

Relationship Of Socio-Economic Characteristics Of The Dairy Farmers And Their Awareness About Icts Regarding Dairy Production Practices In Punjab, Pakistan

Salman Asghar*¹, Ijaz Ashraf¹, Khalid Mahmood Ch¹. and Bakht Baidar Khan²

¹*Institute of Agricultural Extension, Education and Rural Development (IAEERD), University of Agriculture Faisalabad Pakistan-38000*

²*Institute of Animal and Dairy Sciences, University of Agriculture Faisalabad Pakistan-38000*

*Corresponding Author's e.mail: salmanchohanuaf@gmail.com

ABSTRACT

ICT has numerous and diverse impacts on the socio-economic attributes of the dairy farmers. In a cross-sectional research, a survey was conducted in district Sheikhpura by using face to face interaction with dairy farmers. 383 farmers were asked about their awareness related to utilization of ICTs regarding dairy animals' production practices. Data were analyzed by using chi-square test for independent samples and linear regression model. Results indicate that 36% of the dairy farmers were middle aged (36-50 years) whereas, 35.8% dairy farmers had no education while only 12.3% of the respondents had more than high school education. In the case of landholding, 60.1% farmers had up to 5 acres, while 37.6% respondents had more than 20 years farming experience. However, 35.5% dairy farmers were earned 15-25k (PKR) per month. There was a strong association between age of the farmers and awareness about ICTs and negative trend shown that young aged farmers had more information a compare to old. In addition, there were strong and positive association of awareness about ICTs with education of the dairy farmers, size of landholding and monthly income of the respondents. While, there was no association between farming experience of dairy farmers and awareness about ICTs regarding dairy production practices. Multiple regression analysis explained that age, education and income had significant relationship with awareness of the ICTs. However, negative beta value of age shows that young farmers had more awareness about ICTs. While size of land holding and farming experience of dairy farmers had non-significant relationship with awareness of the ICTs.

Keywords: Dairy industry, ICT, Livestock Industry, Policy making, Association and Livelihood

INTRODUCTION

Livestock playing a significant role in the GDP of Pakistan's economy which is 14.04 percent and also contributes 61.89 percent share in overall agriculture (Govt. of Pakistan, 2021-22). More than 8 million rural families are engaged with this

occupation directly or indirectly as well as it is the good source of foreign exchange earnings. In livestock of Pakistan, milk is the major and largest product of this sector. According to the economic survey of Pakistan, 53.4 million cattle found in Pakistan which is the 25.1% of the total population of dairy animals and 1.9 million more as compare to previous year. Whereas, in the case

of buffalo, 43.7 million buffaloes are found in this home land which is the 20.5% of total population of dairy animals and 1.3 million buffaloes are more than previous year 2021 (Govt. of Pakistan, 2021-22). Approximately, 85% are the small farmers who had 1-3 dairy animals and their average production is 3 liters per day per animal. 60% of the total milk produced by small farmers in rural areas is consumed at home and other is reached at local or big cities market. A very small quantity of milk is sent to processing units. In Pakistan, yield of cattle is 1195 liters/lactation and in the case of buffalo, 1800 liters per lactation. (USAID, 2013).

In agriculture sector, information playing an important to aware the farmers about innovations through which they increase their production and improve their livelihood. Now days agriculture facing many challenges like food security, land depletion, climate change, over population, natural disaster and inflation. From them, high prices of food the main factor cause increase the poverty which demand the effective advance changes in agriculture. ICTs can reduce these challenges and improve the livestock production of rural areas through awareness about latest technologies other than traditional farming (Lio and Liu, 2006).

