The Pharma Innovation Journal 2022; SP-11(10): 1245-1250

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(10): 1245-1250

www.thepharmajournal.com
Received: 20-07-2022
Accepted: 25-08-2022

SM Kasondra
M.V.Sc. Scholar, Department of Livestock Production Management, College of Veterinary Science and A. H., Kamdhenu University, Junagadh, Gujarat, India

GP Sabapara
Associate Professor and Head, Department of Livestock Farm Complex, College of Veterinary Science and A. H., Kamdhenu University, Junagadh, Gujarat, India

VA Dodiya
M.V.Sc. Scholar, Department of Livestock Production Management, College of Veterinary Science and A. H., Kamdhenu University, Junagadh, Gujarat, India

HH Savsani
Associate Professor, Department of Animal Nutrition, College of Veterinary Science and A. H., Kamdhenu University, Junagadh, Gujarat, India

MD Odedra
Associate Professor and Head, Department of Livestock Production Management, College of Veterinary Science and A. H., Kamdhenu University, Junagadh, Gujarat, India

AR Ahlawat
Associate Professor and Head, Department of Animal Genetics & Breeding, College of Veterinary Science and A. H., Kamdhenu University, Junagadh, Gujarat, India

Corresponding Author:
SM Kasondra
M.V.Sc. Scholar, Department of Livestock Production Management, College of Veterinary Science and A. H., Kamdhenu University, Junagadh, Gujarat, India

Housing management practices followed by Gir cattle owners in Junagadh district of Gujarat, India

SM Kasondra, GP Sabapara, VA Dodiya, HH Savsani, MD Odedra and AR Ahlawat

Abstract
A field survey of Junagadh district was conducted to collect the information on housing management practices followed by Gir cattle owners and data were ascertained from randomly selected 320 Gir cattle owners through personal interview with the help of structured interview schedule. The present study revealed that majority of the Gir cattle owners (63.75%) provided conventional type of houses. Majority (63.75%) kept their animals inside the shed during day as well as night; 47.81% of animal sheds were nearby to the dwelling of the Gir cattle owners. Majority of the animal houses (67.50%) were oriented in east-west direction and 95.62% of the Gir cattle owners followed single row system of housing. About 93.12, 89.38 and 97.81% of the Gir cattle owners had adequate floor space, light and ventilation, respectively in their animal sheds. Majority of the respondents (87.5%) had earthen floors and only 20.31% of the Gir cattle owners provided slope in floors towards backwards; 88.44% of Gir cattle owners used cemented type pillars. About 78.44% of the Gir cattle owners had single slope type of roof. All the Gir cattle owners provided manger; 64.38% had pucca type manger and 92.19% of animal sheds had no provision of pucca drainage facility for slurry. Majority (59.06%) of the Gir cattle owners provided bedding material on floor during winter season and 60% Gir cattle owners adopted measures to protect their animals from extreme weather conditions.

