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Determinants for Adopting ICTs by Livestock Farmers in Barnala District, Punjab

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ABSTRACT

A study was conducted to determine the propensity of livestock farmers to adopt ICTs in the Barnala district of Punjab, India. The convenience sampling technique was used to select 60 livestock farmers from all three blocks of the Barnala district and the data was collected from respondent livestock farmers via direct interview using a pre-formulated schedule. Livestock farmers were using ICT (GADVASU apps) to enhance their farm income. The commonly used ICT tools were mobile phones, Internet browsing, newspapers, and television. The use of ICT (GADVASU apps) by livestock farmers was effective as it contributed to enhancing livestock productivity. Socio-economic and institutional factors significantly influenced the use and adoption of ICTs by livestock farmers. Tobit analysis results indicated that age, education level, herd size, and participation in extension activities were significant ($p \leq 0.1$) determining factors influencing the adoption of ICTs. Farmers have small herd sizes, little experience using ICT, and higher education levels. Adoption of ICTs (GADVASU apps) may be sustainable among livestock farmers if the extension agencies prioritise developing strategies and programmes to educate farmers. The government also subsidises farmers so that they can purchase data and ICT tools.

INTRODUCTION

Livestock is a part of integrated farming that provides additional income to the farming community. An integrated farming system is considered a sustainable agricultural system that can help enhance food and nutritional security. In mixed-farming systems, not only can farmers mitigate risks by producing a multitude of commodities, but they can also increase the productivity of both crops and animals in a more profitable and sustainable manner. In this context, livestock can make a major contribution to the efficient use of available natural resources. But poor livestock production management practices are one of the major factors in unsustainable livestock production. Farmers need various types of information on livestock production practices, but due to the limited availability of extension personnel, particularly in the field of animal science, it is difficult to communicate the latest information to them through traditional methods. Information and communication technologies (ICTs) for livestock extension are one approach to addressing the information needs of farmers (Chandra et al., 2023). ICTs have the potential to change the economy of the livestock sector (Sasidhar & Sharma, 2006). So, the agriculture extension sector should develop need-based, area-specific content in the local language in the form of ICT tools with respect to livestock farming (Tiwari et al., 2010; Panda et al., 2019). ICT-based livestock advisory services for information dissemination to the farming community at the farm level have become available on time. Mobile phones, among ICT tools, are cheaper, easily available, and easy to use, which has had a positive impact on the farming community as well. Mobile phones are maximally used to get information on farming compared to other ICT tools and mass media sources like TV, radio, etc. (Gangil & Verma, 2018). Livestock apps are software programmes designed to run on smart phones, tablets, and other devices and offer various kinds of services, such as livestock breeds, feeding,

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healthcare management, etc. In the context of this study, the term "livestock apps" is used to characterise GADVASU mobile apps targeting the needs of livestock farmers. Studies that focus on cataloguing available sources of information on livestock farming and understanding factors influencing livestock farmers' decisions to adopt and sustain ICTs (GADVASU apps) in district Barnala are limited. This knowledge gap will be minimised by examining three objectives: (1) the socio-economic characteristics of livestock farmers; (2) available sources of information on livestock farming and their use; and (3) finally, looking at the factors influencing the adoption of ICTs among livestock farmers in the Barnala district of Punjab, one of the important milk-producing districts in Punjab.

METHODOLOGY

The study was conducted through a survey in all three blocks, *viz*., *Mehal Kalan*, *Barnala*, and *Sehna*, of district Barnala in Punjab. Barnala is situated at 30° 22' 46.704" N latitude and 75° 32' 46.0356" E longitude and is bordered by Ludhiana district on the north, Moga district on the northwest, Bathinda district on the west, and Sangrur district on all other sides. Livestock farmers were interviewed directly with the help of a pre-formulated schedule. The sampling method was non-probability sampling, under which the convenience sampling technique was used. Four villages were selected from each block based on easy accessibility, and five livestock farmers were selected from each village; this exercise resulted in the selection of 60 livestock farmers. The collected data were analysed using descriptive statistics such as frequency counts and percentages, as well as the Tobit model in R software (version 3.6.1) to estimate livestock farmers' proclivity to adopt ICT (GADVASU apps).

Since the data includes ICT (GADVASU Apps) adopters and non-adopters, the dependent variable has many zero observations, so the Tobit model is appropriate to handle such observations. The Tobit model, in its simplest form, is presented as:

$yi^* = \beta xi + \mu i$ if RHS > 0 (i= 1, 2——n)
$yi^* = 0$ otherwise

Where yi^* is a latent variable that is not observable and μ is the error term that is independently and normally distributed with $\mu \sim N(\mu, \sigma \wedge 2)$. Thus, Tobit's analysis of factors influencing the adoption of ICTs is specified as:

$$yi = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \text{——} \beta_n x_n$$

