

## **ASSESSMENT OF LIVESTOCK EXTENSION SERVICES ON DAIRY FARM'S PRODUCTIVITY**

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**ABSTRACT:** The objective of this study was to assess the impact of livestock extension services provided by non-government organization and their role in subsequent livestock products enhancement in the randomly selected from enrolled dairy farms in Punjab. A total of 25 dairy farmers were interviewed to get the desired information. The data were collected for the education level, animal raising purpose, herd structure, breeding of animals, animal health, dairy products and their consumption, input and output of the dairy farms and the role of livestock extension services. All the respondents in this study gained education up to post graduate and a great number of the farmers (64%) were engaged in commercial dairying. Dairy farmers were rearing the Buffalo and various cattle breeds {Sahiwal, Friesian, Swedish, Jersey and crossbred (Sahiwal × Friesian, Friesian × Jersey)} and the population of animals ranged from 35 to 600 at different dairy farms. Breeding of dairy animals was executed by 76% farmers through artificial insemination cum natural mating method. Mastitis was found main disease (54.4%) having negative impact on dairy industry. All the farmers were vaccinating their animals against Foot and Mouth disease and Hemorrhagic Septicemia, whereas only 92% dairy farmers were using anthelmintics. It was revealed that 24% respondents availed training programs offered by non-government organization. It was concluded that livestock extension services developed the interest of people to invest in livestock business, also accelerated the adoptability of innovative technologies and ultimately it improved income and living standards of common dairy farmers.

**Keywords:** Private extension services, Managemental practices, Health problems, dairy productivity and Punjab dairy farmers

(Received 18-04-2018

Accepted 29-06-2018)

### **INTRODUCTION**

God has gifted the Pakistan with a diverse variety and well-adjusted livestock species to the local environmental conditions. Majority of livestock (about 90%) is kept by small holders (1-10 animals), which make it an ideal sector to mitigate rural poverty (ACO, 2010). Dairy sector provides not only valuable food items but also acts as source of employment and livelihood. About 82 million dairy animals produce approximately 54 billion liters of milk annually. Nearly 8 million families are generating their about 35 % income from this sector (GOP, 2017). Dairy industry also provides business opportunities, especially in the rural and peri-urban regions. People living in peri-urban regions are also involved in dairy business. Public sector institutions are playing key role in uplifting the dairy sector (Jalil *et al.*, 2009). It is operating to maximize dairy production through provision of livestock extension services in terms of seminars, workshops, farmer's day, awareness campaign and training programs, which are an important priority area for enhancing and illuminating livestock

production potential. In response to increasing adoptability of improved livestock technologies in the animal husbandry sector, the demand of services especially in the areas of health care, breeding, feed production, management, marketing and livestock extension, etc. have been increased. Hence, extension services may enable farmers with appropriate modern technological knowledge and skills through extension education and training programs (Rathod *et al.*, 2012).

Larger farmers respond positively as compared to smaller farmers to adopt the modern livestock technologies. However, they are incapable to react properly and quickly unless they clearly understand the innovative, economical and doable technologies. A continuous updated guidance is mandatory for livestock farmers to maximize their production. It is ultimate mandatory to maximize the livestock production by using innovative technologies in order to fulfill its growing demand, rapid increase in population and to earn foreign exchange (Idrees *et al.*, 2007).

Majority of the Pakistani farmers (about 80%) are incapable to enhance their production due to

unavailability of resources in the form of economic, financial advice, training, technical guidance, innovative techniques, up to date advances and latest knowledge, supervision and management of farms. In the absence of these aspects the farmers are unable to improve their farm production and living standards (Jaffar *et al.*, 2006). In order to consolidate the living values of farming community, a number of organizations, associations and non-government organizations (NGOs) are doing work for their up gradation through provision of livestock extension services. Keeping in view the role of NGOs in empowering the livestock community, it is need of time to design a study in the main aim to assess the impact of livestock extension services and their role in subsequent enhanced livestock productivity on the selected dairy farms of the Punjab.

## MATERIALS AND METHODS

**Selection of dairy farms:** A number of 25 dairy farms located in Punjab were randomly selected from the panel of non-government organization (NGO) to collect relevant the information for assessment of livestock extension services. The Small and Medium Enterprises Development Authority (SMEDA) was NGO providing services to enrolled dairy farmers in the terms of animal procurement, innovative feeding techniques, housing, breeding, health management and milk marketing.

