

UTILIZATION OF INFORMATION SOURCES AND THEIR RELATIONSHIP WITH DEMOGRAPHIC ATTRIBUTES OF FARMERS: IMPLICATIONS FOR LIVESTOCK EXTENSION

Muhammad Saleem¹, Faheem Munawar², Muhammad Arif³, Ghulam Yasin⁴,
Shoukat Ali^{5*}, Aqeela Saghir⁶, Salman Asghar⁷, Muhammad Saeed Shahbaz⁸

^{1,6,7}Institute of Agricultural Extension Education and Rural Development, University of Agriculture,
Faisalabad

²Department of Animal Nutrition, Faculty of Animal Husbandry, University of Agriculture, Faisalabad

³Department of Agricultural Extension, Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi

⁴Department of Agricultural Extension, Balochistan Agriculture College Quetta

^{5*}Institute of Agricultural Extension Education and Rural Development, University of Agriculture,
Faisalabad

⁸College of Humanities and Development Studies, China Agriculture University

Corresponding Author: ^{5*}shoukat78pk@uaf.edu.pk

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ABSTRACT

Livestock sector plays an important role in the economy of Pakistan with a 14% share of the national GDP. This sector is dominated by small farmers in Pakistan owning less than 10 animals per household. These farmers face enormous challenges at different stages of livestock production and require consistent advisory services from experts. Various information sources exist dealing with farmers for livestock extension services to fulfill the information gap. The present study was designed to investigate the behavior of the farmers towards the available information sources and the relationship between the utilization of these sources with demographic attribute. A sample size of 101 was taken from five villages of Multan tehsil. A well-structured, validated questionnaire was used to collect data from livestock farmers. Data were analyzed by using the Statistical Package for Social Sciences (SPSS). The results described that electronic media (mobile phones, Television and Radio) were the preferred information sources by farmers. Regarding interpersonal communication, farmer's meetings and personal observations were among the top sources of information used by farmers. The result of the chi-square table showed that farmers' age does not have an association with the availability and use of ICTs. Whereas education plays a crucial role, with a strong positive association between higher education levels and the likelihood of utilizing information technologies. Regarding Livestock department extension services, age has an inverse relation with the utilization of advisory services, with older farmers likely benefiting less. However, education has no significant relation with traditional livestock extension services.

Key words: Livestock, Demographic attributes, Information Sources, Livestock Extension

INTRODUCTION

Livestock rearing is the most significant economic activity for rural communities in Pakistan, with over 8 million rural families earning about 35-40% of their income from livestock production. Livestock sector of Pakistan contributes approximately 61.9% to the agricultural GDP and 14.0% to the national GDP. Livestock industry is also a source of employment for a large population in rural areas,

supporting both full-time and part-time workers (Ahmad et al., 2019). The continuous growth of the livestock sector is crucial to ensure food security. Pakistan ranks among the top five milk-producing countries in the world, and the dairy industry has the potential to address food shortages and hunger, alleviate poverty, and contribute positively to economic growth (Shahzad, 2022).

The livestock sector is predominated by small farmers, who own around 10 number of animals (Morgan, 2009). The progression and growth of small livestock farmers rely heavily on accurate, need-based and timely information regarding their problems (Dhillon and Moncur, 2023). Dairy farmers need regular updates on innovative dairy production practices, market trends, nutrition, disease management, new breeding techniques, and other management strategies (Idrees et al., 2007). The provision of this information is indispensable to enhance productivity, improve living standards, and boost the economy (Brodnig et al., 2000). It is vital to provide rural farmers with timely, accurate, and relevant information tailored to their needs. Therefore, understanding and addressing the information needs of livestock farmers is essential for delivering relevant and productive support (Anwar, 2007).