Where yi is an observed dependent variable that is only observed or exists when the latent or unobservable variable yi^* is greater than zero, x (s) are the independent socio-economic and institutional vectors of causal variables, and β (s) are parameters to be estimated. The Empirical model is depicted as:

yi = Livestock farmers propensity to adopt ICTs (High= 1, Low= 0)
x_1 = Age (>40 Years = 2; 30-40 Years = 1; 20-29 Years = 0)
x_2 = Education level (Above= 3; Middle= 2; Primary= 1; Illiterate= 0)
x_3 = Herd size (> 8 = 2; 4-8 = 1; <4 = 0)
x_4 = Participation in extension activities (Yes = 1; No = 0)

RESULTS AND DISCUSSION

Sources of information on livestock farming

The farmers were asked to indicate their sources of information for livestock farming, which shaped their knowledge and awareness of livestock production practices. The results are depicted in Figure 1. It is an important finding that an overwhelming majority of the farmers confirm that they received vital information regarding livestock farming mainly from ICTs: GADVASU apps (41.00%) and KVK (35.98%). The other source was the university helpline (23.02%). Livestock farmers with mobile phones were using them to seek information via GADVASU apps, and KVK scientists were updating them about new farming techniques. These results are in agreement with those of Chikaire et al., (2017), who found that mostly farmers in developing countries use mobile phones, radios, and televisions as the only ICT devices available to them. These ICT tools played a major role in changing the lives of livestock farmers through the provision of new agricultural inputs and relevant information. KVK has been promoting the dissemination of livestock farming information through its regular and various extension activities. KVK tried to motivate farmers to use GADVASU apps through personal visits (field visits), animal health camps, and communication with extension functionaries. Training and demonstrations are provided to farmers through a number of programs. The KVK emphasises the use of GADVASU apps by farmers for getting scientific livestock farming information. The results show that farmers had a higher level of awareness of livestock technologies. These results may be due to farmer's participation in extension activities organised by KVK. The results were in line those of Sharma & Sahoo (2008).

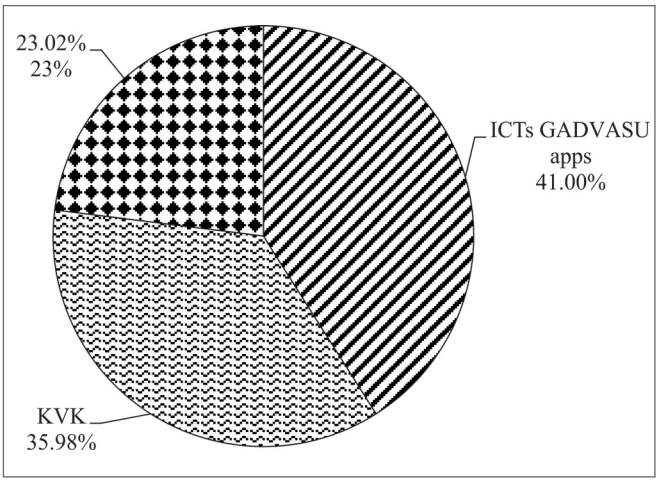

Figure 1. Sources of information on livestock farming

ICTs used by the livestock farmers

All the farmers use ICTs for one purpose or another (Table 1). It shows high adoption of ICTs through GADVASU apps, which are easy to download and use for reliable and timely information in the local language with all subject matter coverage like feeding, housing, calf and kid healthcare, and breeding management. The study found that the use of GADVASU apps has improved livestock farming in the district. The use of these apps has increased farm productivity and income, the availability of timely information, and knowledge on livestock farming. As a result, the livestock farming preference has improved in the district, and youth are starting to be involved in livestock farming as compared to the past time as there is more information about

Table 1. ICTs used by livestock farmers for various purposes (n = 60)

Purpose	Mobile (GADVASU apps)	Internet browsing	Newspaper	Television
Breeds	83.33	18.33	3.33	1.67
Feeding management	91.67	35.00	5.00	1.67
Housing management	86.67	15.00	0.00	0.00
Calf/Kid management	88.33	10.00	0.00	0.00
Health care management	60.00	35.00	3.33	1.67
Breeding management	48.33	5.00	0.00	0.00

Table 2. Estimated Tobit model of livestock farmers' propensity to adopt ICTs (GADVASU apps)

Variable	Estimate	Std. error	t value	Pr(> t)
Intercept	0.97339	0.11049	8.810	<2e-16 ***
Age (x_1)	0.02398	0.04774	0.502	0.616**
Education level (x_2)	-0.02885	0.03417	-0.844	0.398**
Herd size (x_3)	-0.01653	0.04750	-0.348	0.728**
Participation inextension activities (x_4)	0.01369	0.06443	0.212	0.832**
Log-likelihood	-1.656605			

'***' 0.001 '**' 0.1

livestock production and management, more farm income and exposure, and which livestock technology to practice. This finding was in agreement with the findings of Dhaka & Chayal (2010). TV, the internet, and newspapers were less used by the livestock farmers in the study area.