**Data collection:** A questionnaire was designed to collect the information about extension services provided and their impact over dairy productivity. The questionnaire was comprised the information about education level and animal raising purpose, herd structure, breeding of animals, animal health problems and their treatment, dairy products and their usage, input and output of dairy farm and role of provided livestock extension services as mentioned in table-1.

In prior to collection of data, the questionnaire was pretested with the help of dairy experts for meaningful and comprehensive information. Each dairy farm was twice visited to compile the information regarding livestock extension services. The questionnaire were initially distributed amongst different stake holders; farm owner, farm manager and other technical staff engaged with various activities rendered over dairy farms. The quantitative and qualitative information were collected regarding different parameters in this study.

**Data analysis:** Using themes and categories emanating from data and questions, the data were simply uploaded in computer and compiled in single Excel file. These data were then rechecked referring filled questionnaire and analyzed in accordance with the objectives of the study. The collected data were analyzed by using descriptive statistics like percentage and frequency distribution.

## RESULTS AND DISCUSSION

**Education level and animal raising purpose:** The data revealed that all the livestock farmers were small and medium entrepreneurs having education up to post graduate level. However, 64, 12 and 24% of famers were rearing the animals for commercial, domestic and domestic as well as commercial purposes, respectively (table-2).

The finding regarding high education level and involvement in commercial dairying of a good number of farmers in this study was not supported previously. Akhtar *et al.* (2008) documented that very less only 2.6% farmers were highly educated and only 1% respondents were raising animals for commercial basis around peri-urban areas of Faisalabad, Punjab, Pakistan, whereas Patil *et al.* (2009) reported that only 24% farmers were highly educated in India. The possible reason for this divergence might be attributed to the factor of existing heavy investment trend from highly educated people in dairy industry in Punjab.

**Herd structure:** The Sahiwal × Friesian crossbred, Friesian and Swedish cattle breed were reared by 20, 12 and 20% farmers, respectively. Whereas, rest of dairy farmers were keeping the Friesian and Jersey (4%), Sahiwal and Buffalo (8%), Friesian and Swedish (12%), Crossbred and Buffalo (8%), Sahiwal and Crossbred Cattle (8%), Sahiwal, Crossbred Cattle and Buffalo (4%) and Friesian × Jersey Crossbred (4%). Trend of rearing exotic and crossbred with exotic breeds in this study was also authenticated by Zia *et al.* (2011) they reported few years before that crossbred cattle population (13%) was increasing in Pakistan day by day. Exotic and crossbred cattle were preferred over local animals by dairy farmers to gain high milk yield and ultimately high profit.

**Breeding of animals:** Artificial insemination (AI) technique was adopted by 24% respondents as breeding method at dairy farm. However, remaining 76% of farmers were also using AI as breeding method for cattle but natural method for Buffaloes (table-3). The reason for natural mating might be rearing of their own bulls and also factor of having Buffalo with silent heat issue (Bilal *et al.*, 2006). However, adaptation of AI was a factor to increase milk production of dairy animals through crossbreeding. These results were strengthened by a study of Haile (2008) who reported that 52.6% farmers adopted AI having same objectives of crossbreeding in central Ethiopia.

Sizeable number (60%) of the farmers still preferred and had faith on natural mating over AI service (40%) due to low quality of semen, expensive semen of exotic cattle breeds and less disease resistance in progeny (table-3). Whereas, previous studies (Aden *et al.*, 2008; Siddique *et al.*, 2013) reported differently that a high number of respondents prefer the AI over natural

breeding. The reason of this divergence might be attributed to factor that farmers were interested for producing the high yielders through crossbreeding plan.

**Animal health problems and their treatment:** The data regarding the animal health problems; management disease, reproductive disease and treatment sources are given in figure-1. Management diseases having negative impact on dairy industry and affecting the milk market were mastitis (54.5%), parasitic diseases (24%), FMD (14.3%), HS (5.7%) and Anthrax (2.8%) at dairy farms in Punjab. The prevalence of mastitis might be due to low adoptability of post milking therapy and poor sanitation conditions at farms having crossbred and exotic animals. The study was also supported by Khair *et al.* (2013) who reported the mastitis (25.8%) as major disease of crossbred cattle.

