of modern and traditional cattle keepers. The overall net income per annum obtained from modern cattle keepers was Rs. 25,126.45 which ranged from Rs. 28, 196.50 in large farm to Rs. 20,588 on landless category of households. Although the various types of income were positive in case of traditional cattle keepers but lower in comparison to all the categories of modern cattle keepers. The possible explanation for higher income of different categories of households belonging to modern cattle keepers could be due to ICT initiatives for maintaining crossbreed cows and adopting modern dairy technologies.

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