Estimation of livestock farmers' propensity to adopt ICTs: GADVASU apps

The results of the Tobit estimates of livestock farmers' propensity to adopt ICTs (GADVASU apps) indicate that age, education, herd size, and participation in extension activities independent variables significantly influence the farmers' propensity to use GADVASU apps in the Barnala district. The age (x_1) variable has a significant ($p<0.1$) influence on the propensity to use GADVASU apps in the study area. This may be attributed to the fact that more experienced farmers would have come across more problems and found their solutions through these apps and are therefore more convinced about their usefulness. Education level (x_2) is similarly significant at a 10 per cent level of significance. This implies that the more educated a farmer is, the higher his propensity to use ICTs (GADVASU apps). Igodan et al., (1988) said that farmers who are more educated have a higher propensity towards adoption. Herd size (x_3) significantly relates to the propensity to use ICTs (GADVASU apps) at a 10 per cent level of significance. The results show that farmers with a small herd size will have a low propensity to use ICTs (GADVASU apps). Participation in extension activities (x_4) significantly ($p< 0.1$) influenced the use of ICTs (GADVASU apps) by the livestock farmers in the study area (Table 2). The implication is that KVK's activities for the dissemination of information and advisory services have given farmers more confidence to use GADVASU apps.

CONCLUSION

This study established that livestock farmers use ICTs for one purpose or another in the Barnala district, but there is a need to make livestock farmers aware, especially those with small herd sizes, little experience of using ICTs (GADVASU apps), and low education levels, by the extension agencies through developing strategies and programmes for these farmers in the Barnala district of Punjab, India. So, they can improve their livestock farming practices, farm income and living standard.

REFERENCES

Chandra, S., Singh, A. K., Ghadei, K., & Pradhan, S. (2023). Exploring the Relationship between Socio-economic Factors and ICT Adoption among Farmers. *Indian Journal of Extension Education, 59*(3), 54-57.

Chavda, M. G., & Dave, D. H. (1994). Farmers reading behaviour of farm literature about dairy farming. *Gujrat Journal Extension Education, IV&V,* 5-10. https://www.gjoee.org/papers/597.pdf

Chikaire, J. U., Anyoha, N. O., Anaeto, F. C., & Orusha, J. O. (2017). Effects of use of information and communication technologies (ICTs) on farmers' agricultural practices and welfare in orlu agricultural zone of Imo State, Nigeria. *International Journal of Research in Agriculture and Forestry, 4*(3), 6-15. http://dx.doi.org/10.22259/ijraf.0403002

Dhaka, B. L., & Chayal, K. (2010). Farmers' experience with ICTs on transfer of technology in changing the agri-rural environment. *Indian Research Journal of Extension Education, 10*(3), 114-118.

Gangil, D., & Verma, H. K. (2018). Mobile phone use pattern of the dairy farmers of Punjab. *Livestock Extension, 1*(1), 72-74.

Igodan, C., Ohaji, P., & Ekpere, J. (1988). Factors associated with the adoption of recommended practices for maize production in the Kainji lake basin of Nigeria. *Agricultural Administration and Extension, 29,* 149-156.

Mutwedu, V. B., Bacigale, S. B., Mugumaarhahama, Y., Muhimuzi, F. L., Munganga, B., Ayagirwe, R. B. B., Nguezet, P. M. D., & Manyawu, G. (2022). Smallholder farmers' perception and challenges toward the use of crop residues and agro-industrial byproducts in livestock feeding systems in eastern DR Congo. *Scientific African,* 16. https://doi.org/10.1016/j.sciaf.2022.e01239

Oladele, O. I. (2005). A tobit analysis of propensity to discontinue adoption of agricultural technology among farmers in South Western Nigeria. *Journal of Central European Agriculture, 6*(3), 249-254.

Sasidhar, P.V. K., & Sharma, V. P. (2006). Cyber livestock outreach services in India: a model framework. *Livestock Research for Rural Development, 18, Article #2.* http://www.lrrd.org/lrrd18/1/sasi18002.htm

Sharma, A. K., & Sahoo, K. C. (2008). Use of information sources by the farmers of Sagar District (M.P.): a survey. *Journal Library and Information Science, 33*(1/2), 53-62.

Shinde, V. G., Sangle, G. K., & Dikle, R. N. (1998). Adoption of improved dairy practices by dairy farmers. *Maharashtra Journal of Extension Education, 17,* 144-151.

Singodia, M., Rewani, S. K., Rajoria, S., Singh, V., & Saini, G. R. (2019). Perception of livestock farmers towards existing livestock service delivery systems in Jaipur District of Rajasthan, India. *International Journal of Livestock Research, 9*(8), 111-119.

Panda, S., Modak, S., Devi, Y. L., Das, L., Pal, P. K., & Nain, M. S. (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.

Tiwari, R., Phand, S., & Sharma, M. C. (2010). Status and scope of information and communication technology for livestock and poultry production in India- A review. *Indian Journal of Animal Sciences, 80*(12), 1235-1242.