Anestrus (40%), silent heat (31.4%), calving interval (14.3%) and metritis (14.3%) were noticed as reproductive disorders in dairy animals of dairy farms in Punjab.

These findings were supported by the study of Kakar *et al.* (1997) that anestrus (38.6%) as major reproductive problem in crossbred cattle in the province Balochistan and this was observed during the months of decreasing ambient temperature *i.e.* December to February. In relevant to above discussion there might be chances of same factor of anestrus in crossbred animals in the Punjab. In line to these results, Khair *et al.* (2013) also reported the anestrus (20.7%) and metritis (8.6%) as reproductive problems in crossbred cattle.

The data related to treatment source adopted by farmers to minimize disease occurrence at farm showed that abundant of the farmers (88%) were curing the diseased animals from private practitioners due to reliability, quick response and good recovery rate of animals. Only a few farmers (4%) were using Government hospitals for treatment of animals while remaining respondents (8%) were availing services from both Government and private veterinarians. It was determined that dairy farmers availed the private practitioner services for animal treatment and preferred the health of their animals rather than saving of expenditure. In line to these results, Quddus (2012) reported same previously that farmers were reluctant to treat the animals from Government hospitals (30%) treatment due to botheration of this process and preferred animal health over finance.

**Vaccination:** A high number of farmers (92%) were vaccinating their dairy animals against Hemorrhagic Septicemia (HS) and Foot & Mouth Disease (FMD) both while only 8% respondents were using vaccine against FMD, HS and Anthrax (table-4). A high adoption rate of vaccination at dairy farms might be due to involvement of NGO as argued same in district Gujranwala (Arif *et al.*, 2013).

**Deworming:** The data regarding anthelmintic usage revealed that bulk of dairy farmers (92%) were using anthelmintic. Sequence of anthelmintic usage at farm level was thrice (80%), twice (16%) and four times (4%) per year under the study. These results are not in line with the study of Patil *et al.* (2009) who elaborated that only 32% respondents were deworming their animal at farm in India. Public institutions and NGOs facilitation in the form of livestock service might have also played a role in making the farmers awareness about deworming and its ultimate availability.

**Dairy products and their usage:** The data regarding milking system to milk the lactating animals revealed that about 76 and 20% farmers adopted machine and hand milking method, respectively. Rest of the respondents were using both (4%) methods for milking. Bucket milking, milking line and milking parlor systems were adopted to milk their animals by 45, 34, and 20% respondents, respectively. The observations regarding milking usage presented that 28, 64 and 8 percent of farmers were selling all milk to market, partial selling and self-domestic consumption, respectively. Milk was consumed in the form of liquid by 66.7% dairy farmers whereas only 33.3% were value adding in liquid, yoghurt and butter form (table-5). In contrary to these findings, Zia *et al.* (2011) reported that 60% milk produced by smallholders is not marketed and consumed at home. Nominal milk price, low yielders and traditions of smallholders might be barrier in selling of milk.

Data regarding milk marketing (figure-2) concluded that a high quantity of milk (68%) was marketed to processing Companies followed by own outlet / direct consumer & processing companies (12%), direct consumer / own outlet & dhodhi (4%), own outlet / direct consumer (4%) and dhodhi (4%). It was also reported that 8% producers were not marketing the milk and their product was used at home, for calf feeding or to distributing to their labor. High profitability and better market conditions inclined the trend of milk marketing of farmers toward direct processing companies rather than dhodhi and wholesalers. The results of our study also differed from Qasim *et al.* (2005) that only 2.7% milk was sold to milk processing companies, while 51.9 and 26.9% was sold to milk carriers and to direct consumer in the Punjab. Whereas, milk marketed to dhodhi (mobile milk traders) and processing companies was 31 and 5% in Pakistan, respectively (Zia *et al.*, 2011). A very low quantity of milk selling to processing companies might be due to insufficient marketing opportunities, assurance of dhodhi, less collection centers and domestic consumption of milk in rural areas.