In rural areas, ICTs can improve the livelihood of the poor livestock farmers and fishermen through knowing about the better production recommendations by experts (Goyal, 2010). Telephone services of rural areas of China cause the reduce prices of various agricultural supplies (Eggleston et al., 2002). In Ethiopia, credit market had developed with the help of new technology network that was land distance telephone (Hirschmann, 1967). Many employment opportunities, income and also market prices were discussed by Grameen Phone Project in Bangladesh (Richardson et al., 2000). Now world has been changed from the few decades ago. It realized the importance of knowledge which the basic part of economy of

every country system and also it is the major key of production of any country or region in this global village (Khan et al., 2007). Knowledge revolution has many indicators like there is very close relationship among science and technology which indicate that advance education has great impact on the economy and progress of developing country like Pakistan. Modern education and information and communication technologies (ICTs) bring huge change through connectivity and interdependency at world level (World Bank, 2015).

In livestock sector, ICTs playing a significant role in many aspects of livestock like production, market supply chain, research and education. Its contribution to aware the rural people about the diseases of animals, management practices, upcoming threats, marketing trends and as well as about future policies announced by public sector. Ryan and Wilson (1991) described that an application of ICT about the health of livestock animals especially for tuberculosis and brucellosis diseases which is totally computer database system that is called 'National Disease Control Information System' (NDCIS) of New Zealand.

Farming community adopted ICTs which is the most effective factor for agricultural decision making (Rao, 2006). Economy of rural people through agriculture and livestock has Improved by the use of information and communication technologies (ICTs) (Sasidhar and Sharma, 2006).

In this process of advancement of knowledge dissemination process, it has become a very essential to diffuse ICT based livestock information as advisory service for better production and living standard of farming community (Gulati et al., 2007).

MATERIALS AND METHODS

Study area

Study was conducted in district Sheikhupura, Province Punjab-Pakistan. It is divided into five tehsils (sub-district) which are: Sheikhupura, Sharaqpur, Safdarabad, Muridke and Ferozewala. District Sheikhupura is located in the northwest of the Lahore city which is the capital of province

Punjab province and 40 KM away. Its east side is attached with district Narowal and Amritsar (India). On north side, district Gujranwala is located as well as district Nankana is located in the west side of this studied district. It is spread over an area of 4,298 km².

