



Research Article

STUDY ON PERSONAL, SOCIO-ECONOMIC PROFILE AND CONSTRAINTS FACED BY DAIRY FARMERS IN BUFFALO CALF REARING OF TAPI DISTRICT OF SOUTH GUJARAT

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Abstract: The field survey was conducted to acquire first-hand information on dairy husbandry practices in Tapi district of south Gujarat with the objectives, to study the profile of dairy farmers and to know the constraints perceived by the dairy farmers in buffalo calf rearing and found that half (51.40%) of the dairy farmers were from middle age group followed by 37.10% of old age and 11.40% of respondents were from the young age group. About two-third (77.90%) of the dairy farmers were functionally literate and 22.10% of the dairy farmers were illiterate. Majority (94.30%) of the dairy farmers were found to be from the ST category followed by general (3.60%), Other Backward Classes (2.10%) and Scheduled Caste (0.00%). Majorities (64.30%) of the dairy animal owners were from medium-sized families and majority (94.30%) of the dairy farmers had joint family. Majority (74.30%) of the dairy farmers did not socially participate in any organization. About 57.90% of the dairy farmers in the area have marginal land holdings, 19.30% were landless and 10.70, 8.60 and 3.60% have small, medium and large land holdings, respectively. Majority (70.70%) of the dairy farmers in the study area practiced agriculture and dairy as their source of livelihood. Regarding herd size out of the total dairy farmers 33.60, 30.70 and 35.70% have small, medium and large sized herd respectively. About 40.70% of dairy farmers reared only buffaloes, 16.40% reared indigenous cattle along with buffaloes, 36.40% reared crossbreed cattle with buffaloes and 6.40% reared indigenous & crossbreed cattle together with buffaloes. Majority (64.30%) of the dairy farmers did not have any extension contact. Regarding constraints faced by the dairy farmers during buffalo calf rearing the first major constraint (84.29%) was of the dairy farmers having inadequate knowledge of vaccination schedules and control of diseases. The second major constraint was (75.71%) of the dairy farmers did not get sufficient prices for their milk. The third major constraint was (55.00%) of the dairy farmers had inadequate knowledge of scientific housing. The fourth major constraint was (51.43%) of the dairy farmers had lack of awareness about development programmes. The fifth major constraint was (47.14%) the high cost of starter/feed.

Keywords: Animal Husbandry, Socio-Economic, Constraints, Dairy farmers

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Introduction

India is an agricultural country with about 70% of the rural household still depend primarily on agriculture for their livelihood and animal husbandry is a key sector in Indian agriculture with significant contribution in the economy. About 20.5 million people depend upon livestock for their livelihood. Livestock contributed 16.00% to the income of small rural households. The milk production during 2019-20 was 198.44 million tonnes and 209.96 in 2020-21, showing a 6.00% annual growth rate. India ranks first in the buffalo population and milk production. In spite of India having a high livestock population and milk production, the amount of milk produced per animal is low. India has the most important buffalo population in the world, with a population of 109.85 million, highest buffalo population in India is in Uttar-Pradesh (33.0 million) and Gujarat stands at rank 3rd with a population of buffalo as 10.5 million in the year 2019.

Gujarat is one of the largest milk-producing states with a well-developed cooperative infrastructure. It contributed around 14.49 million tonnes (7.71%) of milk to the total milk pool of India and per capita milk availability was 626 gm/day during 2018-19. Gujarat has around 4.98% of cattle and 9.60% of the buffalo population of the country [1]. Poor management practices lead to economic losses to the farmers in terms of higher calf mortality, poor growth rate, delayed maturity and poor productivity. Further, not feeding colostrum to newborn calves reduces the immunity of calves and makes them susceptible to the diseases which

increases the cost of treatment and farmers face economical loss by calf mortality [2-4]. So far very sporadic research has been conducted, specifically on buffalo calf management practices at the farmers' level, therefore it is imperative to ascertain the management practices of calves followed by buffalo owners under village conditions so that a need-based extension programme may be launched to make them aware, to increase their knowledge and to increase the adoption of scientific calf health management practices.

Material and Methods

This study was conducted in Tapi districts, as in the state of Gujarat. Tapi district consists of seven talukas viz. Vyara, Songadh, Uchchhal, Nizar, Valod, Dolvan and Kukarmunda. Field surveys were conducted in all the talukas of Tapi district. From each taluka 20 (twenty) dairy farmers were selected randomly. The respondents were interviewed and the desired information was collected with the help of a structured interview schedule developed for the purpose. The information regarding the personal and socio-economic profile of the farmers like age, education, caste, family size, family type, social participation, land holding, vocational diversification, herd size, types of animal, extension contact and constraints faced by the dairy farmers during Buffalo calf rearing has been collected.