Keywords: Gir cattle, housing, management, practices, rural areas

Introduction
Livestock sector plays a fundamental role in the life of a farmer as it provides self-employment, income and nutrition. Livestock rearing and crop husbandry are complementary to each other and they together lead to the sustainable development of farmers and can also be considered as a 'survival enterprise' for millions of people in India (Premchand *et al*., 2014) [18]. The total number of cattle in the country is 193.46 million in 2019 showing an increase of 1.3 percent (Anonymous, 2019) [1]. The total Gir cattle population in India is 6.85 million with a percentage share of 4.8% (Anonymous, 2022) [5]. India has achieved an annual output of 198.4 million tonnes of milk during 2019-20 as compared to 187.75 million tonnes of milk during 2018-19 with a growth of 5.68 percent (Anonymous, 2021) [3]. The total livestock population in Gujarat is 26.89 million in which 9.63 million cattle and 10.54 million buffaloes. The total milk production of Gujarat is 14.4 million tonnes with per capita availability of milk is 595 g/day (Anonymous, 2020) [2]. Junagadh district has 1,714 exotic cattle and 1.64 lakhs indigenous cattle and the total buffalo population of Junagadh is 2.11 lakhs (Anonymous, 2020) [2]. Total Gir cattle population in Junagadh district is 2.69 lakhs in 2007 (Anonymous, 2013) [6]. Gir is an excellent dairy cattle breed of the Saurashtra region of Gujarat for its heat tolerance, production ability and resistance to certain diseases (Anonymous, 2017) [4]. The main breeding tract of the Gir cattle comprises Junagadh, Amreli, Bhavnagar, Gir Somnath, Surendranagar and Rajkot district of Saurashtra region in Gujarat. To formulate suitable intervention policies specific to a certain region, a deep understanding of the livestock management practices followed by the farmers is necessary to identify the strength and weaknesses of the rearing system (Gupta *et al*., 2008) [10]. Production potential of livestock depends mostly on the management practices under which they are reared and these practices vary significantly across various agro-ecological regions. Housing along with feeding management plays a very vital role in exploiting the real potential of dairy animals (Sinha *et al*., 2009) [28] and both of them constitute about 75% of the total cost incurred on milk production in dairy animals (Gangwar, 1988) [9]. Energy wastage in maintaining thermoneutral zone and incidence of the disease can be reduced by proper housing (Sabapara *et al*., 2010) [21].

Materials and Methods

A survey of the Junagadh district was conducted from January 2022 to April 2022 to collect information on the managerial practices followed by Gir cattle owners to fulfill the objectives of the study. Junagadh district possesses nine talukas namely Manavadar, Vanthali, Junagadh, Bhesan, Visavadar, Mendarda, Keshod, Mangrol, and Malia Hatina. This district is spread over an area of 8,831 sq. km. and has 544 villages. Out of the nine talukas under the Junagadh district of the Saurashtra region, Manavadar, Mendarda, Mangrol, and Junagadh talukas were randomly selected for the present survey. Eight villages from each talukas of the district were randomly selected and Ten Gir cattle owners were selected randomly from each selected village using a multi-stage random sampling technique with the help of Talati cum Mantri/ village dairy cooperatives which constituted a total of 320 respondents. While selecting the respondents' due care was taken to ensure that they were evenly distributed in the village and truly represented Gir cattle management practices prevailing in the area. The selected Gir cattle owners were single interviewed and the desired information was collected regarding housing management practices with the help of a pre-designed and pre-tested interview schedule. Data were tabulated and analyzed as per standard statistical tools to draw meaningful inferences.

Results and Discussion

Type of housing provided by Gir cattle owners

Housing management practices followed by Gir cattle owners are presented in Table 1 and revealed that overall 63.75% of Gir cattle owners provided conventional type houses followed by shed + under tree (35.63%) and loose (0.62%) type of houses while, none of the Gir cattle owners provided open + under tree type of house. The findings are in accordance with the findings of Choudhary *et al*. (2017) [7]. Contrary to the present study, Sheikh and Parmar (2015) [25] reported that 90.00 per cent of respondents provided loose type of houses to their dairy animals. It was observed that 47.81 per cent of animal sheds were nearby to the dwelling followed by 32.81 and 19.38 per cent of the animal sheds were attached to farmers dwelling and at the field of farmers, respectively. Similar findings are also reported by Pilaniya *et al*. (2018) [17] and Singh *et al*. (2018) [27] worked out the situation in rural areas and reported more than 40.00 per cent of animal sheds were nearby the owner's residence. It might be due to the fact that for better management of the dairy animals and farmers preferred to have animal houses in close vicinity of their houses. Further, it was observed that, animal houses that were attached to the dwelling of the farmers were mainly lean to type hence the cost of construction was minimum. Highly significant ($p<0.01$) difference in location of shed was observed between the talukas. Contrary to the present study, Kumar *et al*. (2020) [11] reported that, more than 80.00 per cent of animal sheds were attached to the dwelling.

