

# Management practices followed by dairy farmers in rural Punjab

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## Abstract

The breeding, feeding, housing and healthcare management practices play an important role in attaining the full potential of dairying. The present study aims to investigate about the management practices, such as breeding management, healthcare management, feeding management and housing management, followed by the dairy farmers in rural Punjab. Using multi-stage sampling technique, the present study is based on primary data, collected through a detailed schedule from 420 dairy farmers belonging to different farm size categories from 21 villages situated in three different agro-climatic zones (Shivalik-Foothills, Central Plains and South-West Dry zones) of Punjab state. The results show that a majority of the dairy farmers prefer to breed their dairy animals using Artificial Insemination (using semen of Indian bulls) for breeding by a doctor, vaccinate animals against Foot & Mouth Disease, do deworming of calves against internal parasites but not that of adult animals, ignore disinfecting dairy shed, provide bedding material to new born calves and keep their pregnant dairy animals in the same shed along with other dairy animals. Most of them have the facility of shed with slanted roof of asbestos material for housing their dairy animals in single row system. They feed a mixture of their self-cultivated green fodder, dry fodder and concentrates to dairy animals, preferring stall feeding over grazing.

**Keywords:** Rural dairy farmers; Artificial Insemination; Calves; Deworming; Foot & Mouth Disease

## Introduction

Dairying has occupied a predominant place in rural economy. The entire structure of village economy rests upon agriculture and dairying. The sector involves millions of resource poor farmers, for whom critical livelihood, economic stability and sustainable farming has been ensured by animal ownership. Livestock sector is originated as critical sub-sector of agriculture in Punjab. Livestock population has declined to 7331.27 thousand in 2007 from 8607.50 thousand in 2003, showing the decline of approximately 15 per cent. But, then it has increased to 8117.10 thousand in 2012 (Livestock Census, 2012). Milk production in the state stands at 13347 thousand tonnes in 2019-20. With the increase in milk production in Punjab, the per capita availability of milk has also shown a significant rise over the decades. Per capita availability of milk has increased to 1225 grams per day in 2019-20 from 870 grams per day in 2000-01 (Statistical Abstract of Punjab, 2020). The breeding, feeding, housing and healthcare management practices play an important role in attaining the full potential of dairying. A good number of studies, such as Sabapara et al. (2010), Malsawmdawngliana and Rahman (2016), Dhaliwal and Dhillon (2017), Sreedhar et al. (2017), Patel et al. (2018), Kumar et al. (2019) and Patel et al. (2019), have been undertaken to discuss the feeding, breeding, housing and healthcare management practices adopted by the dairy farmers. Dairy farmers are not getting good economic return (Sharma & Singh, 2020) and continued adoption of traditional practices is one of the factor (Patel et al 2016).

A majority of the dairy farmers have used Artificial Insemination (A.I.) for breeding their animals, have vaccinated their dairy animals against Foot and Mouth Disease, have dewormed their milch animals, and have provided conventional type of housing with concrete floor. Only a few dairy farmers have fed their dairy animals all three rations, viz., green fodder, concentrate and dry fodder. The present study aims to investigate about the management practices, such as breeding management, healthcare management, feeding management and housing management, followed by the dairy farmers in rural Punjab.

## Material and Methods

The present study is based on primary data, collected through a detailed schedule from 420 dairy farmers belonging to different farm size categories from 21 villages (using a multi-stage sampling technique to select the villages and dairy farmers) situated in three different agro-climatic zones (Shivalik-Foothills, Central Plains and South-West Dry zones) of Punjab state. Standard statistical tools like mean values and proportions have been used for analysis.