**Input and output of dairy farm:** Any entrepreneur is considered profitable when its output exceeds the inputs. The same was the idea of all these dairy farmers established farms for commercial and both commercial

and domestication purposes. The data revealed that 52% of farms were in profit, whilst, 40% of farms were at the breakeven point and 8% farmers were not profit concern. Such farmers, which were not gaining profit, were using milk for domestic consumption (feeding to calves, distributing to labor and home purpose). The proper awareness, adoption of modern techniques (TMR, silage, concentrate, multi-nutrient block and mineral mixture feeding), management practices and advice and extension services were some of the factors which contributed to the profitability. These findings were supported by Ahmad *et al.* (2008) they reported that productivity of small and medium farms was enhanced after availing the services of PDDC while these services did not affect the production of large farms in the Pakistan. However these results were not in line with Akhtar *et al.* (2008) they reported that only 9% farmers were advanced and were gaining profit while 88.6% farmers claimed that their input cost has increased than output in Faisalabad.

**Livestock extension services:** About 54.5 and 40.9% of respondents consulted pre-feasibilities “Environmentally controlled dairy farm for 50 exotic cows” and “dairy farm for 200 animals” for animal raising purpose, respectively. Whereas, only 4.6% of farmers consulted both pre-feasibilities (“Environmentally controlled dairy farm for 50 exotic cows” as well as “dairy farm for 200 animals”) for the purpose of rearing the dairy animals (table-6).

Various training programs were also offered by NGOs to farmers to establish livestock business as depicted in table-6. In this contrast, the only 24% registered farmers availed different training programs. Sixteen point seven percent of farmers had availed training titled “training of farmers” and same percent were enrolled in “dairy managers”. Whereas, thirty three point three percent of respondents availed different training programs offered by public institutes or organizations. Our results are in line with the study of Tefera (2008) who reported in Central Ethiopia that 55% farmers availed training program from Ada’a dairy cooperative to enhance dairy productivity.

**Technical interventions:** Adaptation rate of technical interventions, urea treated wheat straw, urea molasses block (UMB), total mixed ration (TMR), multi-nutrient block, mineral mixture and concentrate feeding was 8, 32, 64, 68, 88 and 100%, respectively (table-7). The sixty percent of respondents were engaged in silage making at farm while remaining were not doing this operation. This high adoption rate of technical interventions might be due to high educational level of farmers, livestock extension services and dairy farming on commercial lines. These results were not supported by Bilal *et al.* (2008) who reported that dairy farmers were using only concentrate, whereas other interventions were not adopted at farm level. The possible reason for this difference might be unawareness and traditional farming.

**Table-1: Questionnaire designed to assess the role of livestock extension services on productivity of dairy animals at various dairy farms in Punjab Pakistan.**

<b>1.1: Farm Profile</b>									
Farm Name		Dairy Farmer Name				Address			
<b>1.2: Education Level and Animal Raising Purpose</b>									
Education Level		animal raising purpose							
Secondary	Higher secondary	Graduate and above		Domestic	Commercial		Both		
<b>1.3: Herd Profile</b>									
<b>1.3.1: Animal Type</b>									
Sahiwal/local animal		Buffalo		Holstein Friesian		Crossbred cows			
<b>1.3.2: Animal Population</b>									
Lactating animals		Dry Animals				Total Animals			
<b>1.4: Animal Breeding Methods and perception about method</b>									
Breeding Methods				Perception about Natural and AI services					
Natural	AI	Both		Natural		AI			
<b>1.5: Health Cover</b>									
<b>1.5.1: Prevalence of Disease</b>									
Management Disease					Reproductive Disease				
Mastitis	FMD	HS	Anthrax	Parasites	Anestrus	Silent Heat	Metritis	Calving	