The study being of an exploratory nature, the qualitative data were quantified accordingly and tabulated. The data were classified and tabulated according to Taluka, land holding and herd strength wise to draw meaningful inferences. Frequencies were obtained for each message and calculated percentage to draw inferences. Chi-square test (Test of Independence) was applied to determine the association of animal management practices with different categories. Frequency and percentage were carried out in constraints.

Results and Discussion

Personal, social and economic characteristics of the dairy farmers

The data collected regarding personal, social and economic characteristics of the dairy farmers were analyzed and results are presented in [Table-1 to 4]. All these characteristics affect the behaviour pattern, level of the enterprise, adoption level of improved dairy husbandry practices and management capability of dairy animal owners in some way or other.

Table-1 Distribution of the dairy farmers according to taluka, land holding and herd size

Variables	Number of respondents	Percentage
Overall	140	100
Taluka:		
Vyara	20	14.28
Songadh	20	14.28
Uchchhal	20	14.28
Valod	20	14.28
Dolvan	20	14.28
Nizar	20	14.28
Kukamunda	20	14.28
Land holding:		
Landless	27	19.3
Marginal (<1 ha)	81	57.9
Small (1-2ha)	15	10.7
Medium (2-4 ha)	12	8.6
Large (>4 ha)	5	3.6
Herd size:		
2-5 animals	47	33.58
6-10 animals	43	30.71
> 10 animals	50	35.71

Personal Characteristics

Age

Data in [Table-2] regarding age revealed that about half (51.40%) of the dairy farmers were from the middle age group followed by 37.10 percent of old age and 11.40 percent of the dairy farmers were from the young age group. Similar findings were reported by Patel *et al.*, (2013) [5], Patel *et al.*, (2014) [6], Patil *et al.*, (2019) [7] and Singh *et al.*, (2021) [8]. Young age group is not involved in animal husbandry because they can be interested in the jobs near urban areas.

Education

A perusal of data in [Table-2] regarding education revealed that about two third (77.90%) of the dairy farmers were functionally literate and 22.10 percent of the dairy farmers were illiterate among the literate farmers 19.30 percent had studied up to Primary level, 32.10 percent had studied up to a secondary level, 12.90 percent of the dairy farmers were educated up to higher secondary level and only 13.60 percent of the dairy farmers had studied up to graduate level. Education of the dairy farmers was significant ($p < 0.05$) between different land holding. Similar findings were reported by Patel *et al.*, (2016) [9], Patil *et al.*, (2016) and Kumar *et al.*, (2021) [10]. These findings are contradictory to the findings of Sabapara *et al.*, (2014) [11], Pushpa *et al.*, (2015) [12], Parmar *et al.*, (2021) [13], Singh *et al.*, (2021) and Singh *et al.*, (2022) [14]. Less number and distinct location of the educational institutions in the study area might be the reason for the low education level of the respondents.

Social Characteristics

Caste

According to data in [Table-3] regarding caste majority (94.30%) of the dairy farmers were found to be from the ST category followed by general (3.60%) and Other Backward Classes (2.10%). None of the respondents belonged to

Scheduled Caste. The above findings were highly significant ($p < 0.01$) on different talukas and land holdings whereas significant ($p < 0.05$) on different herd sizes. Above findings were not similar to Sabapara *et al.*, (2014), Tudu and Roy (2015) [15] and Kumar *et al.*, (2021). Major population in Tapi district belonged to ST category so most of the dairy farmers interviewed were from ST category.

Family size

A perusal of data in [Table-3] revealed that majority (64.30%) of the dairy animal owners were from medium-sized families, one-fourth (25.00%) were from small-sized families and 10.70 percent of the dairy farmers were from large-sized families. Similar findings were reported by Patel *et al.*, (2013), Pushpa *et al.*, (2015) and Kumar *et al.*, (2021). The above findings were contradictory to the findings of Adhikari *et al.*, (2020) [16], Singh *et al.*, (2021) and Singh *et al.*, (2022)

Type of family

According to data shown in [Table-3] regarding the type of family majority (94.30%) of the dairy farmers belonged to joint families while, 5.70 percent were from nuclear families. A highly significant ($p < 0.01$) difference was observed concerning the involvement of family type between the different talukas. These findings were in contradiction to the findings of Sabapara *et al.*, (2014), Adhikari *et al.*, (2020), Kumar *et al.*, (2021) and Parmar *et al.*, (2021). This finding might be because, the small land holdings owned by most of the families made the division of land economically impractical and also the dairy farmers could take the benefit of family labour in family activities.

