

*Full Length Research Paper*

## Performance evaluation of the dairy farmers regarding adoption of precise dairy farming practices in the Punjab, Pakistan

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Livestock is the dominant cog of economy of Pakistan and also livelihood supporter fulfiller for the subsistent farmers of country. The country has a great potential and prosperous with dairy animals' breeds. Unfortunately, farmers are so far away to cash in the actual potential of animals. Non-adoption of improved practices is the major productivity retarding factor. In this regard, present study was conducted in the different areas of Punjab, Pakistan. Data were collected from the 107 livestock farmers. The sample was a blend of landless, illiterate and young, middle aged and small farmers who were immensely dependent on livestock. Data analysis indicated that cattle were the more likely animal among farmers. Farmers were interested in different management practices regarding feeding, breeding and disease management. However, farmers were adopting the only practice which needs no investment and technicality. Farmers were lacking in technical knowledge to keep animals healthy therefore it got mean value of 2.77 influenced by non-cooperation of livestock extension agents with maximum mean value of 2.39 as a major constraint. Finance shortage ( $\bar{x}=2.41$ ) and high inputs prices ( $\bar{x}=2.81$ ) were other constraints compelling farmers to adopt traditional practices. Correlation analysis indicated highly significant association of age, education, land size and annual income with adoption of scientific dairy practices. On the basis of results, it is suggested that the role of livestock extension should be diversified under strict evaluation. Micro credit schemes with cooperation of government may also boost the adoption. It is also inferred that international organization may also start some projects keeping in mind the ultimate potential of Pakistan dairy sector.

**Key words:** Livestock, dairy farming, adoption, Punjab.

### INTRODUCTION

Livestock is an important part of agriculture along with crop farming having 55.1% stake in agriculture (Government of Pakistan, 2012). Pakistan is bestowed with distinctive geographical location and environment which is supportive for the rearing of multipurpose animals (PBIT, 2011). Among various breeds of animals' castles, buffaloes, goats and sheep are more important. These animals are domestic animals and farmers rely on their products such as milk and meat for their better

livelihood.

In world Pakistan ranks 4<sup>th</sup> milk producer with average production of 37,475 thousand tons per year for human consumption (Government of Pakistan, 2011) and 2<sup>nd</sup> largest buffalo producer. Buffalo and cattle share 68 and 27% of milk, respectively in the total produces milk in an entire country (Raza and Rabbani, 2012). Livestock sector play a vital role in the economy of Pakistan and dairy animals are the essence of livestock wealth.

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The livestock sector was also influenced by the massive floods and showed significant declining growth at 3.7% in 2010-2011 as against 4.3% last year (Government of Pakistan, 2011). Globally, Pakistan stands among the 5 largest countries contributing 570 billion annually to the national economy (Kakakhel, 2010). Country is gifted with dairy breeds of various farm animals. Regarding buffalos' nilli-Ravi, Kundhi and regarding cattle, Sahiwal, Red Sindhi, Cholistani are nationally renowned. In case of small ruminants such as goats, beetal, Dera Din Panah, and kamori are famous. These all breeds are well renowned because of their enormous potential. More than 70% dairy animals are owned by small farmers having herd size of 1 to 10 animals.

Livestock farmers are considered as spine of national dairy industry through supply of greater than 80% of market milk for consumption in various sectors. Mostly small or landless farmers are the owners of these significant animals such as cattle, buffaloes and goats (Government of Pakistan, 2011).

Various dairy farming systems are adopted in Pakistan such as rural subsistence smallholdings, rural commercial farms, market-oriented smallholdings and peri-urban commercial dairy farms. The ultimate purpose of these systems is to strengthen their livelihood through earning from different dairy products. Livestock farmers sell milk, meat and other products to earn better livelihoods. Meanwhile, they also use these products at their home for food security. Especially landless and small farmers are connected with this setup. These livestock farmers mostly rely on road side, canal banks and water channel sides grazing for their herds feeding. However, this practice remains insufficient and animals remain underfed. More importantly farmers focus more on lactating animals and they do their best for their furnished diet (Raza et al., 2006).

