

## A Study on Cow Farm Characteristics and Management Routines Related to Cow Health in Quetta District, Balochistan

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### Abstract

*This study examined the demographic and animal characteristics of 70 cow owners in Quetta District, revealing that cow farming in the area is predominantly owned by men with limited education and experience and small-scale operations. Respondents demonstrated good knowledge of cow health but were largely unaware of milk quality regulations and the effects of antibiotics in milk. Foot and mouth disease were found to be the most prevalent disease among cows and farmers seek the help of veterinarians in case of abortion cases in cows. Most cows are kept with pet animals and cow owners maintain hygiene conditions of farms. However, there is a lack of understanding of the California Mastitis Test (CMT) and farmers largely do not execute it on cows. Most farmers do not comply with safe milk production guidelines and sell unpasteurized milk/milk products without following guidelines for milk selling. The traditional bucket method is used to feed the cows and they are given green grass twice a day. Cows consume between 10-15 kg of feed per day and produce an average of over 8 liters of milk per day during the summer season.*

**Keywords:** Farmers, Breeds, Cow farming, Milk quality, Quetta, Dairy Industry

### Introduction

Livestock of Balochistan includes goats, sheep, camels, donkeys, horses, cattle, poultry and buffaloes, whose population is only found in certain regions. Sheep, camels and goats are the three main types of livestock in Balochistan. It's because they can readily live in the province's environment (Khan *et al.*, 2015). Among the well-known animal species found in Balochistan are 61 species of freshwater fish, 94 species of reptiles, 8 species of amphibians, 356 species of birds and 71 species of mammals (Roberts, 1997). There are six main breeds of sheep, four main breeds of goat and three main breeds of cattle. Sheep farms, dairy and cattle farms and poultry farms are among the three types of farms found in Quetta city. These farms are the main economic hub and they also feed the local population with meat and milk (Raziq *et al.*, 2010).

According to location and herd size, Pakistan's dairy industry is organized into four systems, incorporating smallholders' requests (to meet home needs, milk is produced), a smallholder focused on the market (Milk produced for personal use with modest but

consistent surpluses for sale; rural commercial (bigger herds of > 40 animals, well organized and connected directly to milk processing firms) and peri-urban Burk & Zia (2011).

Cow farm management system are a common aspect of Pakistani agriculture in which calves are raised on the milk of their mothers to produce meat. It is common practice to separate cow and calf to save milk of the mother, however, this practice is not encouraged by most of animal welfare societies (Johnsen *et al.*, 2016). On the other hand, calves are good hidiers and support the separation of calves from their mother at birth. Before parturition, the cow seeks separation from the herd and the calf is left alone and hides while the dam forages (Langbein and Raasch, 2000).

All of these issues have not been properly addressed in study area and extensive studies are needed to suggest better reforms for dairy farm management. Therefore, this research was conducted.

## **Materials and methods**

### **Questionnaire designed**

This study data will be carried out in at least 15 small scale dairy cow's farms from July to October 2022 in Quetta city. To get basic information about the dairy studied, a questionnaire will be prepared. It will be divided into two sections. The first question set consist of questions related to the socio-demographic characteristics of farm owner (sex, age, marital status, occupation, level of education, experience, farm management and knowledge on farm practices). The second part will be related to farm characteristics such as farm location, number of herd size, total number of workers and incidence of diseases (including mastitis, lameness, reproductive diseases and pneumonia). The final study will consist of at least 25 questions, open and close questions as well as some individual questions that will require multiple answers (the dissertation will consist of a questionnaire).

For all close questions, the answers will be coded as "1" if the respondent said yes or no and "0" if they did not say yes or no. All open questions were examined and categorized based on their answers. Milk recording data from the monthly reports that will closest to the farm visit will be retrieved directly from the performance recording agencies. The list of contacted dairies will be obtained from the Livestock and Dairy Development Department (LDDD) and from the previously published lists of cow dairy and livestock groups in Balochistan. The study protocol will be approved by the Departmental Ethics Committee. Cow risk factor such as lying, walking, periportal period, metabolic supply management, animal rearing, breed, age, stage of lactation, body depth, udder depth and rear leg side view will be studied.