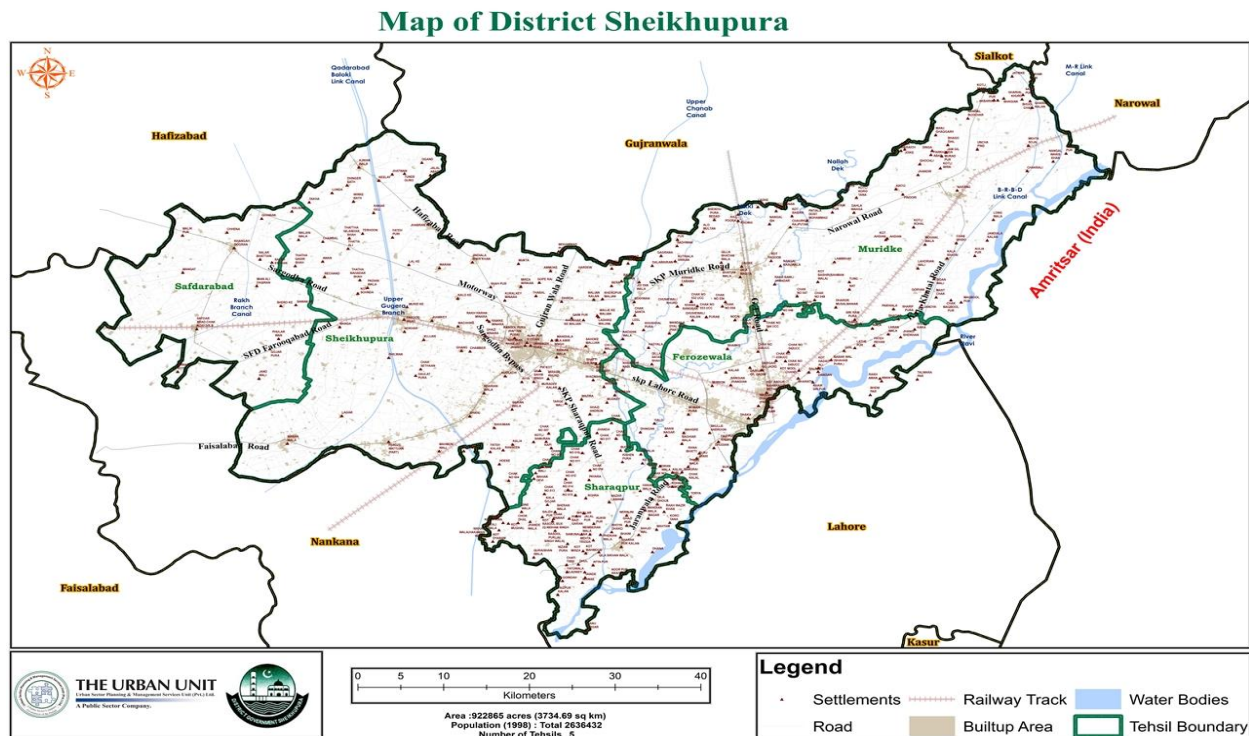


Figure 1. Map of district Sheikhupura

Research design

Cross sectional study design was applied in this research.

Sample frame

List of all household who had cattle and buffalo were collected from district livestock office of Sheikhupura district.

Study population

All households of district Sheikhupura who had cattle and buffalo were the population of this study.

Sampling unit

All dairy farmers who had cattle and buffalo as dairy animals in three subdistrict of district Sheikhupura.

Inclusion and exclusion criteria

Farmers who had dairy animals like goat, sheep and camel were excluded from this study as well as children and who were not mentally and physically unfit were excluded too.

Sample Size Determination and Sampling Procedure

Quantitative study:

Sample size was determined by the use of online website www.surveysystem.com calculator. Where, total dairy animals' households who had cattle and buffalo were 1,69,896 as population of the study. Sample size was 383 calculated with the confidence level 95% and confidence interval 5%. For this quantitative study 383 dairy farmers were interviewed to get information.

Sampling technique and procedure

Sampling procedure of quantitative study:

Three tehsils (sub-district) Sheikhpura, Sharaqpur and Muridke of district Sheikhpura were selected purposively with large number of dairy households. From each tehsil, 8 union councils (UCs) were selected randomly. After that, two villages were selected with high number of cattle and buffaloes holding households. From each village, eight dairy farmers were interviewed randomly. Finally, 383 dairy farmers who had cattle and buffaloes were selected and got information through face-to-face interview.

Variables in the study

Dependent variables: Awareness regarding about ICTs regarding dairy production practices in district Sheikhpura

Independent variable:

Socio-demographic and economic factors

- Age of the dairy farmers
- Education of the dairy farmers
- Landholding of the respondents (Acres)
- Farming Experience (Years)
- Monthly income (PKRs)

Data collection instrument and procedure

Data collection instrument:

Quantitative data was collected from dairy farmers of selected subdistricts of districts Sheikhpura by using a well-designed and well-structured interview schedule as a research instrument. Well-structured questions of Interview schedule were prepared with the consultancy of two experts. Interview schedule was converted into Urdu language to facilitate the literate farmers. A pilot survey was conducted to check the reliability of research tool. Data were collected from thirty respondents for pre-testing. After the analysis of pilot survey, check the reliability of questionnaire which had Cronbach alpha value 0.80. In this research tool, five main socio-economic characteristics are included as independent variable which checked their association with awareness about ICTs as dependent variable.

Data collection procedure

Quantitative data:

Before get information from the respondents, purpose and confidentiality of the research were explained briefly. Data were collected through face-to-face interaction or interviewed at a very peaceful place. All questions were asked in local language (Punjabi) for better understanding. Data were collected with the help of three well trained Ph. D. fellows in four visits of selected research area. Focus group discussion also applied when maximum number of the respondents were available at one time.