Despite of the vital importance of livestock and dependency of farmers the productivity is far below than the actual potential. Several factors are responsible for this low production. Ghafoor (2003) and Gillespie et al. (2007) reported poor finance earning, lack of appropriate knowledge, negative attitude of government and poor marketing facilities, as factors responsible for the non-adoption of improved dairy farm practices. Moreover, according to Arif et al. (2013), inadequate feed resources, unawareness of artificial insemination, finance shortage and limited health facilities were the major constraints among farmers. In this context, mostly small farmer or landless farmer suffer more because they fail to get the targeted outcome and in this way their livelihood becomes more diverse. Majority of farmers remain unaware of new practices and low adoption of recommended practices are also cause of poor dissemination of information through information sources (Ahmed et al., 2004). Adoption can be enhances through delivery of accurate extension services regarding all the

dairying aspects (SMEDA, 2011). Keep in mind these facts present study was conducted in the different areas of Punjab, Pakistan.

## METHODOLOGY

Punjab province is famous for livestock as most of the respondents are dependent on livestock. Three districts as Muzaffargarh, Khanewal and Nankana Sahib were selected purposively for the data collection. All of these districts have unique importance regarding livestock. Total 107 livestock farmers were interviewed from these three selected areas purposively. For the data collection an interview schedule was developed. The interview schedule was based on various aspects of dairying management such as feeding, breeding, disease and management practices and was checked by the livestock experts of Animal Husbandry Department, University of Agriculture Faisalabad, Pakistan. All the suggestions were incorporated in interview schedule.

Later on for further reliability interview schedule was pre tested on 5 livestock farmer. Three point Likert scale was used for data collection. Data were collected from the targeted respondents in selected areas. Farmers were interviewed at their farms and face to face interviews were preferred. Collected data were analyzed through Computer software Statistical Package for Social Sciences (SPSS). Descriptive statistics (Mean, Standard Deviation) and inferential statistics were applied for the interpretation of data analyzed. Ranking of adoption status and constraints faced by livestock farmers was formulated on means values basis. Furthermore, correlation analysis was applied to investigate the association between demographic characteristics of the respondents with adoption status of farmers' regarding scientific practices.

## RESULTS AND DISCUSSION

Table 1 is the representation of respondents' personal demographic attributes. According the data mentioned in Table 1, majority of the farmers were of middle aged. Middle aged category appeared prominent with the percentage of 43.9% respondents. Inclination of young and middle aged farmers represents the interest in livestock business. Regarding education 15.9% respondent were found, who never attended the formal education, except to these illiterate people up to primary level education holding respondents were more prominent. This scenario reports the poor literacy level of farmers. More than one third of total respondents were basically landless and were tenants. Generally, overwhelming majority were small farmers with land holding size of up to 12.5 acres. Major income sources observed in the farm level were crop sale and livestock while some were also doing some sort of private business. Total income derived from these different income sources appeared not more than 2 lacs as just 13.1% respondents were earning more than 2 lacs rupees. Mostly, farmers rear dairy animals for better income through milk selling and young animals such as calf and heifers selling. Small rudiments such as goat and sheep are not in good trend nowadays because of low profit. People were having various animals such buffaloes and

**Table 1.** Demographic characteristics of farmers.

Demographic characteristics of farmers		Frequency
Age (Year)	<35 (Young)	39 (36.4)
	35-50 (Middle age)	47(43.9)
	>50 (Old)	21(19.6)
Education	Illiterate	17(15.9)
	Up to primary	37(34.6)
	Middle-matriculation	24(22.4)
	Above matriculation	29(27.1)
Land holding size	Landless	42(39.3)
	Up to 5 acre	37(34.6)
	5-10 acre	12(11.2)
	Above10 acre	16(15)
Annual income	<1 lac	35(32.7)
	1-2 lac	58(54.2)
	>2 lac	14(13.1)

Source: Field Data 2013. Note: Values in parenthesis are percentages.