												interval	
<b>1.5.2: Treatment of diseases</b>													
Govt. Hospitals			Private Practitioners				Both						
<b>1.5.3: Vaccination of animals</b>													
FMD		HS		BQ		FMD & HS both			All		None		
<b>1.5.4: Deworming of animals</b>													
Anthelmintic usage				Frequency of anthelmintic usage (Per Year)									
Yes		No		Once			Twice			Thrice			
<b>1.6: Milking method and milk marketing</b>													
<b>1.6.1: Milking method and usage</b>													
Milking Method			Type of milking machine						Milk usage				
Manual	Machine	Both	Bucket system		Milking Line		Milking Parlor		Home	marketing		both	
<b>1.6.2: Milk Marketing</b>													
Own outlet			Company				Dhodhi			No sale			
<b>1.7: Extension services availed by livestock farmers</b>													
Pre-feasibility consulted				Availed training program		Type of training program							
Controlled dairy farm (50 cows)	Dairy farm (200 animals)	Both	Yes	No	Training of Farmers		Dairy Managers		Investment Opportunities in Livestock Sector			Supervisors	Any other
<b>1.8: Technical interventions</b>													
Urea treated straw		Urea molasses block		TMR		Multi-nutrient block		Mineral mixture		Concentrate			
Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No		
<b>1.9: Input and output of Dairy farm</b>													
Dairy farm in profit				Dairy farm in loss				Dairy farm in breakeven point					

Table-2: Education level of farmers with animal raising purpose at various dairy farms in Punjab Pakistan.

Animal raising purpose	Education level			Frequency	Percentage
	Secondary	Higher secondary	Graduate		
Domestic	0	0	3	3	12
Commercial	0	0	16	16	64
Both	0	0	6	6	24
	Total			25	100

**Table-3: Breeding methods adopted by farmers and their perception about natural and AI services at various dairy farms in Punjab.**

Mode and perception about breeding methods	Category	Frequency	Percentage
Breeding Method	AI	6	24
	Natural & AI	19	76
Perception	Natural service	15	60
	AI service	10	40

**Table-4: Vaccination of farm animals at enrolled dairy farms in Punjab.**

Type of Vaccine	Frequency	Percentage
FMD and HS	23	92
Anthrax alone	0	0
FMD, HS and Anthrax	2	8
Total	25	100

**Table-5: Mode of milking and milk usage at different dairy farms in Punjab.**

Mode of milking and milking usage	Category	Frequency	Percentage
Milking method	Manual milking	5	20
	Machine milking	19	76
	Both	1	4
Type of Machine Milking	Bucket system	9	45
	Milking line	7	34
	Milking Parlor	4	20
Milk Usage	At Home consumption	2	8
	Selling to market	7	28
	Both	16	64
Milk consumption at home	Liquid Milk as whole	12	66.7
	Yoghurt alone	0	0
	Butter alone	0	0
	All	6	33.3

**Table-6: Livestock extension services availed by farmers at dairy farms.**

Livestock extension services	Category	Frequency	Percentage
Pre-feasibility consulted	Environmentally Controlled Dairy farm (50 Exotic cows)	12	54.54
	Dairy farm (200 animals)	9	40.91
	Both	1	4.55
Availed any Training Program	Yes	6	24
	No	19	76
Type of Training Program	Training of Farmers	1	16.7
	Dairy Managers	1	16.7
	Investment Opportunities in Livestock Sector	2	33.3
	Supervisors	0	0
	Any other	2	33.3

**Table-7: Response of dairy farmers regarding technical interventions adaptation at dairy farms.**

Technical interventions	Response	Frequency	Percentage
Urea treated straw	Yes	2	8
	No	23	92
Urea molasses block	Yes	8	32

	No	17	68
TMR	Yes	16	64
	No	9	36
Multi-nutrient block	Yes	17	68
	No	8	32
Mineral mixture	Yes	22	88
	No	3	12
Concentrate	Yes	25	100
	No	0	0