Fig 1: showing villages of Punjab selected for survey

## Results and Discussion

### *Breeding Practices followed by dairy farmers in rural Punjab*

The reproductive performance in dairy cattle is important variable for its economic success. The reproductive efficiency is a major area of concern for the farmers when using Natural Services (N.S.) and Artificial Insemination (A.I.). Table 1 shows the distribution of dairy farmers as per the adoption of breeding practices in Punjab. Out of all, 80 (19.05 per cent) dairy farmers resort to natural services for inseminating their cattle, while 340 (80.95 per cent) dairy farmers like to choose artificial insemination over natural services. This scenario is similar across the regions, except South-West Dry region. In South-West Dry region, 33 (33 per cent) dairy farmers prefer natural services and 67 (67 per cent) prefer artificial insemination for inseminating their dairy animals. These findings are in conformity with Sabapara et al. (2010), Malsawmdawngliana & Rahman (2016), Dhaliwal & Dhillon (2017) and Kumar et al. (2019). According to Sabapara et al. (2010), around 96 per cent of the dairy farmers have artificially inseminated their milch animals in south Gujarat. The findings of Malsawmdawngliana & Rahman (2016) have shown that 98 per cent of the dairy farmers have resorted to artificial insemination of their cattle in Mizoram. The study of Dhaliwal & Dhillon (2017) has revealed that 65 per cent of the dairy farmers in rural areas and 85 per cent of the dairy farmers in urban areas have preferred artificial insemination of their dairy animals in Bathinda district of Punjab. Around 80 per cent of the dairy farmers have resorted to artificial insemination over natural services in western Uttar Pradesh as per the study of Kumar et al. (2019). However, Sreedhar et al. (2017) have found opposite results in which 81 per cent of the dairy farmers have preferred natural services over artificial insemination of their dairy animals.

The technique of inseminating dairy animals requires adequate knowledge and experience. Improper artificial insemination can negate all other efforts to obtain conception. Out of 340 dairy farmers preferring artificial insemination over natural services, 331 (97.35 per cent) dairy farmers prefer veterinarian for artificial insemination procedure, while in case of 9 (2.65 per cent) dairy farmers, artificial insemination procedure is performed by farmers themselves. This scenario is similar across the regions with a minor percentage changes here and there.

Farmers, who want to make the most of the genetic gain for the renewal of their herd, often prefer to choose artificial insemination over natural services. They, therefore, use imported semen on their cows. As much as 184 (54.12 per cent) dairy farmers use the semen of Indian bulls. Remaining 156 (45.88 per cent) dairy farmers prefer imported semen for artificial insemination procedure.

In Shivalik-Foothills region, the maximum number (108) of dairy farmers prefers to use imported semen for artificial insemination procedure. In Central Plains region and South-West Dry region, the maximum number (58 & 45 respectively) uses the semen of Indian bulls for artificial insemination.

### ***Healthcare Management Practices followed by Dairy Farmers***

Table 2 provides the information regarding healthcare management practices, such as vaccination against Foot & Mouth Disease, deworming of calves, deworming of adult animals, shed disinfection, bedding material for calves and separate shed for pregnant dairy animals, followed by the dairy farmers in rural Punjab. Foot & mouth disease is a severe, highly contagious viral disease of cattle. Across the regions, almost all dairy farmers vaccinate their dairy animals against Foot & Mouth Disease. These findings are in conformity with the results of Sabapara et al. (2010), Patel et al. (2018) & Patel et al. (2019). Deworming plays an important role in reducing the internal parasites. Ideally, the deworming should start from the first week of birth of calf. The distribution of dairy farmers on the basis of deworming of calves reveals that as much as 178 (80.91 per cent) dairy farmers from Shivalik-Foothills region and 90 (90 per cent) each from Central Plains region and South-West Dry region resort to the practice of deworming of calves after birth. Regarding deworming of adult animals, 151 (68.64 per cent) from Shivalik-Foothills region do not deworm their adult animals. Remaining 37 (16.82 per cent) do deworming of adult animals after every three months, followed by 29 (13.18 per cent) doing half-yearly deworming and just 3 (1.36 per cent) do yearly deworming of adult animals. Out of all, 67 (67 per cent) and 72 (72 per cent) dairy farmers from Central Plains region and South-West Dry region, respectively, do not deworm their adult animals. The highest number (17, 17 per cent) of dairy farmers from Central Plains region do half-yearly deworming and lowest (5, 5 per cent) of them do yearly deworming of adult animals. The maximum number (18, 18 per cent) of the dairy farmers from South-West Dry region does half-yearly deworming of adult animals, followed by 5 (5 per cent each) doing deworming after every three months and yearly respectively. The findings of the study are supported by the results of Malsawmdawngliana & Rahman (2016) However, Sabapara et al. (2010) and Patel et al. (2018) have found the results not in conformity with the findings of present study.