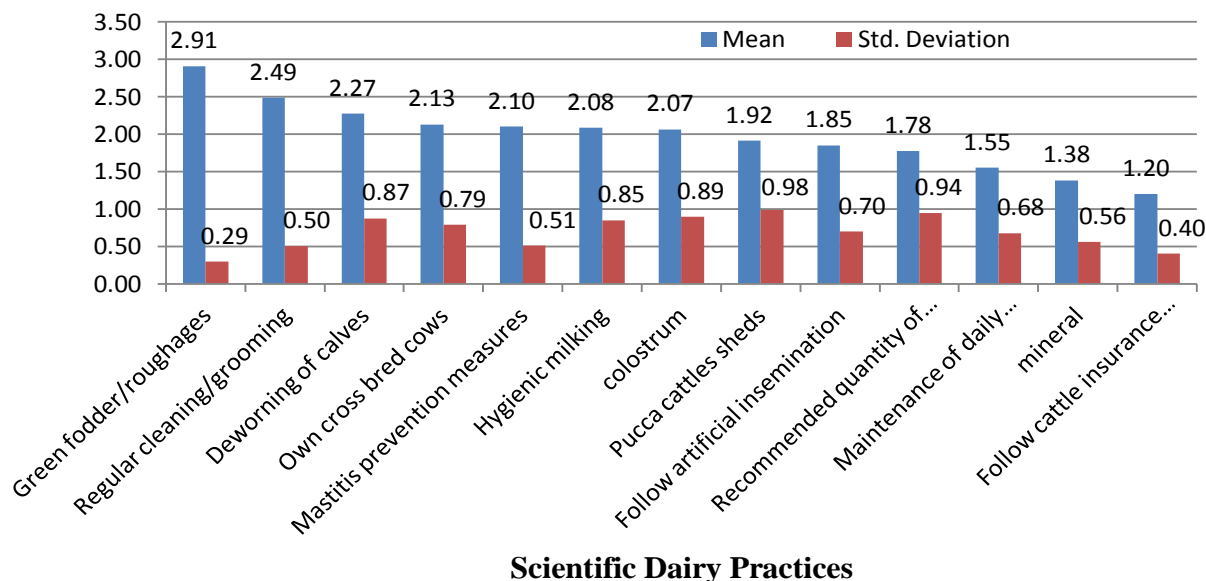
cattle for different purpose such as milk purpose. Farmers owned different number of animals but mostly animals on their farm were in range of 2 to 3. Some progressive farmers were also interviewed who were holding a larger herd size. Majority (60.7%) of respondents was holding up to 2 buffaloes in milk. Lesser number of respondents (8.41%) owned buffaloes in milk more than 5. More than one third respondents (39.3%) owned buffaloes (heifers, young and dry). Farmers were more interested in cattle therefore majority of farmers owned cattle including in milk and heifers, dry and young cattle. About half of the respondents owned cattle population up to 2 while one third respondents were found with in milk cattle population of 2 to 5. Population of small rudiments such as goats and sheep was not so good due less profit. During data collection, it was rarely seen that someone is holding goats and sheep except someone who were rearing for domestic purposes. During informal discussion few respondents also stated that goats and sheep did not have impressive benefits, infact they have losses. Mostly these small animals cause damages to crops and home based plantations.