Present study revealed that 67.50 per cent of the animal houses were oriented in eastwest direction, while 32.50 per cent of the animal houses were having north-south orientation which is similar to the findings reported by Dhage *et al*. (2015) [8]. Contrary to the present findings, Kumar *et al*. (2017) [13] who reported that, 70.00 per cent of the respondents had north-south orientation of their animal shed. Majority (95.62%) of the Gir cattle owners in the area of the study had single row system of animal housing and remaining 4.38 per cent of the respondents had double row system of animal housing. Out of which 2.50 and 1.88 per cent of the respondents had head to head and tail to tail type of housing system, respectively. These findings are supported with the findings of Sabapara *et al*. (2015) [22] and Patel *et al*. (2018) [16]. Adequate floor space was available in animal houses of 93.12 per cent of the respondents whereas, it was inadequate in animal houses of 6.88 per cent respondents. Floor space was significantly ($p<0.05$) different between the talukas. Present results are encouraging than the finding of Kumar *et al*. (2020) [11] who found that, more than 70 per cent of respondents had adequate floor space in their animal houses. About 89.38 per cent of the Gir cattle owners had adequate provision of light in the animal houses, while it was inadequate in the houses of 10.62 per cent of the respondents.

Majority (78.75%) of the animal sheds had provision of artificial light. Supported findings were reported by Sabapara *et al*. (2015) [22] and Patel *et al*. (2018) [16]. Contrary to the present study, Singh *et al*. (2018) [27] revealed that, very low i.e. about 28.13 per cent of respondents provided sufficient light in the animal houses of Ajmer district of Rajasthan. Most (97.81%) of Gir cattle owners had adequate provision of ventilation to their animal sheds, while only 2.19 per cent had inadequate provision of ventilation to their animal shed. Out of total Gir cattle owners, 19.38 had provision of artificial ventilation. Present findings are in agreement with the findings of Kumar *et al*. (2020) [11]. However, contradictory to the study of Singh *et al*. (2018) [27] who found that 68.13 per cent of respondents provided inadequate ventilation in animal houses of Villupuram district of Tamil Nadu, respectively. This might be due to the lack of awareness of Gir cattle owners.

Data in the Table 1 indicated that majority of the Gir cattle owners (87.5%) had earthen floors to their animal houses, while 7.81, 2.81 and 1.88 per cent of the respondents had pucca, brick paved and stone paved floors, respectively. It is generally observed that, earthen floors are found to be less hygienic and also leads to worm problems as compared to pucca floors. It shows the lack of awareness regarding advantages of pucca floor in animal shed. These findings are in close conformity with the earlier reports of Sabapara *et al*. (2010) [21] reported that, more than 80.00 per cent dairy animal owners had earthen floor. However, the results are contrary to the result recorded by Patel *et al*. (2018) [16] in Valsad district of Gujarat.

Present study revealed that 79.69 per cent of the Gir cattle owners had no slope in floors of animal sheds and 20.31 per cent had slope towards back, while none had slope towards front in the animal shed in the study area. This might be due to lack of awareness regarding keeping slope in floor to maintain hygienic conditions of animal sheds. The findings are supported by Singh *et al*. (2018) [27] who observed that 65.00 per cent of the respondents had no slope in the animal shed, respectively. However, Madkar *et al*. (2021) [14] contrary observed that, more than 70.00 per cent of the animal houses had slope towards back in floor of animal shed in Valsad district of Gujarat and Western Maharashtra, respectively.