The effective control of the infectious diseases is important for animal health. This mainly relies on the maintenance of healthy environment involving cleaning and disinfection. Across the regions, 185 (84.09 per cent) dairy farmers from Shivalik-Foothills region, 82 (82 per cent) from Central Plains region and 89 (89 per cent) dairy

farmers from South-West Dry region do not disinfect the dairy shed at all. This result is in contrast with the study of Patel et al. (2018). The information on provision of bedding material shows that, generally, straw is used for making bedding material for young calf as it provides thermal insulation to calves. In Shivalik-Foothills region, 216 (98.18 per cent) dairy farmers provide bedding material for new born calves and just 4 (1.82 per cent) do not do so. As much as 87 (87 per cent) dairy farmers from Central Plains region provide the bedding material to calves and remaining 13 (13 per cent) do not provide this facility to their calves. In South-West Dry region, 90 (90 per cent) dairy farmers are providing the facility of bedding to calves and just 10 (10 per cent) do not provide bedding to the new born calves.

Animals of advance pregnancy must be kept separated at dried-off floor to avoid udder troubles in subsequent lactation. In Shivalik-Foothills region, 15 (6.82 per cent) dairy farmers keep pregnant animals in separate shed and 205 (93.18 per cent) do not do so. Just 2 (2 per cent) and 3 (3 per cent) dairy farmers in Central Plains region and South-West Dry region has the facility of serrate shed for pregnant dairy animals.

#### **Housing Practices followed by Dairy Farmers**

It is important to provide clean and comfortable housing facilities to the dairy animals. This, in turn, ensures their proper growth and optimum productivity. The milch animals should be protected from the extreme weather conditions. Dairy animals are being kept either in shed or under trees in the study area. The shed is a structure or building to house dairy animals.

Table 3 exhibits the distribution of the dairy farmers on the basis of housing practices followed by the dairy farmers in Punjab. A majority, i.e. more than 92 per cent, of the dairy farmers from each region keep their dairy animals under shed to ensure their comfort. The findings are in the line with the results of Prasad et al. (2017) as they have shown that more than three-fourth of the dairy farmers provide *pucca* animal house.

Floor is another important part of the animal building as it is frequently used by the dairy animals for resting, feeding and milking. Floor must be strong and durable. Generally, non-slippery floor is preferred to avoid injuries from the accidental slipping of the dairy animals. Floor can be *katcha*, concrete and matted. In Shivalik-Foothills region, dairy animals are kept on the concrete floor by 169 (76.82 per cent) dairy farmers, followed by 45 (20.45 per cent) keeping on *katcha* floor and 6 (2.73 per cent) keeping on matted floor. Concrete floor in Central Plains region is provided by 74 (74 per cent) dairy farmers, followed by 24 (24 per cent) providing *katcha* floor and just 2 (2 per cent) providing matted floor. In South-West Dry region, 49 (49 per cent) dairy farmers keep their dairy animals on concrete floor, followed by 45 (45 per cent) keeping on *katcha* floor and 6 (6 per cent) on matted floor.