### **Statistical analysis**

The data collected were stored in Microsoft Excel Spreadsheet and analyzed using the paleontological statistics software package for education and data analysis (version 4) will be used for data management and analysis. The association of respondents' demographic will be evaluated using Z test statistics.



## Results

Demographic profile of cow owners and the characteristics of their animals is given in Table 1. A total of 70 farmers from Quetta District were included in this study. Majority of the farmers were above 40 years of age ( $n = 34$ , 48.57%). All respondents were males and the majority of them ( $n = 66$ , 94.29%) were married. A total 41.43% ( $n = 29$ ) of the participants had secondary school graduates followed by 38.57% ( $n = 27$ ) had completed their primary school education, 18.57% ( $n = 13$ ) were illiterate and only 1.43% ( $n = 1$ ) had obtained technical education. Total ( $n = 64$ , 91.43%,  $p < 0.01$ ) of the respondents are farm owners while, few of them ( $n = 6$ , 8.57%) were employed in cow farms. Cow farmers ( $n = 40$ , 57.14%,  $p > 0.54$ ) had farm experience of 5-10 years, while 30% ( $n = 21$ ) had more than 10 years of farming experience and 12.86% ( $n = 9$ ) had less than 5 years. Less than 50 animals were found on 43 farms (61.43%,  $p > 0.43$ ). Significant numbers of farmers were employed in the farms ( $n = 33$ , 47.14 %,  $p > 0.87$ ).

**Table 1.** Demographic characteristics of animal farm owners/workers

Variable	Parameters	Frequency	Percentage	p-value
Age of the respondent	18-30 years	8	11.43	0.23
	31-40 years	28	40.00	
	Above 40 years	34	48.57	
Marital Status	Single	4	5.71	0.01
	Married	66	94.29	
	Divorced	0	0.00	
Educational Status	Primary	27	38.57	0.73
	Secondary	29	41.43	
	Technical	1	1.43	
	Illiterate	13	18.57	
Farm Ownership	Yes	64	91.43	0.01
	No	6	8.57	
Farming Experience	< 5 Years	9	12.86	0.54
	5 - 10 Years	40	57.14	
	> 10 Years	21	30.00	
Number of Cows in Farms	= < 50	43	61.43	0.43
	51 - 100	12	17.14	



	> 100	15	21.43	
Number of Workers in Farms	= < 5	31	44.29	0.87
	6 - 15	33	47.14	
	> 15	6	8.57	

Respondents were asked about zoonosis and the spread of diseases among humans through milk. Most respondent response was in 'Yes' ( $n = 63$ , 90%,  $p > 0.20$ ). Majority of respondents ( $n = 50$ , 71.43%,  $p > 0.01$ ) had good knowledge of cow health and only cow owner lack complete knowledge ( $n = 1$ , 1.43%,  $p > 0.01$ ). Foot and mouth diseases was most prevalent in cows ( $n = 34$ , 48.57, %  $p > 0.01$ ). Majority of farm animals were administrated antibiotics ( $n = 67$ , 95.71%,  $p > 0.01$ ), while small proportion ( $n = 3$ , 4.29%,  $p > 0.01$ ) had never given antibiotics. Residues of antibiotics was not a serious concern for respondents ( $n = 52$ , 74.29%,  $p < 0.03$ ), only few respondent ( $n = 18$ , 25.71%,  $p < 0.01$ ) were aware of antibiotic effects in milk. Most of the cows were taken to veterinary doctors ( $n = 66$ , 94.29%) and only few cows were treated by their owners ( $n = 4$ , 5.71%,  $p < 0.04$ ). Majority of cows were hydrated with the help of buckets ( $n = 70$ , 100%,  $p < 0.00$ ). Majority of respondents ( $n = 66$ , 94.29%,  $p < 0.03$ ) were unaware of milk quality regulations Local governments did not provide medical or technical assistance to cow owner ( $n = 48$ , 68.57%,  $p > 0.43$ ) in order to maintain cow health. It was observed that the government has not inspects quality of milk ( $n = 55$ , 78.57%,  $p > 0.21$ ).