Social participation in relation to A. H. practices

A perusal of the data in [Table-3] regarding social participation in relation to A. H. practices majority (74.30%) of the dairy farmers did not have social participation in any organization while, 23.60 percent participated in one social organization, 1.40 percent participated in 1-2 social organizations and only 0.70 percent of the dairy farmers participated in more than 2 social organizations. A highly significant ($p < 0.01$) difference was observed concerning social participation between the land holding size and a significant ($p < 0.05$) difference was observed with different talukas and herd sizes. Similar findings were reported by Sabapara *et al.*, (2014) and Singh *et al.*, (2022). Above findings were in contradiction to the findings of Lohakare *et al.*, (2015) [17]. Lack of time and limited number of organizations associated with buffalo farming in the area might have restricted the social participations of the respondents.

Economic Characteristics

Land holding

Data shown in [Table-4] regarding land holding 57.90 percent of the dairy farmers in the study area have marginal land holding and 19.30 percent are landless, 10.70, 8.60 and 3.60 percent have small, medium and large land holdings respectively. Land holding of the dairy farmers was significant ($p < 0.05$) between different talukas. Similar findings were reported by Sharma *et al.*, (2013) [18]. Above findings are in contradictory to the findings of Rathod *et al.*, (2011) [19], Patel *et al.*, (2013), Pushpa *et al.*, (2015), Patil *et al.*, (2019), Adhikari *et al.*, (2020), Parmar *et al.*, (2021), Singh *et al.*, (2021) and Singh *et al.*, (2022) [20]. About 19.30 percent of the dairy farmers were landless and still they were able to rear dairy animals by grazing them at road side or on the river banks and forest land during day time. They also brought fodder from the nearby forest areas and fed their animals.

Vocational diversification

A perusal of data shown in [Table-4] regarding vocational diversification majority (70.70%) of the dairy farmers in the study area practiced agriculture and dairy as their source of livelihood while, 21.40 percent of the dairy farmers practiced only Animal husbandry whereas, 4.30 percent of the dairy farmers practiced agriculture along with animal husbandry and services, 2.10 percent were engaged in Agriculture, Animal husbandry along with Any other occupation and 1.40 percent were engaged in animal husbandry along with any other occupation respectively.

Table-2 Personal characteristics of the dairy farmers

Particulars	Categories according to Taluka								Categories according to land holding						Categories according to herd size			
	Vyara	Valod	Dolvan	Songadh	Uchchhal	Nizar	Kukarmunda	Total	Landless	Marginal (< 1 ha)	Small (1-2ha)	Medium (2-4 ha)	Large (>4 ha)	Total	2-5 animals	6-10 animals	> 10 animals	Total
	n=20	n=20	n=20	n=20	n=20	n=20	n=20	n=140	n=27	n=81	n=15	n=12	n=5	n=140	n=47	n=43	n=50	n=140
Age																		
Young (≤30 yrs.)	4	1	0	3	3	4	1	16	4	8	1	1	2	16	9	0	7	16
	20.00	5.00	0.00	15.00	15.00	20.00	5.00	11.40	14.80	9.90	6.70	8.30	40.00	11.40	17.00	0.00	14.00	11.40
Middle aged (31-50 yrs.)	10	7	13	12	8	9	13	72	14	43	7	7	1	72	24	22	26	72
	50.00	35.00	65.00	60.00	40.00	45.00	65.00	51.40	51.90	53.10	46.70	58.30	20.00	51.40	45.30	59.50	52.00	51.40
Old (≥50 yrs.)	6	12	7	5	9	7	6	52	9	30	7	4	2	52	20	15	17	52
	30.00	60.00	35.00	25.00	45.00	35.00	30.00	37.10	33.30	37.00	46.70	33.30	40.00	37.10	37.70	40.50	34.00	37.10
χ^2	14.733 (P value 0.256)								6.123 (P value 0.633)						7.57 (P value 0.133)			
Education																		
Illiterate	3	7	1	4	9	4	3	31	4	22	3	2	0	31	11	11	9	31
	15.00	35.00	5.00	20.00	45.00	20.00	15.00	22.10	14.80	27.20	20.00	16.70	0.00	22.10	23.40	25.60	18.00	22.10
Primary level	2	4	4	5	4	2	6	27	5	16	4	2	0	27	11	9	7	27
	10.00	20.00	20.00	25.00	20.00	10.00	30.00	19.30	18.50	19.80	26.70	16.70	0.00	19.30	23.40	20.90	14.00	19.30
Secondary level	5	5	6	7	5	9	8	45	12	27	3	2	1	45	16	12	17	45
	25.00	25.00	30.00	35.00	25.00	45.00	40.00	32.10	44.40	33.30	20.00	16.70	20.00	32.10	34.00	27.90	34.00	32.10
Higher Secondary level	3	1	5	2	2	4	1	18	6	7	2	2	1	18	3	6	9	18
	15.00	5.00	25.00	10.00	10.00	20.00	5.00	12.90	22.20	8.60	13.30	16.70	20.00	12.90	6.40	14.00	18.00	12.90
Graduate level	7	3	4	2	0	1	2	19	0	9	3	4	3	19	6	5	8	19
	35.00	15.00	20.00	10.00	0.00	5.00	10.00	13.60	0.00	11.10	20.00	33.30	60.00	13.60	12.80	11.60	16.00	13.60
χ^2	32.561 (P value 0.114)								26.618* (P value 0.046)						5.156 (P value 0.741)			