Type of housing materials used by Gir cattle owners

Distribution of Gir cattle owners according to type of housing materials used was presented in Table 2 indicated that majority (88.44%) of the Gir cattle owners used cemented type poles, while 10.31 per cent of the respondents used wooden poles to support the roof and only 1.25 per cent of the respondents used iron poles to support the roof. Significant

($p<0.05$) difference was observed with respect to type of pillar/pole between the talukas. The findings are supported by the findings of Sabapara (2017) [23] and Patel *et al*. (2018) [16]. Contrary to present study, Sabapara *et al*. (2010) [21] who observed that, only 14.50 per cent of the respondents had cemented type poles in tribal area of South Gujarat. Majority (84.69%) of the Gir cattle owners had full walls in their animal houses, while 11.25 and 4.06 per cent of the respondents had half and no walls in their animal houses, respectively. It might be due to the fact that full wall provided better protection from extreme weather. Wall of animal shed was found significant ($p<0.05$) different between the four talukas. Supported finding also reported by Kumar and Mishra (2011) [12]. About 35.62, 28.75, 24.69 and 10.94 per cent of the Gir cattle owners used galvanized iron sheets, cemented sheets, tiles and thatch as roofing material for their animal sheds, respectively. Prevailing climatic condition and economic status of the farmers might have played a significant role in the selection of roofing materials. The results are in accordance with the findings of Pilaniya *et al*. (2018) [17].The results are contrary to results of Rathore *et al*. (2010) [20], who observed that, 70.50 per cent of the respondents used thatch as roofing material for their animal sheds, respectively. It was found that majority of the Gir cattle owners (78.44%) possessed single slope type of roof, while 13.75 and 7.81 per cent of the Gir cattle owners possessed double slope and flat type roof in their animal sheds, respectively. It might be due to the fact that most of the houses were lean type, hence might have single slope type of roof. Highly significant ($p<0.01$) difference in features of roof of shed was observed between the talukas. Present results were supported by findings of Patel *et al*. (2018) [16] who observed 76.70 per cent respondents possessed single slope type of roof in their animal sheds.

Data in Table 2 revealed that all the respondents provided manger to their animals. Similar findings were observed by Sarap *et al*. (2012) [24]. Contrary to present findings, Rajadurai *et al*. (2020) [19] who observed that, only 20.30 per cent of the farmers provided manger for feeding in Villupuram district of Tamil Nadu. Majority (64.38%) of the Gir cattle owners had pucca manger, while 30.93 and 4.69 per cent of the respondents had Kutcha and wooden assisted temporary type manger of varying size and shape. Pucca feed manger is considered more hygienic, easy to clean and durable by the farmers in these area. Type of manger was found highly significant ($p<0.01$) different between the talukas. Present findings are in accordance with Pilaniya *et al*. (2018) [17]. However, the results are contrary to the findings of Sheikh and Parmar (2015) [25] who observed that, more than 88.00% of dairy animal owners provided kutcha type of manger in animal sheds. This might be due to the lack of awareness of dairy farmers. Majority (62.81%) of the Gir cattle owners had adequate depth of manger in their animal sheds, while 37.19 per cent of Gir cattle shed had inadequate depth of manger. Highly significant ($p<0.01$) difference was observed between the four talukas. These findings are supported by findings of Madkar *et al*. (2021) [14]. It was observed that 92.19 per cent of animal sheds had no provision of drainage facility for urine which is supported by earlier findings of Kumar and Mishra (2011) [12]. Significant ($p<0.05$) difference was observed with respect to provision of drainage system between the talukas. Contrary to present finding, Patel *et al*. (2018) [16] reported that, majority of the respondents had pucca drainage facility for urine in their animal shed.

Housing practices adopted by Gir cattle owners

It was revealed from the Table 3 that 59.06 per cent Gir cattle owners provided bedding material on floor to their animals, while 40.94 per cent Gir cattle owners did not provide bedding material on floor to their animals in the shed. It was also found that, majority (57.19%) of the Gir cattle owners used straw followed by rubber mat (1.25%) and sugarcane leaves (0.62%) as a bedding materials in the shed. Significant difference ($p<0.05$) was observed with respect to bedding material used on the floor in winter season by Gir cattle owners between the four talukas. Present finding was in accordance with the findings of Choudhary *et al*. (2017) [7]. Contrary to the present findings, Singh *et al*. (2019) [26] reported that, only 22.00 per cent of the respondents provided bedding during winter season in Hoshiarpur district of Punjab. Majority (60%) of the Gir cattle of Junagadh district adopted measures to protect the animals from extreme weather conditions, while 40.00 per cent of the Gir cattle owners did not followed any kind of practice to protect animal from extreme weather. It might be due to awareness of the Gir cattle owners regarding ill effects of the extreme weather conditions on health and production of the dairy animals. Significant ($p<0.05$) difference was observed with respect to provision and practice to protect animal from extreme weather between the four talukas. Supported findings are also reported by Pilaniya *et al*. (2018) [17] who observed that, 70.66 per cent of the respondents adopted measures to protect animal from extreme weather.