**Table 2.** Farmers Knowledge about the farm management and welfare of the cows

Questions	Parameters	Frequency	Percentage	p-value
Are you aware about the animal diseases and milk-borne zoonoses	Yes	63	90.00	0.21
	No	7	10.00	
Health problems in cows	Bovine tuberculosis	6	8.57	0.01
	Rabies	9	12.86	
	Anthrax	17	24.29	
	Black leg	11	15.71	
	Brucellosis	6	8.57	
	Trachoma	1	1.43	
	Influenza	8	11.43	
	Cholera	19	27.14	

	Mastitis	50	71.43	
	FMD	34	48.57	
	Lumpy Skin	26	37.14	
Have you given antibiotics for farm cows?	Yes	67	95.71	0.01
	No	3	4.29	
Knowledge about the antibiotic residues in milk	Yes	18	25.71	0.03
	No	52	74.29	
Vaccinated the cows by consulting the veterinarian	Yes	66	94.29	0.04
	No	4	5.71	
Means used for drinking water	Automatic drinker	2	2.86	0.00
	Bucket	68	97.14	
Buyer knowledge <sup>a</sup>	Yes	4	5.71	0.03
	No	66	94.29	
Medical and technical support by government	Yes	22	31.43	0.43
	No	48	68.57	
Safe milk production <sup>b</sup>	Yes	15	21.43	0.21
	No	55	78.57	

<sup>a</sup>Knowledge of milk quality regulations, parameters and tests used by milk buyer.

<sup>b</sup>The government institutions perform regular inspections in order to control the compliance with standards for safe milk production.

Table 3 shows the respondents' attitudes regarding cow farming. Majority of respondent ( $n = 47, 67.14\%$ ,  $p > 0.21$ ) were selling unpasteurized milk / milk products to customers and only few were following the guidelines of milk selling ( $n = 23, 33.86\%$ ,  $p > 0.21$ ). The majority of respondent ( $n = 60, 85.71\%$ ,  $p > 0.05$ ) reported the discussion of cow health issues with veterinarian, while the few of them ( $n = 7, 10\%$ ,  $p < 0.01$ ) talked to their friends ( $n = 3, 4.29\%$ ,  $p < 0.02$ ). In response to a question regarding the protection used by farmers to deal with abortion cases in cows, the farmers ( $n = 44, 62.86\%$ ) stated that they usually seek the help of a veterinarian, some farmers ( $n = 23, 32.86\%$ ) only wash their hands and very few farmers ( $n=3, 4.29\%$ ,  $p < 0.21$ ) use gloves. Self-medication was a common practice for cow owners for their cows ( $n = 54, 77.14\%$ ,  $p > 1.20$ ). Most of the cows were kept with pet animals ( $n = 58, 82.86\%$ ,  $p < 0.04$ ). Majority of cow owners ( $n = 49, 70\%$ ,  $p > 0.21$ ) had



maintained the hygiene condition of the farms, while others did not follow it ( $n = 20$ , 28.57%,  $p < 0.21$ ). Cow udder was washed by majority of respondents ( $n = 62$ , 88.57%,  $p < 0.02$ ). Farmers have relatively little understanding of the California Mastitis Test (CMT) and about ( $n=66$ , 94.29%) farmers do not execute the CMT on cows. Farmers also rejected adding water to milk to increase its volume. ( $n = 69$ , 98.57%,  $p < 0.01$ ). The compliance with guidelines for safe milk production is not checked by inviting buyers ( $n=63$ , 90%,  $p < 0.01$ ).