Roof is the main structure to prevent dairy animals from heavy rains, hot sun and chilling cold. Roof can be slanted or plain-top. The region-wise figures reveal the similar pattern in Shivalik-Foothills region and South-West Dry region, except for Central Plains region. As much as 151 (74.02 per cent) and 70 (76.09 per cent) dairy farmers from Shivalik-Foothills region and South-West Dry region prefer slanted roof of the shed respectively. In Central Plains region, slanted and plain-top roof is preferred by 50 (52.63 per cent) and 45 (47.37 per cent) dairy farmers respectively. Different types of materials are used for covering the roof of the shed. The commonly used roofing materials are tiles, asbestos sheets, aluminum sheets and thatched roof. In Shivalik-Foothills region, 129 (63.24 per cent) dairy farmers are using asbestos sheet for covering roof, followed by 59 (28.92 per cent) using tiles and 16 (7.84 per cent) using thatched roof. A half of the dairy farmers, i.e. 48 (50.53 per cent), in Central Plains region use asbestos sheet, followed by 36 (37.89 per cent) using tiles and remaining 11 (11.58 per cent) using thatched roof. In South-West Dry region, 48 (52.17 per cent) dairy farmers prefer asbestos sheet as roofing material of the shed, followed by 41 (44.57 per cent) preferring tiles and just 3 (3.26 per cent) preferring thatched roof.

The milch animals generally have single row system and double row system. In single row system, 12-16 milch animals can be kept together. If it is greater than 16, double row system, i.e. tail to tail or face-out method and head to head or face-in method, is preferable. Across the regions, 206 (93.64 per cent) dairy farmers in Shivalik-Foothills region keep their dairy animals in single row system and remaining 14 (6.36 per cent) dairy farmers keep them in head-to-head system. In Central Plains region, dairy animals are kept in single row system and head to head system by 99 (99 per cent) and 1 (1 per cent) dairy farmers respectively. In South-West Dry region, single row system and head-to-head system is preferred by 94 (94 per cent) and 6 (6 per cent) dairy farmers respectively. No dairy farmer use tail to tail (face-out) method in double row system.

#### **Feeding Practices followed by Dairy Farmers**

Feeding is one of the important aspects of animal husbandry. A balanced animal feed is a proper combination of proteins, carbohydrates, fats, minerals and vitamins. A good animal feedstuff is balanced in nutrients, clean and fresh, and free from toxins. However, there is shortage of feed and fodder in India, along with ineffective feed quality control and poor-quality feed (Kumar et al., 2019).

Table 1: Breeding practices followed by dairy farmers in rural Punjab

Sr. No.	Breeding Practices	Breeding Practices followed by Dairy Farmers							
		Shivalik-Foothills region		Central Plains region		South-West Dry region		Sampled	
		No.	%	No.	%	No.	%	No.	%
1	Insemination Method								
	Natural	31	14.09	16	16.00	33	33.00	80	19.05
	Artificial	189	85.91	84	84.00	67	67.00	340	80.95
	Total	220	100.00	100	100.00	100	100.00	420	100.00
2	Performance of Artificial Insemination Procedure								
	Doctor	183	96.83	82	97.62	66	98.51	331	97.35
	Farmer	6	3.17	2	2.38	1	1.49	9	2.65
	Total	189	100.00	84	100.00	67	100.00	340	100.00
3	Type of Semen Used								
	Indian Bulls	81	42.86	58	69.05	45	67.16	184	54.12
	Imported	108	57.14	26	30.95	22	32.84	156	45.88
	Total	189	100.00	84	100.00	67	100.00	340	100.00