Data depicted in Table 1 revealed that, in general most of the farmers were inclined toward the adoption of scientific dairy practices. The hidden reality behind this adoption was their dependency of livelihoods on livestock. During data collection, it was observed that farmers were so caring and loving to their animals but they were doing in their own way according their available resources and knowledge that they have. Farmers' were enquired regarding breeding, feeding, disease and management practices. Regarding breeding

practices own cross bred cows got the maximum mean value ( $\bar{x}=2.13$ ). This indicates that majority of the farmer were having cattle especially cow. During informal discussion farmers reported the early growth of cows and calf as a reason for more inclination toward cows. Lesser number of respondents was inclined toward artificial insemination therefore it got mean value of 1.85. It was observed that farmers used breeding practices according the feasibility, sometime they breed animals naturally, some time both artificial insemination and natural mating while some one also show interest in their farm produced bull for natural breeding. Same observation was reported by Arif et al. (2013).

Feeding practices were not being adopted according the recommendations as the farmers were not so good in financial condition. Moreover, farmers were also lacking in technical knowledge that is why adoption revealed lower. Farmers were relying more on fodder and roughages ( $\bar{x}=2.91$ ). Diseases cause several losses in animals in form of week health and deaths. In this regard, farmers were mostly caring and were adopting precautionary measures such as regular cleaning, deworming of calves, hygienic milking and vaccination against the diseases. These results in respect of vaccination coincide with Karim and Najeeb (2001).

Colostrums feeding to calves were adopted almost by overwhelming majority because farmers consider calves their net income source assets. These results coincides with Arif et al. (2013) and Fulwider et al. (2007) where they reported many farmers offering 3.8 liters/day milk as first feed to calves. Income availability is the key to avail all the facilities and poor financial condition did not



**Figure 1.** Descending Means in regard of farmers adoption level.

allow many farmers to construct pucca cattle shed for animas. It was observed that farmers were placed inside the house and families were living along with them without any precautions and fear of diseases. Poor literacy was responsible for the low awareness regarding cattle insurance. Only progressive farmers were maintaining the daily management records of their animals. Record keeping system had significant link with increased milk production (Tomaszewski, 1993).

It is clear from Figure 1 that green fodder/roughages ( $\bar{x}=2.91$ ) usage got the maximum means value followed by the regular cleaning ( $\bar{x}=2.49$ ) and deworming of calves ( $\bar{x}=2.27$ ). Own cross bred cows attained the 4<sup>th</sup> highest means value ( $\bar{x}=2.13$ ). If we look in depth that all the practices that do not need any technicality and expenses got the maximum means. Farmers were doing these practices at their own within the available resources. Other technical aspects such as recommend quantity of concentrates, maintenance of daily records, mineral utilization and cattle insurance go the lower mean values. These aspects are highly technical and need investment, therefore farmers were away of their adoption because of their limited resources and lack of technical knowledge.

From the dissemination to adoption of technology, it is surrounded by various factors which affect its adoption and these factors are simply known as constraints. These constraints enormously exist at farmers' level. According to the data mentioned in Table 2, inadequate technical advice by livestock extension department attained the highest mean value and was ranked first. Farmers argued that they have never seen the livestock extension agent here in the area. These comments raise the critics on the livestock extension agents and their deficient role describes their laziness. Lack of government support was

ranked second ( $\bar{x}=2.87$ ) followed by the high cost of livestock inputs ( $\bar{x}=2.80$ ). Due to these high rates, farmers were not adopting minerals and recommended quantities of concentrates for their animals as they cannot purchase these inputs at high rates.

Naylor et al. (2005) suggested that livestock production can only be increased by reducing the feed prices. Ramsey et al. (2005) also reported that several production practices can increase cow herd returns either by increasing revenue or by reducing costs (Table 3). Farmers were not having technical knowledge and even they were unaware of this technical knowledge. Farmers stated this lack of technical knowledge as the major constraint toward adoption (Table 4). Low quality inputs were another major constraint regarding feeding practices among farmers while provision of balanced rations is vital for better survival of animals (Riley et al., 2004). Lack of training facilities got the mean value ( $\bar{x}$ ) of 2.61. Without training, adoption cannot be enhanced and livestock extension agents are considered trainers among the farmers while the role of these agents is already negligible. Availability of labour ( $\bar{x}=1.63$ ) and vaccines ( $\bar{x}=1.48$ ) were not considered as significant constraints. Vaccines are easily available in the market but their availability was considered as constraints among the farmers living in remote area and where the females were the heads of family.