Majority (98.12%) of the Gir cattle owners stored the manure by heaps, while 1.88 per cent of the Gir cattle owners stored the manure in pits. These results are in accordance with the results of Patel *et al*. (2019) [15] who observed that, 76.67 per cent of the respondents had stored manure in heaps. Contrary to the present study, Kumar *et al*. (2020) [11] found that, 86.7% diposed the manure from animal shed to manure pit. It was observed that majority (81.25%) of the Gir cattle owners kept storage of manure at distance to their animal sheds, while 18.75 per cent of the Gir cattle owners kept storage of manure adjacent to their animal sheds. Location of manure was significantly ($p<0.05$) different between the talukas. The present results are supported by findings of Dhage *et al*. (2015) [8] who reported that, 70.00 per cent of the respondents stored manure at distant location. Contrary to the present results, Kumar and Mishra (2011) [12] reported that, 86.25 per cent of the respondents stored manure adjacent to the animal shed.

Table 1: Distribution of the Gir cattle owners according to housing management practices followed.

Sr. No.	Practices	Manavadar (N= 80)		Mendarda (N= 80)		Mangrol (N= 80)		Junagadh (N= 80)		Overall (N= 320)	
		N	%	N	%	N	%	N	%	N	%
1	**Type of Housing**										
	Loose	00	00	01	1.25	00	00	01	1.25	02	0.62
	Shed+under tree	28	35.00	25	31.25	33	41.25	28	35.00	114	35.63
	Conventional	52	65.00	54	67.50	47	58.75	51	63.75	204	63.75
	X^2	3.67									
2	**Location of shed**										
	Attached to human dwelling	20	25.00	27	33.75	28	35.00	30	37.50	105	32.81
	Nearby their dwelling	52	65.00	22	27.50	50	62.50	29	36.25	153	47.81
	At the field of farmer	08	10.00	31	38.75	02	2.50	21	26.25	62	19.38
	X^2	52.69**									
3	**Direction of shed**										
	East-west	55	68.75	58	72.50	53	66.25	50	62.50	216	67.5
	North-South	25	31.25	22	27.50	27	33.75	30	37.50	104	32.5
	X^2	1.94									
4	**Method of tying**										
	Single line	76	95.00	77	96.25	74	92.50	79	98.25	306	95.62
	Head to head	02	2.50	03	3.75	02	2.50	01	1.25	08	2.50
	Tail to tail	02	2.50	00	00	04	5.00	00	00	06	1.88
	X^2	8.5									
5	**Floor space**										
	Adequate	73	91.25	76	95.00	70	87.50	79	98.75	298	93.12
	Inadequate	07	8.75	04	5.00	10	12.50	01	1.25	22	6.88
	X^2	8.78*									
6	**Light**										
	Adequate	68	85.00	70	87.50	72	90.00	76	95.00	286	89.38
	Inadequate	12	15.00	10	12.50	08	10.00	04	5.00	34	10.62
	X^2	4.6									
7	**Ventilation**										
	Adequate	76	95.00	80	100.0	79	98.75	78	97.50	313	97.81
	In adequate	04	5.00	00	00	01	1.25	02	2.50	07	2.19
	X^2	5.11									
8	**Type of floor**										
	Pucca (cement concrete)	03	3.75	08	10.00	09	11.25	05	6.25	25	7.81
	Earthen floor	73	91.25	69	86.25	67	83.75	71	88.75	280	87.5
	Brick paved	01	1.25	02	2.50	03	3.75	03	3.75	09	2.81
	Stone paved	03	3.75	01	1.25	01	1.25	01	1.25	06	1.88
	X^2	7.15									
9	**Slope of floor**										
	Towards front	00	00	00	00	00	00	00	00	00	00
	Towards back	15	18.75	23	28.75	14	17.5	13	16.25	65	20.31
	No slope	65	81.25	57	71.25	66	82.5	67	83.75	255	79.69
	X^2	4.85									