Source: Field Survey, 2019

Table 2: Healthcare Management Practices followed by Dairy Farmers

Sr. No.	Healthcare Practices	Healthcare Management Practices followed by Dairy Farmers							
		Shivalik-Foothills region		Central Plains region		South-West Dry region		Sampled	
		No.	%	No.	%	No.	%	No.	%
1	Vaccination against Foot and Mouth Disease								
	Yes	220	100.00	99	99.00	98	98.00	417	99.29
	No	0	0.00	1	1.00	2	2.00	3	0.71
	Total	220	100.00	100	100.00	100	100.00	420	100.00
2	Deworming of Calves								
	Yes	178	80.91	90	90.00	90	90.00	358	85.24
	No	42	19.09	10	10.00	10	10.00	62	14.76
	Total	220	100.00	100	100.00	100	100.00	420	100.00
3	Deworming of Adult Animals								
	No	151	68.64	67	67.00	72	72.00	290	69.05
	After 3 months	37	16.82	11	11.00	5	5.00	53	12.62
	Half-yearly	29	13.18	17	17.00	18	18.00	64	15.24
	Yearly	3	1.36	5	5.00	5	5.00	13	3.10
Total	220	100.00	100	100.00	100	100.00	420	100.00	
4	Disinfection of Shed								
	KMNO4	8	3.64	0	0.00	1	1.00	9	2.14
	Phenyl	15	6.82	13	13.00	6	6.00	34	8.10
	Tick Spray	12	5.45	5	5.00	4	4.00	21	5.00
	Not Disinfected	185	84.09	82	82.00	89	89.00	356	84.76
Total	220	100.00	100	100.00	100	100.00	420	100.00	
5	Bedding Material for New Born Calf								
	Yes	216	98.18	87	87.00	90	90.00	393	93.57
	No	4	1.82	13	13.00	10	10.00	27	6.43
	Total	220	100.00	100	100.00	100	100.00	420	100.00
6	Separate Shed for Pregnant Women								
	Yes	15	6.82	2	2.00	3	3.00	20	4.76
	No	205	93.18	98	98.00	97	97.00	400	95.24
	Total	220	100.00	100	100.00	100	100.00	420	100.00

Source: Field Survey, 2019

Table 3: Housing Practices followed by Dairy Farmers

Sr. No.	Housing Practices	Housing Practices followed by Dairy Farmers							
		Shivalik-Foothills region		Central Plains region		South-West Dry region		Sampled	
		No.	%	No.	%	No.	%	No.	%
1	Housing of Dairy Animals								
	Shed	204	92.73	95	95.00	92	92.00	391	93.10
	Under Trees	16	7.27	5	5.00	8	8.00	29	6.90
	Total	220	100.00	100	100.0	100	100.0	420	100.0
2	Floor								
	<i>Katcha</i>	45	20.45	24	24.00	45	45.00	114	27.14
	Concreted	169	76.82	74	74.00	49	49.00	292	69.52
	Matted	6	2.73	2	2.00	6	6.00	14	3.33
	Total	220	100.00	100	100.0	100	100.0	420	100.0
3	Roof of Shed								
	Slanted	151	74.02	50	52.63	70	76.09	271	69.31
	Plain-top	53	25.98	45	47.37	22	23.91	120	30.69
	Total	204	100.00	95	100.0	92	100.0	391	100.0
4	Roofing Material of Shed								
	Asbestos Sheets	129	63.24	48	50.53	48	52.17	225	57.54
	Tiles	59	28.92	36	37.89	41	44.57	136	34.78
	Thatched Roof	16	7.84	11	11.58	3	3.26	30	7.67
	Total	204	100.00	95	100.0	92	100.0	391	100.0
5	Shed								
	Single	206	93.64	99	99.00	94	94.00	399	95.00
	Head-to-Head	14	6.36	1	1.00	6	6.00	21	5.00
	Total	220	100.00	100	100.0	100	100.0	420	100.0