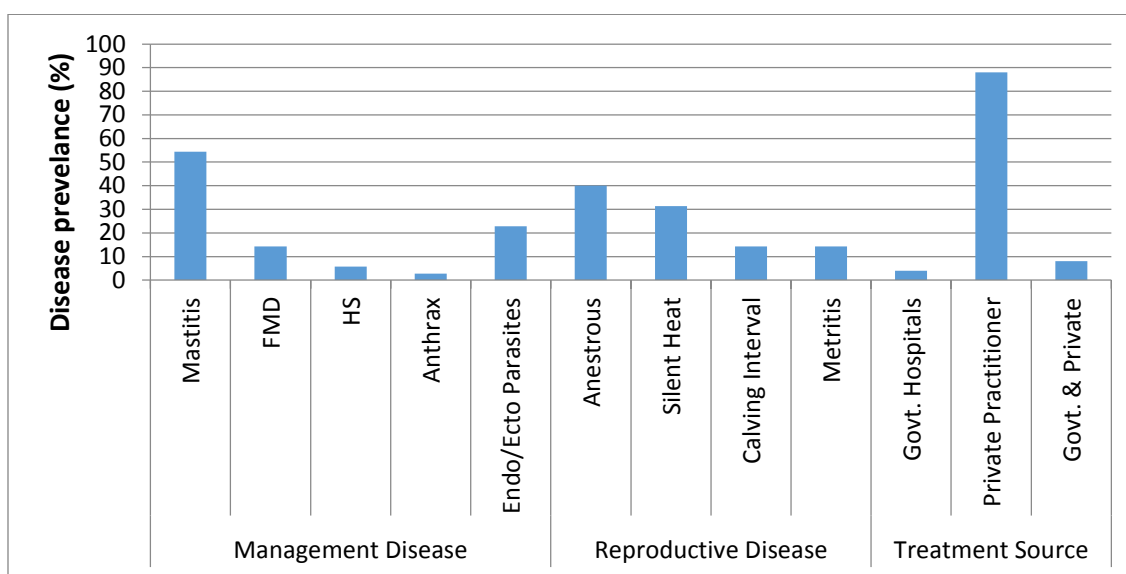


Figure-1: The prevalence of diseases and reproductive disorders and their treatment sources at selected dairy farms in Punjab

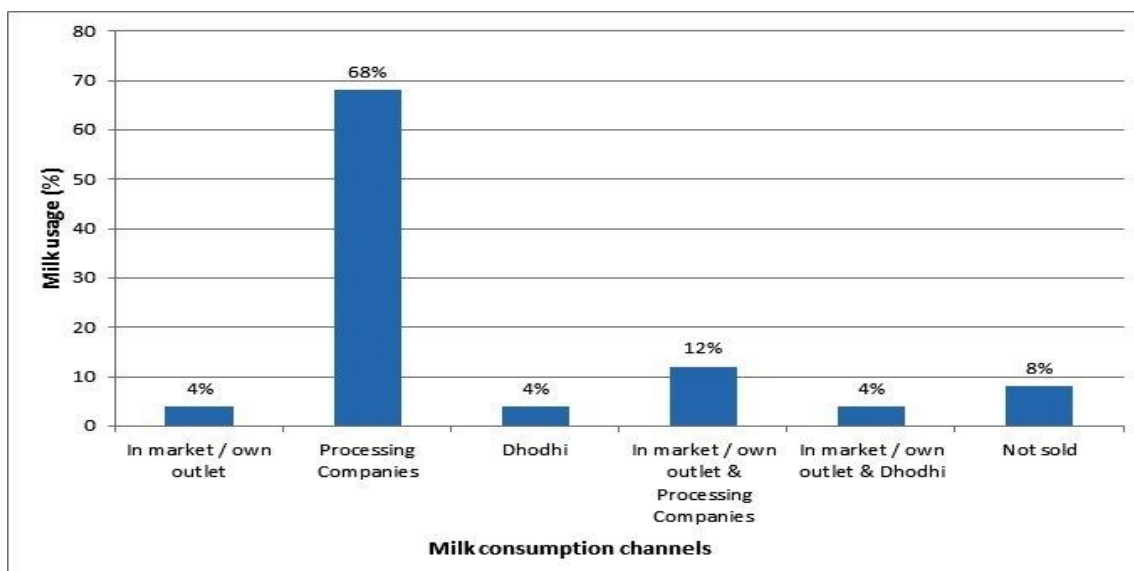


Figure-2: Pattern of milk marketing by dairy farmers in Punjab

**Conclusion:** The results of the study concluded that provision of quick and reliable livestock extension services by NGO, high education level and good economic resources influenced positively the productivity

of dairy farms. Moreover livestock extension services developed the interest of people to invest in livestock business, also accelerated the adoptability of innovative

technologies and ultimately it improved income and living standards of common dairy farmers.

**Acknowledgements:** This study was facilitated by small and medium enterprises development authority (SMEDA). We are also thankful to Mr. Adnan Ali (SMEDA), Lahore, the participating Dairy farmers, their Managers and staff for their technical services and assistance in data collection. The guidance of Dr. Muhammad Hanif (PMAS-AAUR) relevant to data analysis is also acknowledged.

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