#### **Association between demographic characteristics and adoption of dairy practices**

Table 5 revealed the association checked between demographic characteristics and the adoption level of

**Table 2.** Status of farmers regarding owned herd size.

Class of animals	No. of animals	Owners (Percentage)	
		f	%
Buffalo (in milk)	< 2	65	60.7
	2-5	4	3.7
	>5	9	8.41
Buffalo (Heifers, dry and young)	< 2	42	39.3
	2-5	8	7.5
	>5	3	2.8
Cattle (in milk)	< 2	48	44.9
	2-5	33	30.8
	>5	4	3.7
Cattle (Heifers, dry and young)	< 2	40	37.4
	2-5	29	27.1
	>5	11	10.2
Adult goat	< 2	13	12.1
	2-5	18	16.8
	>5	-	-
Young goat	< 2	17	15.9
	2-5	19	17.8
	>5	-	-
Sheep	< 2	3	2.8
	2-5	2	1.9
	>5	-	-

Source: Field Data 2013.

of livestock farmers regarding scientific dairy farming practices. Regarding age and adoption mix response was found as with some particulars such as own cross bred cows and regular cleaning positive association was found while with other particulars such as artificial insemination, utilization of recommended concentrated and green forages or roughages positive association was revealed. Positive but negative association of age was found with vaccination and colostrums feeding to the calves. It can be said on the basis of results that as the age increase, interest of livestock farming goes down as potential of farmers does not allow them to do hard work. As compared to these old ages, young aged farmers may have better intentions toward adoption.

Education plays vital role in awareness and adoption of any innovation. In that case, highly significant relation of education was found with most of the particulars except mastitis prevention measures and cattle insurance. Literacy level of the study areas was not so good as 15.9% respondents found were illiterate. On the basis of

results, it can be concluded that because low adoption was influenced by the poor literacy level. Land is another major factor.

Farmers with large land holding have better intentions toward livestock farming and adoption of improved practices. According to correlation analysis, land holding size was highly associated with the adoption as highly significant association as found with most of the particulars except own bred cows, artificial insemination and green fodder or roughages.

Finance is always needed to purchase inputs and financially sound farmers can afford any type of concentrated but financially poor farmers cannot. Income showed highly significant relationship with vaccination against disease and mastitis prevention measures as both of these particulars are money consuming. Age was also significantly associated with adoption of recommended concentration of concentrates. Moreover, income was positively or negatively connected with rest of the particulars.

**Table 3.** Farmers level of adoption regarding scientific dairy practices.

Scientific dairy practices	Adoption		
	Mean	Std. deviation	
Breeding practice	Own cross bred cows	2.13	0.79
	Follow artificial insemination	1.85	0.70
Feeding practice	Recommended quantity of concentrated	1.78	0.94
	Green fodder/roughages	2.91	0.29
	Mineral and vitamin supplements	1.38	0.56
Disease control practice	Regular cleaning/grooming	2.49	0.50
	Vaccination against diseases	2.37	0.61
	Hygienic milking	2.08	0.85
	Deworning of calves	2.27	0.87
	Mastitis prevention measures	2.10	0.51
Management practices	Follow cattle insurance practice	1.20	0.40
	Feed colostrums to newly born calves	2.07	0.89
	Pucca cattles sheds	1.92	0.98
	Maintenance of daily management records	1.55	0.68

Source: Field Data 2013.