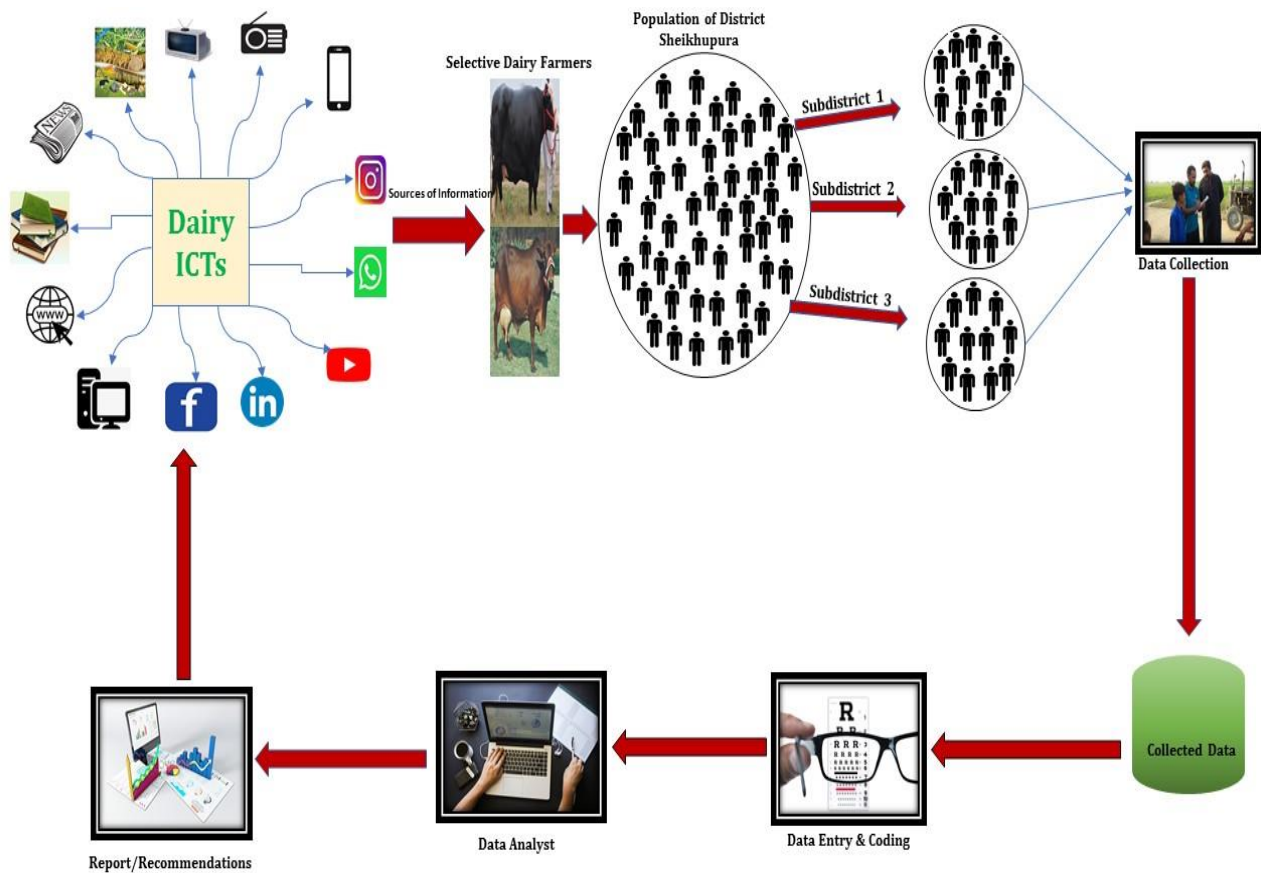
Data analysis

quantitative data were entered in excel sheet and then it was exported to SPSS version 22 for further analysis. Consistency and comprehensiveness of data were checked through pilot survey before. Descriptive analysis was used to find out the percentage and frequencies of demographic characteristics of respondents as independent variable of the study. Chi square was applied to check the association between these

profile attributes with awareness about ICTs regarding dairy production practices as dependent variable. If the p-value of chi-square is less than 0.05 then it will be significant relationship between them and on other hand if it is more than 0.05 then it shows the non-significant relationship between them. Finally, data were compiled in the form of graph, tables and text. Multiple regression analysis was also applied to check the overall relationship between them.