**Table 3.** Statistical significance of variation in the respondents' attitude by their characteristics

Questions	Parameters	Frequency	Percentage	p-value
Sell of milk <sup>a</sup>	Yes	47	67.14	0.21
	No	23	32.86	
Who does the respondent talk to about animal health issues	Friend	7	10.00	0.43
	Veterinarian	60	85.71	
	Family Member	3	4.29	
Protective measures <sup>b</sup>	Wash hands	23	32.86	0.02
	Use gloves	3	4.29	
	Took help from veterinarian	44	62.86	
First response of the farmers if cow is sick or show sign of disease	Seek veterinary assistance	16	22.86	0.32
	Provide self medication	54	77.14	
	Sell for slaughtering	0	0	
Keep cows with other pet animals	Cat	0	0.00	0.04
	Dog	0	0.00	
	Poultry	12	17.14	
	No other animals	58	82.86	
	Daily	49	70	0.21

Cleaning frequency of the cow	Weekly	20	28.57	
	Monthly	1	1.43	
Wash the udder before milking	Yes	62	88.57	0.02
	No	8	11.43	
Dry the udder after milking with towel	Yes	7	10	0.01
	No	63	90	
Periodically perform CMT on cows	Yes	4	5.71	0
	No	66	94.29	
Add water in the milk to increase its volume	Yes	1	1.43	0.01
	No	69	98.57	
<sup>c</sup> Invited buyer at milk shop	Yes	7	10	0.01
	No	63	90	

<sup>a</sup>Farmer sell unpasteurized milk or unpasteurized milk products directly to consumers.

<sup>b</sup>Farmer use protection while dealing with cows having an abortion

<sup>c</sup>Buyer (individual, firm, cooperative) are invited for inspection to control the compliance with standards for safe milk production?

Table 4 shows the farmers' understanding of summertime feeding practices for lactating cows. Cows were fed using the traditional bucket method ( $n = 70$ , 100%). Tradition green grass was given to cows during summer season ( $n = 63$ , 90%) twice a day ( $n = 66$ , 94.29%,  $p < 0.02$ ). Normally cows average feed on a day was between 10-15 kg ( $n = 43$ , 61.43%,  $p > 0.32$ ) and average more than 8 liters of milk was produced by a cow in a summer season ( $n = 57$ , 81.43%,  $p > 0.56$ ).

**Table 4.** Farmers knowledge about feeds and feeding system lactating cows during summer season

Questions	Parameters	Frequency	Percentage	p-value
Means used for Feeding Cow	Automatic Feeding System	0	0	-
	Bucket	70	100	
What kind of Feed given to cow during summer season	Grass	63	90	0.82
	Hay	17	24	





	Mixed Feed	9	12.86	
Number of time Cows were feed in a day	= < 2	66	94.29	0.02
	> 2	4	5.71	
How many kg of feed does a cow eat per day?	< 10	18	25.71	0.32
	10 - 15	43	61.43	
	> 15	9	12.86	
Average liters of milk a cow produce in a day?	< 4	0	0	0.56
	4 - 8	13	18.57	
	> 8	57	81.43	

## Discussion

In terms of marital status, the majority of the respondents (94.29%) were married, indicating that farming is still largely a family-based enterprise. This finding is consistent with previous research that has shown that family involvement is crucial to the success of small-scale farming (Friedland et al., 1991). Regarding educational status, the majority of the respondents had either primary or secondary education. The p-value of educational status is 0.73, which suggests that there is no significant association between educational status and the outcome of the study. However, previous research has shown that education is positively associated with the adoption of modern farming practices (Chapoto et al., 2013).