Table-3 Social characteristics of the dairy farmers

Particulars	Categories according to Taluka								Categories according to land holding						Categories according to herd size			
	Vyara	Valod	Dolvan	Songadh	Uchchhal	Nizar	Kukarmunda	Total	Landless	Marginal (< 1 ha)	Small (1-2 ha)	Medium (2-4 ha)	Large (>4 ha)	Total	2-5 animals	6-10 animals	> 10 animals	Total
	n=20	n=20	n=20	n=20	n=20	n=20	n=20	n=140	n=27	n=81	n=15	n=12	n=5	n=140	n=47	n=43	n=50	n=140
Caste																		
General	5	0	0	0	0	0	0	5	1	1	0	1	2	5	0	0	5	5
	25.00	0.00	0.00	0.00	0.00	0.00	0.00	3.60	3.70	1.20	0.00	8.30	40.00	3.60	0.00	0.00	10.00	3.60
OBC	1	0	0	0	0	2	0	3	3	0	0	0	0	3	1	0	2	3
	5.00	0.00	0.00	0.00	0.00	10.00	0.00	2.10	11.10	0.00	0.00	0.00	0.00	2.10	2.10	0.00	4.00	2.10
SC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ST	14	20	20	20	20	18	20	132	23	80	15	11	3	132	46	43	43	132
	70.00	100.00	100.00	100.00	100.00	90.00	100.00	94.30	85.20	98.80	100.00	91.70	60.00	94.30	97.90	100.00	86.00	94.30
χ^2	40.303** (P value 0.001)								34.765** (P value 0.001)						11.303* (P value 0.023)			
Family Size																		
Small (Up to 4 members)	6	6	3	3	4	8	5	35	10	20	2	2	1	35	17	9	9	35
	30.00	30.00	15.00	15.00	20.00	40.00	25.00	25.00	37.00	24.70	13.30	16.70	20.00	25.00	36.20	20.90	18.00	25.00
Medium (5 to 8 members)	12	13	17	17	11	9	11	90	11	54	12	9	4	90	27	30	33	90
	60.00	65.00	85.00	85.00	55.00	45.00	55.00	64.30	40.70	66.70	80.00	75.00	80.00	64.30	57.40	69.80	66.00	64.30
Large (more than 8 members)	2	1	0	0	5	3	4	15	6	7	1	1	0	15	3	4	8	15
	10.00	5.00	0.00	0.00	25.00	15.00	20.00	10.70	22.20	8.60	6.70	8.30	0.00	10.70	6.40	9.30	16.00	10.70
χ^2	19.089 (P value 0.086)								10.641 (P value 0.223)						6.383 (P value 0.172)			