Ethical consideration

Proceeding to data collection, research ethical committee of Institute of Agricultural Extension, Education and Rural Development (IAEERD), University of Agriculture Faisalabad was issued a clearance letter. A meeting was conducted with the districts livestock authority to get permission for data collection from dairy farmers. Before data collection, every respondent was informed through one page attached letter as cover page of questionnaire and verbally about the purpose of study and insure their data confidentiality.



Conceptual Research frame work of dairy ICTs

Figure 2. Conceptual frame of the research

ANALYSIS AND RESULTS

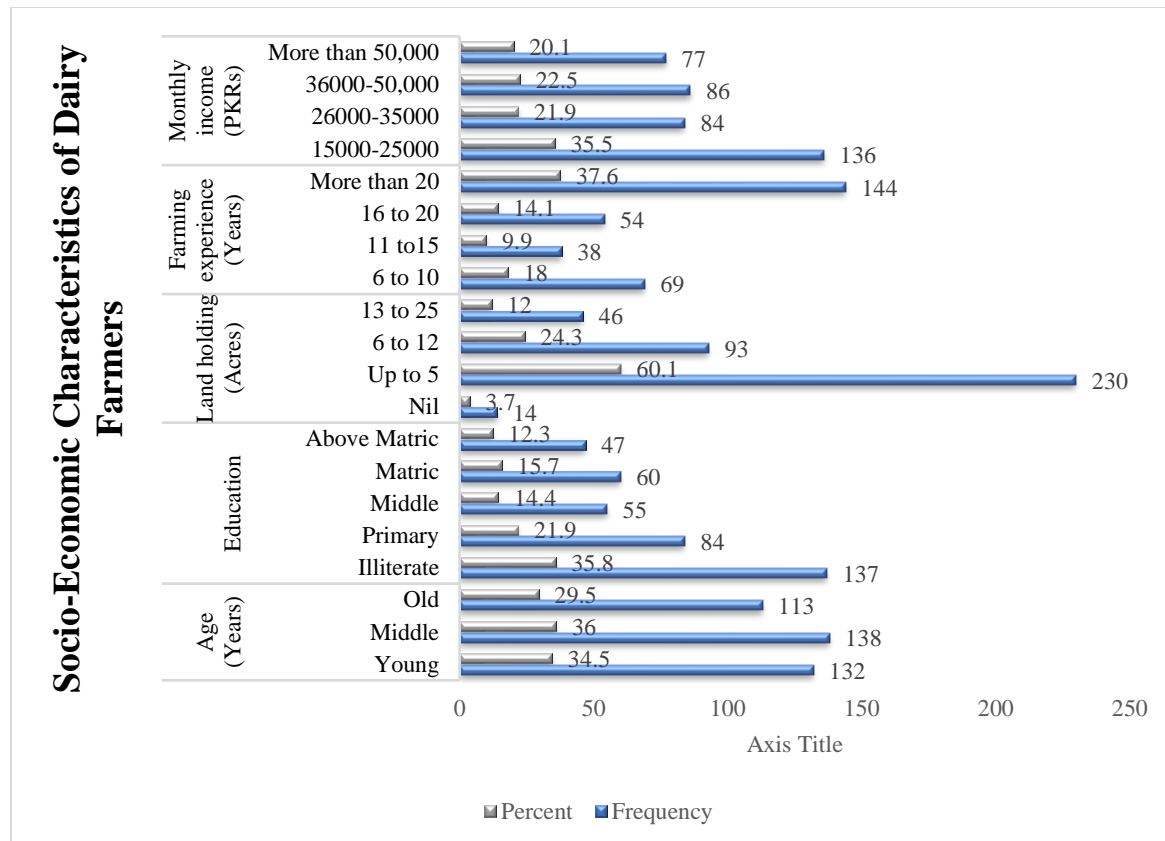


Figure 3. Socio-economic characteristics of the respondents

Data presented in Figure 3 depict that 36 and 34.5% of the dairy farmers were middle and young aged respectively. However, less than one third (29.5%) of the respondents were old aged. Partially similar results were reported by Mohanakumara & Biradar (2018) which revealed that less than half (44.44%) of the respondents were old (51 years and above) whereas, less than one-third (28.89%) of the respondents fell middle aged (31-50 years) and more than one-fourth (26.67%) of the respondents were young (18-30 years).

More than one third (35.8%) of the respondents had no education while less than one fourth (21.9%) of the respondents had their primary education. However, 14.4, 15.7 and 12.3% of the dairy farmers had middle, matric and above matric qualifications respectively. Anyan and Frempong (2019) reported partially similar results which indicate that 34% of the

respondents had no formal education. However, 42% of the livestock farmers had middle school education. While, only 17 and 7% of the respondents had secondary and tertiary education level respectively.

Simple majority (60.1%) of the respondents hold up to 5 acres land for their agriculture purpose. While, 24.3% of the dairy farmers had 6-12 acres agricultural land to feed their animals. However, 13-25 acres land was owned by only 12% dairy farmers. Moderately similar results were mentioned by Ali, et al. (2019) which describe that 55.8% of the respondents had up to 5 acres. While, 29.4% of the farmers owned 6-10 acres land for their fodder cultivation. At last, 14.7% of the respondents had more than 10 acres land.