It is essential to enhance dairy farmers' knowledge and improve their decision-making abilities concerning the latest technologies and advancements in livestock practices (Mane et al., 2016). This can be achieved by utilizing various sources of information (Arshad et al., 2010). Knowledge gap among farmers is one of the contributory factors for low animal production in Pakistan compared to the developed countries (Thornton, 2010). Knowledge gap is attributed to the inefficiency of technology transfer agents (such as livestock extension services and field staff) and lack of adoption of improved livestock production practices by farmers (Vatta, 2019; Chahal, 2015; Kebebe, 2019).

Effective communication of information is key to maximizing animal productivity. Understanding farmers' information needs is crucial for policymakers in the livestock sector to make informed decisions regarding production care, breeding, disease management, nutrition management, and marketing (Mugnier et al., 2012; Magne et al., 2010). Traditional information sources including radio, pamphlets, newspapers, magazines, television, demonstration plots, traditional extension services and indigenous knowledge are still important in developing countries like Pakistan (Apata and Ogunrewo, 2010; Opara, 2008). With the rise of digital media, the use of Information

and communication technologies (ICTs) as information delivery systems to farmers is significant. Taking into account the importance of farmers' education in livestock development, this study aims to investigate the information-seeking behavior of farmers, which is crucial for managing daily farming practices. Further, there is a dire need to examine the linkage of these information sources both traditional and ICT-based with the demographic characteristics of farmers, if any. Knowledge about these relationships contributes to making informed decisions for designing farmers-specific technology transfer models for livestock farmers. Studies are available on this topic but mostly related to crop extension services while a literature gap exists on livestock-related information sources for farmers and their utilization determinants. So, study objectives are: i) to identify the different sources of information used by the livestock farmers, ii) to identify the relationship between the age, and education of the farmers and their awareness level and iii) utilization of ICTs to identify the relationship between age, education of the farmers and their access and availability to extension advisory services.

Methodology

All farmers residing in the study area constitute the population of the study. For this study, five villages from Tehsil Multan were selected randomly. The list of registered farmers in these villages was obtained from the Livestock and Dairy Development Department, totaling 303 livestock farmers. The sample size was calculated by using the online sample size calculator www.surveysystem.com while keeping a Confidence Level of 95% and a Margin of Error of 8%. The calculated sample size was 101. Furthermore, the number of farmers selected from each village was determined using proportionate sampling, as outlined below:

Villages	No. of Registered Farmers	Sample Farmers
Village -1	81	27
Village- 2	50	17
Village-3	64	21
Village-4	70	23
Village-5	38	13
Total	303	101

Following the objectives of the study, a meticulously organized questionnaire was developed. The questionnaire was carefully structured to elicit all the necessary information from the respondents. The investigator personally visited the study area and research ethics were duly considered in the data collection. Likert scale based on 3 level of choices from low utilization, medium utilization to high utilization was used to measure the level of utilization of information sources in the questionnaire. The collected data were analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics, such as means, standard deviations, and standard errors, were computed from data

regarding the utilization of various information sources as they were ranked according to mean values. Further, the chi-square test of independence was applied to measure the relationship between the age and education of the farmers and utilization of ICT-based information sources as well as association with the livestock extension department as an information source.

Dependent variable: 1). Availability and Utilization of ICT among livestock farmers
 2). Extension services rendered by Livestock Extension Department
Independent Variables: 1) Age of farmers
 2) Education of farmers

Results

Table 1. Level of utilization of various information sources among farmers

Electronic and Print Media	Mean	SE	SD
Mobile phone	2.51	0.095	0.950
TV	2.39	0.085	0.854
Radio	1.86	0.086	0.866
Newspapers	0.72	0.090	0.907
Telephone	0.28	0.072	0.723
Magazines	0.23	0.061	0.615
Internet	0.04	0.020	0.196
Brochures/Pamphlets	0.03	0.017	0.171
Interpersonal Sources			
Farmer meetings	2.57	0.077	0.770
Personal Observation	2.18	0.075	0.757
Fellow farmers	1.98	0.062	0.621
Livestock extension department	1.38	0.093	0.936
Milk Processing companies	0.16	0.039	0.393

Scale: 1= low utilization 2=medium utilization 3=high utilization

Sources of information were categorized into two main groups: Electronic and Print Media, and Interpersonal Sources. These sources were ranked based on their usage. The table shows that

mobile phones having a mean value of 2.51 were the most commonly used source of information for livestock management among farmers.