**Table 4.** Ranking of constraints hindering the adoption level.

Constraints	Means	Rank	Std. deviation
Inadequate technical advice by livestock extension department	2.93	1	0.36
Lack of government support	2.87	2	0.46
High cost of livestock inputs	2.80	3	0.56
Lack of technical knowledge	2.77	4	0.51
Lack of awareness about technical knowledge	2.71	5	0.50
Low quality of livestock inputs	2.64	6	0.62
Lack of training facilities	2.61	7	0.66
Literacy	2.51	8	0.81
Lack of financial resources	2.41	9	0.90
Availability of credit/loan	2.38	10	0.88
Marketing of animals	2.33	11	0.80
Less availability of land	2.32	12	0.91
Lack of grazing field	2.32	13	0.94
Shortage of fodder in winter season	2.14	14	0.86
Availability of labour	1.63	15	0.58
Availability of vaccines against infectious diseases	1.48	16	0.77

Source: Field Data 2013.

## CONCLUSION AND RECOMMENDATION

It is concluded on the basis of present study that whole livestock husbandry is based on traditional techniques resulting half way productivity than potential due to several factors. Farmers do not have technical knowledge and they lack in resources to create interest toward technicality attainments. More importantly, role of Livestock Extension Field Staff was negligible.

Addressing these factors only on paper will not boost the dairy productivity until the reduction of these factors through proper policies. To improve the economic viability of dairy farming communities, it is essential to modify the role of livestock extension field staff though proper trainings and strict evaluations. It will also be good to create chances for the collaboration of international companies to launch some projects as dairy in Pakistan hold immense potential. Correlation analysis revealed

**Table 5.** Association between demographic characteristics of livestock farmers and adoption of scientific dairy farming practices.

Particulars	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14
Age	0.006 (0.953)	-0.087 (0.376)	-0.069 (0.483)	-0.074 (0.449)	-0.071 (0.466)	0.122 (0.212)	-0.218(*) (0.024)	0.068 (0.483)	-0.016 (0.866)	-0.154 (0.112)	0.056 (0.569)	-0.209(*) (0.031)	-0.012 (0.904)	0.046 (0.046)
Education	0.403(**) (0.00)	-0.440(**) (0.000)	0.650(**) (0.000)	0.278(**) (0.004)	-0.222(*) (0.021)	0.489(**) (0.000)	0.557(**) (0.000)	0.259(**) (0.007)	-0.621(**) (0.000)	-0.099 (0.309)	0.188 (0.053)	0.455(**) (0.000)	0.248(**) (0.010)	0.406(**) (0.000)
Land	0.076 (0.435)	-0.112 (0.253)	0.553(**) (0.000)	0.189 (0.051)	0.403(**) (0.000)	0.535(**) (0.000)	0.519(**) (0.000)	0.620(**) (0.000)	-0.476(**) (0.000)	0.293(**) (0.002)	0.422(**) (0.000)	0.260(**) (0.007)	0.419(**) (0.000)	0.475(**) (0.000)
Income	0.142 (0.144)	-0.065 (0.504)	0.204(*) (0.035)	0.151 (0.122)	-0.102 (0.295)	0.006 (0.952)	0.307(**) (0.001)	-0.107 (0.275)	0.011 (0.907)	0.316(**) (0.001)	0.077 (0.432)	0.186 (0.055)	-0.173 (0.076)	0.003 (0.972)

\*\* Significant at 0.01 level, \*Significant at 0.05 level. Note: values given in parenthesis are significance level. X1=Own cross bred cows , X2=Follow artificial insemination, X3=Recommended quantity of concentrated, X4=Green fodder/roughages, X5=Mineral and vitamin supplements, X6=Regular cleaning/grooming, X7=Vaccination against diseases, X8=Hygienic milking, X9=Deworming of calves, X10=Mastitis prevention measures, X11=Follow cattle insurance practice, X12=Feed colostrums to newly born calves, X13=Pucca cattle sheds, X14=Maintenance of daily management records.

highly significant association of education and income with adoption therefore, it is also suggested that government should introduce farmers' trainings strategies and subsidies on inputs along with micro credit schemes to cover up the finance shortage.

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