More than one third (37.6%) of the respondents had more than 20 years farming experience. Although, 18% of the dairy farmers had 6 to 10 years farming experience. While, 14.1 and 9.9%

of the farmers had 16 to 20 and 11 to 15 farming experience respectively. Opposite results were coded by Ali et al. (2019) which depict that 29.4% of the respondents had up to 5 years farming experience. While, 12.8, 12.5 and 13.6% of the respondents had 6-10 years, 11-15 years and 16-20 years farming experience respectively. In this research, 35.5% of the respondents earned 15000-25000 PKR monthly. Although, less than one fourth (21.9, 22.5 and 20.1%) of the respondents earned 26k-35k, 36k-50k and more than 50k PKR monthly income respectively. Opposite results were reported by Ali, et al. (2019) which describe that 23.9% of the respondents earned less than 2000 MYR as monthly income. While, 29.4 and 42.5% of the

respondents earned 2001-3500 and 3501-4500 MYR monthly.

Relationship between Socio-economic Characteristics of respondents and awareness regarding ICTs

Parametric analysis is made through draw relationship on the basis of given information provided by respondents. To figure out the relationship between awareness and adoption of ICTs (dependent variables) and various socio-economic characters (independent variables), Chi-square and F-test are used. The data regarding this aspect are presented in Tables 1 to 6.

Table (1): Relation between respondent's age and their awareness about ICTs

Age (in years)	Awareness about the ICTs			Total
	Low	Medium	High	
Young	37	61	34	132
	28.0%	46.2%	25.8%	100.0%
Middle	72	46	20	138
	52.2%	33.3%	14.5%	100.0%
Old	101	6	6	113
	89.4%	5.3%	5.3%	100.0%
Total	210	113	60	383
	54.8%	29.5%	15.7%	100.0%

Chi-square = 94.10 d.f. = 4 P-value = .000**
Gamma (λ) = -0.633 P-value = .000**

Data presented in the Table 1 display significant ($\chi^2 = 94.10$, $p = .000$) association between the respondents' age and their awareness about the ICTs. Gamma statistics ($\lambda = 0.633$, $p = .000$) show a significant and negative relation between the variables. It means that the young

age respondents had more awareness about ICTs as compared to old age respondents. Results of study are opposite to those of Rehman et al. (2013) who reported that there was non-significant relationship between age and access to agricultural information.