Television ranked second ($\bar{x}=2.39$) and has high utilization in the study area. During discussions, farmers mentioned that they attended various programs broadcasted on television related to agriculture and livestock management, which they found effective. In some areas, radio was also utilized, but its overall utilization is medium, ranking in third place with $\bar{x}=1.86$.

On the other hand, magazines, internet, and brochures/pamphlets were used by fewer farmers and, therefore, ranked lower with minimum utilization.

Interpersonal sources were also categorized based on the farmers' dependency. Farmers' meetings were ranked in the first position with a mean score of 2.57. Personal observation ranked second and is considered as medium level in utilization with a mean score of 2.18. Fellow farmers are another common source to get routine information among farmers with a mean value of 1.98 its utilization is of medium level. Livestock

extension department as a source of information among farmers ranked in the lower category with a medium level of utilization, resulting in a lower ranking for this source. Whereas the milk processing companies, ranked at last with a mean value of 0.16.

Relationship between the age of the respondents and ICTs utilized

Socioeconomic characteristics of the growers played an important role in determining their attitude towards the adoption or rejection of new ideas (Adesope et al., 2012; Comer et al., 1999). Demographic characteristics like age, education and size of landholding affect the utilization of information and communication technologies (Ali, 2012). In order to determine the relationship between the socio-economic characteristics of the respondents and ICT utilization by farmers, crosstabulation data is available in Table 2.

Table 2. Age and education of respondents in comparison with ICT utilization

Age (in years)	ICTs available and utilized by farmers		Total
	Yes	No	
Up to 30	7	4	11
	63.6%	36.4%	100.0%
>30-40	36	7	43
	83.7%	16.3%	100.0%
>40-50	24	2	26
	92.30%	7.7%	100.0%
50<	18	3	21
	85.7%	14.3%	100.0%
Total	85	16	101
	84.2%	15.8%	100.0%
Educational Level	ICTs available and utilized by farmers		Total
	Yes	No	
0	22	9	31
	70.97%	29.03%	100.0%
1-5	19	2	21
	90.47%	9.52%	100.0%
5-8	14	1	15
	93.33%	6.67%	100.0%
>8	30	4	34
	88.23%	11.77%	100.0%
Total	85	16	101
	84.2%	15.8%	100.0%

According to Table 3, age was categorized into four categories, farmers from each category were asked whether they had the availability of ICTs and their utilization or not. It was interesting to know majority of farmers (36) fall in the age category of thirty years to forty years, they claimed that they have the availability and utilization of ICTs. The second major category was more than forty years to fifty years of age in which 24 farmers fall. Similarly, the farmers were categorized into four groups based on their education level i.e.

illiterate, up to primary, up to middle, and above middle, they were also inquired about the availability and utilization of ICTs. The majority of farmers (30) fall in the category of more than middle level of education with 88.23% who accepted that there is the availability and utilization of ICTs, While the second major category and third category are farmers who have education primary and middle education. It was interesting to know that farmers with no formal education are also using ICT up to a significant level as 70.97% agreed that they are using it.

Table 3. Relationship between age and education vs ICT utilization by farmers

Relationship between age of the respondents and ICTs availability and utilized by farmers			
Chi-square	d.f	P-value	Gamma
4.81	3	.186	-.313*
Relationship between education of the respondents and ICTs availability and utilized by farmers			
23.51	3	= .000**	.760**,

The above table depicts that the P value is 0.186, a value greater than a significant level of 0.05, it depicts that the relationship between age and availability and utilization is not significant. Age does not have a significant impact on how farmers access and utilize Information and communication technologies. While the gamma value which is -.313, depicts a moderate inverse relationship between the age and utilization of Information technologies, the tendency for utilization of technologies by the older farmer is

less than that of young farmers. In case of the education relationship, the P value (0.000) depicts the strong association between education and the availability/utilization of information technologies. It shows that education is an important variable that determines how farmers access and utilize information technologies. A gamma value of 0.760, depicts that as education increases the likelihood to availability and utilization of Information technologies also increases.