n- Frequency, NS- Non-significant, * Significant at 5 per cent level (p<0.05), ** Significant at 1 per cent level (p<0.01)

Table 2: Distribution of Gir cattle owners according to type of housing materials used

Sr. No.	Practices	Manavadar (N= 80)		Mendarda (N= 80)		Mangrol (N= 80)		Junagadh (N= 80)		Overall (N= 320)	
		N	%	N	%	N	%	N	%	N	%
1	**Type of pillar/pole**										
	Wooden	15	18.75	03	3.75	10	12.50	05	6.25	33	10.31
	Iron	00	00	02	2.50	00	00	02	2.50	04	1.25
	Cemented/brick	65	81.25	75	93.75	70	87.50	73	91.25	283	88.44
	X^2	15.32*									
2	**Wall of house**										
	Full	58	72.50	71	88.75	68	85.00	74	92.5	271	84.69
	Half	14	17.50	08	10.00	09	11.25	05	6.25	36	11.25
	No wall	08	10.00	01	1.25	03	3.75	01	1.25	13	4.06
	X^2	16.88*									
3	**Type of roof**										
	Cemented sheets roof	26	32.50	21	26.25	27	33.75	18	22.5	92	28.75
	Galvanized iron sheet roof	29	36.25	27	33.75	28	35.00	30	37.5	114	35.62
	Thatched roof	11	13.75	05	6.25	12	15.00	07	8.75	35	10.94
	Tiles roof	14	17.50	27	33.75	13	16.25	25	31.25	79	24.69
	X^2	14.3									

4	**Features of roof of shed**										
	Flat	07	8.75	11	13.75	05	6.25	02	2.50	25	7.81
	Single slope	66	82.50	47	58.75	67	83.75	71	88.75	251	78.44
	Double slope	07	8.75	22	27.5	08	10.00	07	8.75	44	13.75
	X^2	27.06**									
5	**Provision of manger**										
	Yes	80	100.0	80	100.0	80	100.0	80	100.0	320	100.0
	No	00	00	00	00	00	00	00	00	00	00
6	**Type of manger**										
	Kutcha	36	45.00	21	26.25	21	26.25	21	26.25	99	30.93
	Pucca	37	46.25	59	73.75	54	67.50	56	70.00	206	64.38
	Wooden assisted temporary	07	8.75	00	00	05	6.25	03	3.75	15	4.69
	X^2	19.64**									
7	**Depth of manger**										
	Adequate	36	45.00	57	71.25	54	67.50	54	67.50	201	62.81
	Inadequate	44	55.00	23	28.75	26	32.50	26	32.50	119	37.19
	X^2	14.81**									
8	**Provision of drainage system**										
	Yes	04	5.00	05	6.25	12	15.00	04	4.00	25	7.81
	No	76	95.00	75	93.75	68	85.00	76	95.00	295	92.19
	X^2	7.77*									

n- Frequency, NS- Non-significant, * Significant at 5 per cent level (p<0.05), ** Significant at 1 per cent level (p<0.01)

Table 3: Distribution of Gir cattle owners according to housing practices followed