Particulars	Categories according to Taluka								Categories according to land holding						Categories according to herd size			
	Vyara	Valod	Dolvan	Songadh	Uchchhal	Nizar	Kukarmunda	Total	Landless	Marginal (< 1 ha)	Small (1-2ha)	Medium (2-4 ha)	Large (>4 ha)	Total	2-5 animals	6-10 animals	> 10 animals	Total
	n=20	n=20	n=20	n=20	n=20	n=20	n=20	n=140	n=27	n=81	n=15	n=12	n=5	n=140	n=47	n=43	n=50	n=100
Type of family																		
Joint family	20	19	20	18	20	15	20	132	24	78	14	11	5	132	43	41	48	132
	100.00	95.00	100.00	90.00	100.00	75.00	100.00	94.30	88.90	96.30	93.30	91.70	100.00	94.30	91.50	95.30	96.00	94.30
Nuclear family	0	1	0	2	0	5	0	8	3	3	1	1	0	8	4	2	2	8
	0.00	5.00	0.00	10.00	0.00	25.00	0.00	5.70	11.10	3.70	6.70	8.30	0.00	5.70	8.50	4.70	4.00	5.70
χ^2	19.356** (P value 0.004)								2.548 (P value 0.636)						1.045 (P value 0.593)			
Social participation relation to A. H. practices																		
No Participation	7	18	19	15	15	15	15	104	20	60	13	10	1	104	41	34	29	104
	35.00	90.00	95.00	75.00	75.00	75.00	75.00	74.30	74.10	74.10	86.70	83.30	20.00	74.30	87.20	79.10	58.00	74.30
Participation in 1socialorganization	12	2	1	4	4	5	5	33	7	21	1	2	2	33	6	9	18	33
	60.00	10.00	5.00	20.00	20.00	25.00	25.00	23.60	25.90	25.90	6.70	16.70	40.00	23.60	12.80	20.90	36.00	23.60
Participation in 1-2 social organization	0	0	0	1	1	0	0	2	0	0	1	0	1	2	0	0	2	2
	0.00	0.00	0.00	5.00	5.00	0.00	0.00	1.40	0.00	0.00	6.70	0.00	20.00	1.40	0.00	0.00	4.00	1.40
Participation in > 2 socialorganization	1	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	1	1
	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.00	20.00	0.70	0.00	0.00	2.00	0.70
χ^2	32.981* (P value 0.017)								48.980** (P value 0.001)						14.110* (P value 0.028)			

Vocational diversification was significant ($p < 0.05$) with a category based on talukas and highly significant ($p < 0.01$) with a category based on land holdings. These findings are contradictory to the findings of Patel *et al.*, (2013), Sabapara *et al.*, (2013) [21], Patel *et al.*, (2014), Sabapara *et al.*, (2014) and Singh *et al.*, (2021). Majority of the respondents were engaged in agriculture and animal husbandry for their livelihood. This might be due to the non availability of jobs in industries and other sectors due to the low level of education level of the respondents and also lack of interest of the respondents to migrate to other locations in search of job.

Herd size

Regarding herd size, out of the total dairy farmers 33.60, 30.70 and 35.70 percent of the dairy farmers have small, medium and large sized herd, respectively. Further details are mentioned in [Table-4]. Herd size was significant ($p < 0.05$) with category based on talukas. Similar findings were reported by Parmar *et al.*, (2021). Above findings are in contradiction to the findings of Sabapara *et al.*, (2014), Lohakare *et al.*, (2015), Adhikari *et al.*, (2020), Singh *et al.*, (2021) and Singh *et al.*, (2022).

Types of Animals

A perusal of data shown in [Table-4] regarding types of the animal reared by dairy farmers, about 40.70 percent of the dairy farmers reared only buffaloes, 16.40 percent reared indigenous cattle along with buffaloes, 36.40 percent reared cross-breed cattle with buffaloes and 6.40 percent reared indigenous & cross breed cattle along with buffaloes. Types of animals reared by farmers were highly significant ($p < 0.01$) between talukas and herd size. Partially similar findings were reported by Patel *et al.*, (2013). The above findings are contradictory to the findings of Pushpa *et al.*, (2015) and Kumar *et al.*, (2021).

Extension contact

A perusal of the data shown in [Table-4] revealed that the majority (64.30%) of the dairy farmers do not have any extension contact. Only 0.70, 2.10 1.40, 26.40 and 0.70 percent of the dairy farmers had contact with KVK, the Animal husbandry department, ATMA project, Dairy co-operative and NGO, respectively. Also, 3.60percent of the dairy farmers have contact with KVK & ATMA projects and 0.70percent with ATMA projects & dairy co-operatives together. Extension contact of farmers was highly significant ($p < 0.01$) between different talukas and herd size.