Table 4. Relationship between age and education vs advisory services rendered by Livestock Extension Department

Age (in years)	Livestock Extension Department rendered Advisory Services		Total
	Yes	No	
Up to 30	9	2	11
	81.8%	18.2%	100.0%
>30-40	23	20	43
	53.5%	46.5%	100.0%
>40-50	22	4	26
	84.6%	15.4%	100.0%
50<	14	7	21
	66.7%	33.3%	100.0%
Total	68	33	101
	67.3%	32.7%	100.0%
Educational Level	Livestock Extension Department rendered Advisory Services		
0	22	9	31
	70.97%	29.03%	100.0%

1-5	15	6	21
	71.43%	28.57%	100.0%
>5-8	12	3	15
	80%	20%	100.0%
>8	19	15	34
	55.89%	44.11%	100.0%
Total	68	33	101
	67.3%	32.7%	100.0%

In the above table, farmers were inquired about the livestock services rendered to them by the Livestock Department (Extension). It can be concluded that 67.3% of the respondents reported that they have access to and utilize the advisory services of the department, while one-third of the respondents reported that they do not have access to or utilize these services.

Farmers who fall in the category of 40-50 years of age expressed the highest interaction (84.6%) with Department extension agents followed by

the category of farmers having upto 30 years of age (81.8%). Whereas, the 30-40 years age category showed the lowest interaction (53.5%) with extension workers. On the other hand, data regarding the education of farmers in relation to departmental extension showcased that farmers having 5-8 years of formal education have the highest engagement (80%), while those with more than 8 years of formal education have the lowest (55.89%).

Table 5. Relationship between age and education vs Livestock Extension Department rendered Advisory Services

Relationship between the age of the respondents and Livestock Extension Department rendered Advisory Services			
Chi-square	d.f	P-value	Gamma
8.33	3	.040**	-.132*
Relationship between Education and Livestock Extension Department rendered Advisory Services			
4.98	3	.173	-.022*

Table 5 depicts the association between the age of the respondents and the advisory services of Livestock Department. A p-value of 0.040 indicated that the association is significant at a 5% level. From this, it can be concluded that age is significantly related to how farmers perceive and utilize advisory services. On the other hand, the gamma value (-0.132) indicated the strength and the direction of association between the age and advisory services. The negative value represents a slightly inverse relationship. From this, it can be concluded that as the age of the respondents increases the chances of getting benefits from the advisory services may decrease. For education, the P-value is 0.173 which is greater than 0.05. it depicts no significant association between education and advisory services rendered by the livestock sector. This means education does not significantly influence the interaction of farmers with advisory services

from the department. The value of gamma (-.022) depicts a negligible association among the variables.

Discussion:

Table 1 highlights various information sources among livestock farmers, unveiling insights about the popularity of these sources and the extent to which these sources are used through weighted score ranking. The top-ranked sources of information, the use of mobile phones and TV by farmers indicates the potential and importance of these mediums in livestock extension services. Mobile phones are considered the best way to disseminate information in today's world due to their widespread availability, instant messaging ability, internet-based communications and portability (Mwangi, 2012; Zhang et al., 2016; Khan et al., 2019). Television, being an audio-visual medium is an efficient medium of

information delivery that can influence the behaviors of farmers, the most (Yahia et al., 2018; Owiti, 2021; Choudhury et al., 2024). Further TV and Radio, ranking second and third, play a vital role in spreading information in rural areas where the literacy rate is low and internet services are limited (Chapman et al., 2003; Rahman et al., 2023). Further, newspapers, magazines and pamphlets are the less utilized media among farmers might be due to low literacy and the unavailability of these resources (Kughur et al., 2018).