Sr. No.	Practices	Manavadar (N= 80)		Mendarda (N= 80)		Mangrol (N= 80)		Junagadh (N= 80)		Overall (N= 320)	
		N	%	N	%	N	%	N	%	N	%
1	**Bedding material used on the floor in winter season**										
	No bedding	43	53.75	24	30.00	28	35.00	36	45.00	131	40.94
	Straw	37	46.25	54	67.50	50	62.50	42	52.50	183	57.19
	Sugarcane leaves	00	00	00	00	00	00	02	2.50	02	0.62
	Use of rubber mat	00	00	02	2.50	02	2.50	00	00	04	1.25
	Other, specify	00	00	00	00	00	00	00	00	00	00
	X^2	20.42*									
2	**Provision and practice to protect animal from extreme weather**										
	Yes	41	51.25	56	70.00	53	66.25	42	52.50	192	60.00
	No	39	48.75	24	30.00	27	33.75	38	47.50	128	40.00
	X^2	9.06*									
3	**Storage of manure**										
	Manure pit	03	3.75	01	1.25	00	00	02	2.50	06	1.88
	Manure heap	77	96.25	79	98.75	80	100.0	78	97.50	314	98.12
	X^2	3.39									
4	**Location of manure**										
	Adjacent	22	27.50	09	11.25	12	15.00	17	21.25	60	18.75
	Distant	58	72.50	71	88.75	68	85.00	63	78.75	260	81.25
	X^2	8.04*									

n- Frequency, NS- Non-significant, * Significant at 5 per cent level (p<0.05), ** Significant at 1 per cent level (p<0.01)

Conclusion

It can be concluded only few aspects of housing management practices were properly followed to certain extent by majority of the respondents that majority of the respondents followed few aspects of housing. Thus, by organizing awareness camps, exposure visits and training programmes regarding scientific animal housing management practices will help in improving the overall dairy husbandry practices in future.

Acknowledgements

Authors thankful to the Dean & Principal, College of Veterinary Science and Animal Husbandry, Kamdhenu University, Junagadh-362001, Gujarat, India, for the facilities provided for this research work.

Conflict of Interest: Nil.

References

1. Anonymous. 20th Livestock census. All India Report. Department of animal husbandry, dairying and fisheries, Ministry of Fisheries, Animal husbandry and Dairying, Government of India. Krishi Bhavan, New Delhi; c2019.
2. Anonymous. 41st Bulletin of animal husbandry and dairying statistics. Directorate of animal husbandry Krishi Bhavan, sector 10/A, Gandhinagar, Gujarat state; c2020.
3. Anonymous. Annual report 2020-21. Department of Animal Husbandry and Dairying, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India; c2021.
4. Anonymous. Approaches and experiences of NDDB in development of Gir a promising indigenous milch breed.