Table (2): Relation between respondents' education and their awareness about the ICTs

Education	Awareness about the ICTs			Total
	Low	Medium	High	
Illiterate	121	8	8	137
	88.3%	5.8%	5.8%	100.0%

Primary	60	19	5	84
	71.4%	22.6%	6.0%	100.0%
Middle	16	34	5	55
	29.1%	61.8%	9.1%	100.0%
Matric	8	45	7	60
	13.3%	75.0%	11.7%	100.0%
Above matric	5	7	35	47
	10.6%	14.9%	74.5%	100.0%
Total	210	113	60	383
	54.8%	29.5%	15.7%	100.0%

Chi-square = 286.10 d.f. = 8 P-value = .000**

Gamma (λ) = 0.762 P-value = .000**

Data given in the Table 2 display a significant ($\chi^2 = 286.10$, $p = .000$) association between the participants' education and their awareness about the ICTs. Gamma statistics ($\lambda = 0.762$, $p = .000$) show a significant and positive relation between the variables. It means that the highly qualified

participants had more awareness about the ICTs as compared to the respondents with low education. Results of this study are similar to those of Rehman et al. (2013) who highlighted that there was a positive relationship between education and access to agricultural information.

Table (3): Relation between the size of landholdings of the participants and their awareness about the ICTs

Size of land	Awareness about the ICTs			Total
	Low	Medium	High	
Up to 5	149	64	17	230
	64.8%	27.8%	7.4%	100.0%
6-12	51	33	23	107
	47.7%	30.8%	21.5%	100.0%
13-25	10	16	20	46
	21.7%	34.8%	43.5%	100.0%
Total	210	113	60	383
	54.8%	29.5%	15.7%	100.0%

Chi-square = 50.15 d.f. = 4 P-value = .000**

Gamma (λ) = 0.478 P-value = .000**

Data presented in the Table 3 display a significant ($\chi^2 = 50.15$, $p = .000$) association between the respondents' land size and their awareness about the ICTs. Gamma statistic ($\lambda = 0.478$, $p = .000$) show a significant and positive relation between the variables. It means that majority of the large

farmers had more awareness about the ICTs as compared to small farmers. Results of this study are similar with those of Saadi et al. (2008) who found that there was a highly significant relationship between size of landholding of farmers and access to agricultural information.

Table (4): Relation between farming experience of the participants and their awareness about the ICTs

Experience (years)	Awareness about the ICTs			Total
	Low	Medium	High	
Up to 5	47	19	12	78
	60.3%	24.3%	15.4%	100.0%
6-10	31	28	10	69
	44.9%	40.6%	14.5%	100.0%
11-15	18	13	7	38
	47.4%	34.2%	18.4%	100.0%
16-20	24	20	10	54
	44.4%	37.0%	18.5%	100.0%
More than 20	90	33	21	144
	62.5%	22.9%	14.6%	100.0%
Total	210	113	60	383
	54.8%	29.5%	15.7%	100.0%

Chi-square = 13.36 d.f. = 8 P-value = .120^{NS}
 Gamma (λ) = -0.110 P-value = .093^{NS}

Data given in the Table 4 display an insignificant ($\chi^2 = 13.36$, $p = .120$) association between the participants' experience and their awareness about the ICTs. Gamma statistics ($\lambda = 0.110$, $p = .093$) also showed an insignificant relation between the variables. It means farming

experience had no role in having awareness about the ICTs. Results of this study are similar with those of Rehman et al. (2013) who expressed that there was non-significant relationship between farming experience of the respondents and access to agricultural information.