Amongst the inter-personal sources of information, farmer meetings stand at first rank. Farmers reported that they gathered to attend meetings organized by extension agents, private veterinary staff, or by the farmers themselves. It offers a two-way flow of information, experience sharing and awareness of all the problems of their areas (Knook et al., 2023). Studies have shown that peer-to-peer learning is a basic source of knowledge in the farming community (Asprooth et al., 2023; Hill and Pamphilon, 2024).

Farmers ranked the Livestock Extension Department in the middle as a source of information indicating it as a valuable resource. Lower ranking might be due to the limited reach of these services to farmers or the low capacity of livestock extension advisors (Warriach et al., 2024). Lastly, there stood the milk processing companies reflecting the absence of advisory services by these companies in the area.

Tables 2 and 3 explore the association between independent variables (age and education levels) and dependent variables (utilization of advisory services rendered by the Livestock Extension Department and utilization of advisory through Information and Communication Technologies (ICT)). The positive relationship between the utilization of advisory by the Livestock Extension Department and the age of farmers indicates the age disparity of farmers concerning traditional farmers' education services. A negative gamma value (-0.132) indicates less utility of departmental extension services among older farmers. This might be because they rely on their enriched experience and abundance of local knowledge about farming practices despite advisory services from the Livestock Department. Some farmers give priority to old traditional farming practices and ancestral

knowledge and are reluctant to adopt new practices (Alam et al., 2016). Similar results were mentioned in the study (Bonou-Zin, 2022), according to which farmers' age is associated with the experience gained and the accumulation of local knowledge. These older farmers have years of bond with traditional practices. On the other hand, young farmers with little or no experience more often consult with extension workers to access technical information about various aspects of production Baloch and Thapa (2018). Further, there might be bad experiences between aged farmers and livestock extension agents. Extension workers sometimes fail to deal with complex farmers' behaviour and roles leading to a lack of trust in the department's advisory services (Hauser et al., 2016).

The insignificant association between farmers' education and the use of Livestock Extension services points out that even well-educated farmers are not utilizing Livestock Extension services to their full potential. The departmental advisory services might not be adequately customized to the needs of farmers (Faure, 2012; Hansen et al, 2019). Farmers require specialized or problem-oriented advice that might be missing among departmental extensions (Kizilaslan et al., 2007). Further, educated farmers might be more inclined towards alternative sources of information, such as ICT-based media, and private advisory services (Mittal and Mehar, 2015). Regarding ICT utilization in getting livestock advisory services, no association exists with the age of respondents. While the negative gamma value (-.313), depicts a moderate inverse relationship between the age and utilization of ICT sources. Several studies have been published saying that older people often struggle with ICT adoption due to a lack of digital literacy and the nature of resistance to change (Nwokoye et al., 2019; Mittal et al., 2016; Aldosari et al., 2019). A strong relationship exists between education and the use of ICT-based information resources, indicating the significance of education in instigating the use of ICT as an information source in agriculture. Educated farmers are predisposed to use ICT based information sources because they are normally adapted to using these technologies and can navigate ICT tools more conveniently (Ali, 2012; Mwombe et al., 2013) This relationship stresses the policy interventions

to enhance both formal and adult educational facilities for rural communities in order to achieve long-term developmental goals.

Conclusion and Recommendations

The data reveals important insights into the relationship between age, education, and the utilization of information technologies and advisory services among farmers. Age does not significantly impact the availability and use of information and communication technologies, though older farmers tend to use these technologies less compared to their younger counterparts. In contrast, education plays a crucial role, with a strong positive association between higher education levels and the likelihood of utilizing information technologies. Regarding Livestock Department advisory services, age is significantly related to their utilization, with older farmers potentially benefiting less from these services, while education does not have a significant influence on how advisory services are perceived or used. Findings of the study suggest that targeted training programs should be developed to help older farmers adopt new technologies, and educational initiatives should be expanded to enhance overall technological proficiency. Additionally, making advisory services more accessible and tailored to the needs of different age groups can help improve their effectiveness.

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