National Dairy Development Board, Anand, Gujarat; c2017.
5. Anonymous. Breed-wise report of livestock and poultry. Ministry of Fisheries, Animal Husbandry & Dairying. Department of Animal Husbandry & Dairying, Animal Husbandry statistic division, Krishi Bhawan, New Delhi; c2022.
6. Anonymous. Dairying in Gujarat- A statistical profile. National Dairy Development Board, Anand, Gujarat; c2013.
7. Choudhary S, Gurjar ML, Choudhary V, Meel P, Ganguly S. Study on cattle housing practices in relationship to herd size in non-tribal area of Udaipur district of Rajasthan. International Journal of Livestock Research. 2017;7(12):87-92.
8. Dhage SA, Sarwade DD, Pachpute ST, Mane SH. Housing practices followed by crossbred cattle owners in Baramati tahsil of Pune district. Journal of Agriculture Research and Technology. 2015;40(1):117-124.
9. Gangwar AC. Performance of buffaloes kept on different categories of farms. Indian Journal of Animal Production and Management. 1988;4(3-4):119-123.
10. Gupta DC, Suresh A, Mann JS. Management practices and productivity status of cattle and buffaloes in Rajasthan. Indian Journal of Animal Sciences. 2008;78(7):769-774.
11. Kumar A, Upadhyay VK, Singh VP. Existing dairy husbandry practices followed by livestock owners in Farrukhabad district of Uttar Pradesh. International Journal of Current Microbiology and Applied Sciences. 2020;9(2):1863-1873.
12. Kumar S, Mishra BK. Existing feeding and housing management practices followed by dairy producers in Tehri Garhwal district of Uttarakhand. Indian Journal of Animal Production and Management. 2011;27(3-4):159-162.
13. Kumar S, Subash S, Rameti J, Sankhala G. Management practices of indigenous cattle adopted by the farmers in Thar desert region of Rajasthan state. Indian Journal of Dairy Science. 2017;70(4):482-485.
14. Madkar AR, Dutt T, Boro P, Verma MR. Housing and shelter management practices followed by dairy owners of Western Maharashtra. Journal of Entomology and Zoology Studies. 2021;9(1):978-982.
15. Patel NS, Patel JV, Parmar D, Ankuya KJ, Patel VK, Madhavatar MP, *et al*. Survey on housing practices of buffalo owners in Patan district of Gujarat, India. Journal of Entomology and Zoology Studies. 2019[a];7(2):635-640.
16. Patel PC, Sabapara GP, Sorathiya LM. Housing management practices followed by dairy animal owners in Valsad district of Gujarat. Indian Journal of Animal Production and Management. 2018;34(3-4):7-13.
17. Pilaniya P, Desai PM, Mordia A. Existing housing management practices followed by rural dairy animal owners in Sabar dairy milk shed of Gujarat, India. International Journal of Current Microbiology and Applied Sciences. 2018;7(8):1642-1649.
18. Premchand, Sirohi S, Singh SRK, Dwivedi AP, Mishra A. Sustainability of dairy breeding practices in semi-arid eastern zone, Rajasthan. Indian Research Journal of Extension Education. 2014;14(3):43-46.
19. Rajadurai A, Rajamanickam K, Ali MS, Kumeravelu N. Housing management practices of dairy cows in Villupuram district of Tamil Nadu. The Pharma Innovation Journal. 2020;9(3):123-126.
20. Rathore RS, Singh R, Tiwari A. Studies on existing managemental practices followed by the crossbred cattle owners. Indian Journal of Animal Production and Management. 2010[a];26(1-2):85-88.
21. Sabapara GP, Desai PM, Kharadi VB, Saiyed LH, Singh RR. Housing and feeding management practices of dairy animals in the tribal area of south Gujarat. Indian Journal of Animal Sciences. 2010;80(10):1022-1027.
22. Sabapara GP, Fulsoundar AB, Kharadi VB. Existing housing management practices followed by rural dairy animal owners in Surat district of Gujarat. International Journal of Farm Sciences. 2015;5(4):299-308.
23. Sabapara GP. Housing and health care management practices of dairy animals followed by farmers in coastal areas of south Gujarat. Indian Journal of Animal Production and Management. 2017;33(1-2):1-6.
24. Sarap KW, Chavan SD, Shelke RR, Pawar RV, Janorkar HP. Animal husbandry practices followed by cattle owners in Karanja Tehsil of Washim district. Research Journal of Animal Husbandry and Dairy Science. 2012;3(1):5-12.
25. Sheikh AS, Parmar DV. Kankrej cattle management practices followed in rearing at northern part of Gujarat. Life Sciences Leaflets. 2015;60:78-86.
26. Singh G, Sharma RK, Verma HK, Singh J. Livestock management practices followed by Kandi farmers of Hosiarpur district of Punjab, India. International Journal of Current Microbiology and Applied Sciences. 2019;8(11):982-990.
27. Singh V, Goswami SC, Choudhary VK, Choudhary P, Jhirwal AK, Choudhary ML, *et al.* Housing and health care management practices followed by Gir cattle owners for conservation of Gir cattle in Ajmer district of Rajasthan. Advances in Animal and Veterinary Sciences. 2018;6(6):265-270.
28. Sinha RRK, Dutt T, Singh RR, Bhushan B, Singh M, Kumar S. Feeding and housing management practices of dairy animals in Uttar Pradesh. Indian Journal of Animal Sciences. 2009;79(8):829-833.