Table (5): Relation between monthly income of the participants and their awareness about the ICTs

Income (PKR)	Awareness about the ICTs			Total
	Low	Medium	High	
15000-25000	120	6	10	136
	88.2%	4.4%	7.4%	100.0%
26000-35000	46	27	11	84
	54.8%	32.1%	13.1%	100.0%
36000-50,000	37	40	9	86
	43.0%	46.5%	10.5%	100.0%
More than 50,000	7	40	30	77
	9.1%	51.9%	39.0%	100.0%
Total	210	113	60	383
	54.8%	29.5%	15.7%	100.0%

Chi-square = 144.55 d.f. = 6 P-value = .000**

Gamma (λ) = 0.673 P-value = .000**

Data presented in the Table 5 display a significant ($\chi^2 = 144.55$, $p = .000$) association between the respondents' income and their awareness about the ICTs. Gamma statistics ($\lambda = 0.673$, $p = .000$) showed a significant and positive relation

between the variables. It means that majority of the high-income farmers had more awareness about the ICTs as compared to lower-income farmers.

Table (6): Relationship of socio-economic characteristics of the participants and their awareness about ICTs

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.833 ^a	.693	.689	.415

a. Predictors: (Constant), Income, Age, size of landholdings, experience, education

ANOVA^a

Model	Sum of Squares	Degree of Freedom	Mean Square	F	Sig.
Regression	146.428	5	29.286	170.32	.000 ^b
Residual	64.825	377	.172		
Total	211.253	382			

a. Dependent Variable: Awareness

b. Predictors: (Constant), Income, Age, size of landholdings, experience, education

Co-efficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	1.699	.072		23.529	.000
Age	-.528	.062	-.567	-8.453	.000
Education	.467	.047	.892	10.005	.000
Size of land holdings	.028	.059	.026	.469	.639
Experience	.037	.036	.080	1.047	.296
Income	.166	.056	.256	2.955	.003

a. Dependent Variable: Awareness

Multiple regression analysis was carried out to investigate the effect of socio-economic

characteristics on their awareness about the ICTs. To check the overall significance of the model

R², adjusted R² and F-test were used. The respective values of R², adjusted R², and F-test were calculated as 0.693, 0.689, and 170.32 respectively. The value of R² indicated that about 69 percent of the total variation in awareness about the ICTs was explained by the 5 explanatory variables (socio-economic characteristics) included in the model. As the primary data were used in the analysis, the estimated value was very high, and the overall model was considered reliable. To check the reliability of the model F-test was also used. The calculated value of 170.32 was statistically significant at less than one percent level of significance; this too indicated that all the independent variables included in the model were explaining the dependent variable.

The dependent variable in this regression model was awareness about the ICTs. The impacts of two explanatory variables (education and income) are positive and significant while that of age had a negative and significant relationship with their awareness about the ICTs. However, the size of landholdings and experience had insignificant relation with awareness of the ICTs. It means that young, educated and high-income farmers had more awareness about the ICTs.

CONCLUSION

The study revealed that more than one-third and less than half of the respondents had middle age, no education, up to 5 acres land, more than 20 years farming experience and earned 15000-25000 PKRs per month. Based on the results there was good association of age, education, landholding and monthly income of the dairy farmers with awareness about ICTs regarding dairy animals' production practices. While, there was no any association between awareness about ICTs and farming experience of the farmers. So, there is dire need to create awareness among dairy farmers about the use of ICTs to improve their farm practices as well as their profit. It is

also recommended that don't do such type of research before creating awareness about the use of ICTs otherwise it will be the waste of sources and time.

Authors contributions statement

Asghar S: Conceived the idea, collected the data, wrote the research paper; Ashraf I: Reviewing and editing; Chaudhary KM: designed and layout the study; Khan BB: Proofreading the article.

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Conflict of Interest

There is no conflict of interest by the authors.

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