Source: Field Survey, 2019

Table 4: Feeding Practices followed by Dairy Farmers

Sr. No.	Feeding Practices	Feeding Practices followed by Dairy Farmers							
		Shivalik-Foothills region		Central Plains region		South-West Dry region		Sampled	
		No.	%	No.	%	No.	%	No.	%
1	Feeding System								
	Stall Feeding	220	100	100	100	100	100	420	100
	Total	220	100	100	100	100	100	420	100
2	Ration Mixture of Green Fodder & Dry Fodder								
	Yes	217	98.64	93	93.00	87	87.00	397	94.52
	No	3	1.36	7	7.00	13	13.00	23	5.48
	Total	220	100.00	100	100.00	100	100.00	420	100.00
3	Ration Mixture of Green Fodder & Concentrates								
	Yes	176	80.00	68	68.00	75	75.00	319	75.95
	No	44	20.00	32	32.00	25	25.00	101	24.05
	Total	220	100.00	100	100.00	100	100.00	420	100.00
4	Ration Mixture of Green Fodder, Dry Fodder & Concentrates								
	Yes	175	79.55	63	63.00	73	73.00	311	74.05
	No	45	20.45	37	37.00	27	27.00	109	25.95
	Total	220	100.00	100	100.00	100	100.00	420	100.00
5	Cultivation of Green Fodder								
	Yes	181	82.27	83	83.00	80	80.00	344	81.90
	No	39	17.73	17	17.00	20	20.00	76	18.10
	Total	220	100.00	100	100.00	100	100.00	420	100.00

Source: Field Survey, 2019

Table 4 provides the information regarding feeding practices followed by the dairy farmers in Punjab. Feeding system includes stall feeding and grazing. Stall feeding is most popular these days. Moreover, the grazing lands are no longer exists in the state of Punjab. All dairy farming households across the regions prefer stall feeding over grazing. This result is in line with the findings of Malsawmdawngliana et al. (2016) and Kumar et al. (2019), who have found that all almost all dairy farmers do stall feeding of their animals.

Region-wise data on ration mixture of green fodder and dry fodder reveal that 217 (98.64 per cent) dairy farmers feed their dairy animals with this mixture and just 3 (1.36 per cent) dairy farmers feed one of them. The ration mixture of green and dry fodder is fed by 93 (93 per cent) dairy farmers in Central Plains region. In South-West Dry region, green and dry fodder mixture is fed by 87 (87 per cent) dairy farmers and 13 (13 per cent) dairy farmers do not feed mixture of green and dry fodder to their animals.

The ration mixture of green fodder and concentrates is fed to the dairy animal by 176 (80 per cent), 68 (68 per cent) and 75 (75 per cent) dairy farmers from Shivalik-Foothills region, Central Plains region and South-West Dry region respectively. On contrary, 44 (20 per cent), 32 (32 per cent) and 25 (25 per cent) dairy farmers are not feeding dairy animals concentrate along with green fodder from Shivalik-Foothills region, Central Plains region and South-West Dry region respectively. Regarding the ration mixture of green fodder, dry fodder and concentrates, 175 (79.55 per cent) dairy farmers from Shivalik-Foothills region, 63 (63 per cent) dairy farmers from Central Plains region and 73 (73 per cent) dairy farmers from South-West Dry region are feeding this ration mixture to their dairy animals. Green fodder is one of the main components of the ration mixture of the dairy animals. A majority, i.e. around four-fifth, of the dairy farmers are cultivating green fodder themselves for meeting the nutritional requirement of their animals. These findings are in line with the result of Kumar et al. (2019), in which they have found that a majority of the dairy farmers are themselves cultivating green fodder for their animals.

### Conclusion

A majority of the dairy farmers prefer to breed their dairy animals using Artificial Insemination (using semen of Indian bulls) for breeding by a doctor, vaccinate animals against Foot & Mouth Disease, do deworming of calves against internal parasites but not that of adult animals, ignore disinfecting dairy shed, provide bedding material to new born calves and keep their pregnant dairy animals in the same shed along with other dairy animals in the shed with slanted roof of asbestos material for housing their dairy animals in single row system. They feed a mixture of their self-cultivated green fodder, dry fodder and concentrates to animals, preferring stall feeding over grazing. It is suggested to provide scientific knowledge regarding the adoption of better dairy management practices through training courses organised by the government institutions.

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