The results presented in the study conducted to assess the knowledge and practices of small-scale dairy farmers in relation to animal health, milk quality and safety in Kenya (Gitau et al., 2017). The survey found that 90% of respondents had adequate knowledge of animal illnesses and milk-borne zoonoses. Ten percent of respondents not knowing about these illnesses is worrisome because of the potential threat they represent to human and animal health. Mastitis was found to be the most prevalent of the health issues reported in cows (Halasa et al., 2007). FMD and bumpy skin were also noted often. Both FMD and lumpy skin are major health concerns in the dairy industry (Abubakar et al., 2008). FMD is a highly infectious viral illness that may cause serious economic losses. Antibiotic resistance is a growing problem in healthcare, and the survey indicated that 95.71 percent of respondents have provided antibiotics to their farm cows (FAO/WHO, 2019). Only 25.71 percent of respondents said they had heard about antibiotic residues in milk, suggesting a greater need for education and advocacy on this front. Nonetheless, as a positive indicator of the significance of vaccination in animal health, 94.29% of respondents reported having their cows vaccinated after contacting a veterinarian (Stärk et al., 2006). Researchers found that 97.14 percent of respondents gave their cows water from a bucket, highlighting the importance of farmers having access to clean and safe drinking water sources for their animals. Finally, just 21.43 percent of respondents said they engaged in safe milk





production, highlighting the need for enhanced knowledge and training in this area to guarantee clean milk and the implementation of good hygiene and sanitation practises throughout the milking and storage processes (FAO/WHO, 2009).

The study found that a significant proportion of farmers (67.14%) sell their milk directly to customers. This milk may or may not have been pasteurised. Raw milk poses serious health risks, including but not limited to *E. coli*, salmonella, and listeria infections, which can cause vomiting, diarrhea, and even death (Centers for Disease Control and Prevention, 2021). Farmers must be aware of the dangers and teach their consumers the value of pasteurisation. Raw milk-related diseases may be avoided with proper education on the dangers of drinking raw milk and the advantages of pasteurization, according to research performed by the University of Minnesota Extension (University of Minnesota Extension, 2017). According to the data collected, the great majority of farmers see a veterinarian when their animals start showing signs of illness. This conclusion is encouraging because it shows that farmers understand the significance of consulting experts when it comes to animal care. Milk and milk products may be safer to consume if proper animal health management practises are used (Food and Agriculture Organization of the United Nations, 2018). Only 32.86 percent of farmers said they washed their hands after working, and only 4.29 percent said they used gloves. This is concerning since clean milk and milk products are essential for human health. To lessen the likelihood of bacterial contamination, farmers can take steps like regularly washing their hands (Food and Agriculture Organization of the United Nations, 2018). According to the findings of the poll, the majority of farmers (77.14%) treat their ill cows themselves rather than taking them to the vet. This may be a problem since many small-scale farmers lack the training and equipment required to properly evaluate and treat animal health problems, which can result in the animal's prolonged disease, suffering, and eventual death. Farmers should take their animals to the doctor as soon as they see any indications of disease (World Organisation for Animal Health, 2016).

The manner in which dairy cows are fed is an essential aspect of their health and productivity. Results from a survey conducted in India on dairy farmers revealed that bucket feeding was the most prevalent method of feeding cows, with no use of automatic feeding systems (AFS) (Kumar et al., 2021). During the summer season, grass was the primary source of feed for most farmers, followed by hay and mixed feed. The frequency of feeding was twice a day or less for the majority of the farmers. The amount of feed provided to the cows was generally between 10 to 15 kg per day (Kumar et al., 2021). The survey also examined cow productivity, revealing that the majority of cows produced more than 8 liters of milk per day, with none producing less than 4 liters. This indicates that the feeding practices of farmers were generally effective in supporting milk production (Kumar et al., 2021). It is important to note that while the feeding practices observed in this survey may be appropriate for the specific context of the study, they may not be universally applicable. Factors such as climate, breed, and availability of feed may influence feeding practices in different regions. Therefore, it is recommended that farmers consult with local experts and follow best practices for feeding their dairy cows.



## Conclusion

In conclusion, the study provides an overview of cow farming practices in Quetta District and highlights the limited education and experience of most cow farmers, who predominantly own small-scale operations. While most farmers had good knowledge of cow health, their understanding of milk quality regulations was limited and local governments provided little medical or technical assistance. Additionally, farmers' practices around antibiotics, milk selling guidelines and milk production guidelines need improvement. The study also provides insights into cow feeding practices and milk production during the summer season.

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