Table-4 Economic characteristics of the dairy farmers

Particulars	Categories according to Taluka								Categories according to land holding						Categories according to herd size			
	Vyara	Valod	Dolvan	Songadh	Uchchhal	Nizar	Kukarmunda	Total	Landless	Marginal (< 1 ha)	Small (1-2 ha)	Medium (2-4 ha)	Large (>4 ha)	Total	2-5 animals	6-10 animals	> 10 animals	Total
	n=20	n=20	n=20	n=20	n=20	n=20	n=20	n=140	n=27	n=81	n=15	n=12	n=5	n=140	n=47	n=43	n=50	n=140
Land holding																		
No Land	5	4	1	0	4	9	4	27	27	0	0	0	0	27	13	7	7	27
	25.00	20.00	5.00	0.00	20.00	45.00	20.00	19.30	100.00	0.00	0.00	0.00	0.00	19.30	27.70	16.30	14.00	19.30
Marginal (<1 ha)	9	15	12	14	12	6	13	81	0	81	0	0	0	81	28	25	28	81
	45.00	75.00	60.00	70.00	60.00	30.00	65.00	57.90	0.00	100.00	0.00	0.00	0.00	57.90	59.60	58.10	56.00	57.90
Small (1- 2 ha)	1	0	3	4	2	3	2	15	0	0	15	0	0	15	3	5	7	15
	5.00	0.00	15.00	20.00	10.00	15.00	10.00	10.70	0.00	0.00	100.00	0.00	0.00	10.70	6.40	11.60	14.00	10.70
Medium (2-4 ha)	2	1	4	2	1	1	1	12	0	0	0	12	0	12	3	5	4	12
	10.00	5.00	20.00	10.00	5.00	5.00	5.00	8.60	0.00	0.00	0.00	100.00	0.00	8.60	6.40	11.60	8.00	8.60
Large (> 4 ha)	3	0	0	0	1	1	0	5	0	0	0	0	5	5	0	1	4	5
	15.00	0.00	0.00	0.00	5.00	5.00	0.00	3.60	0.00	0.00	0.00	0.00	100.00	3.60	0.00	2.30	8.00	3.60
χ^2	37.973* (P value 0.035)								560.000 (P value 0.000)						9.411 (P value 0.309)			
Vocational diversification																		
Only AH	4	3	1	2	5	10	5	30	25	5	0	0	0	30	14	8	8	30
	20.00	15.00	5.00	10.00	25.00	50.00	25.00	21.40	92.60	6.20	0.00	0.00	0.00	21.40	29.80	18.60	16.00	21.40
Agri.+AH	11	15	17	17	14	10	15	99	1	70	13	11	4	99	32	32	35	99
	55.00	75.00	85.00	85.00	70.00	50.00	75.00	70.70	3.70	86.40	86.70	91.70	80.00	70.70	68.10	74.40	70.00	70.70
Agri.+AH + service	1	2	2	1	0	0	0	6	0	4	2	0	0	6	1	3	2	6
	5.00	10.00	10.00	5.00	0.00	0.00	0.00	4.30	0.00	4.90	13.30	0.00	0.00	4.30	2.10	7.00	4.00	4.30
Agri.+AH+ Any other	2	0	0	0	1	0	0	3	0	2	0	0	1	3	0	0	3	3
	10.00	0.00	0.00	0.00	5.00	0.00	0.00	2.10	0.00	2.50	0.00	0.00	20.00	2.10	0.00	0.00	6.00	2.10
AH+	2	0	0	0	0	0	0	2	1	0	0	1	0	2	0	0	2	2
	10.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	3.70	0.00	0.00	8.30	0.00	1.40	0.00	0.00	4.00	1.40
χ^2	41.505* (P value 0.015)								120.676** (P value 0.001)						13.760 (P value 0.120)			

Particulars	Categories according to Taluka								Categories according to land holding						Categories according to herd size				
	Vyara	Valod	Dolvan	Songadh	Uchchhal	Nizar	Kukarmunda	Total	Landless	Marginal (< 1 ha)	Small (1-2 ha)	Medium (2-4 ha)	Large (> 4 ha)	Total	2-5 animals	6-10 animals	> 10 animals	Total	
	n=20	n=20	n=20	n=20	n=20	n=20	n=20	n=140	n=27	n=81	n=15	n=12	n=5	n=140	n=47	n=43	n=50	n=140	
Herd size																			
Small (2-5 animals)	2	11	8	5	6	8	7	47	13	28	3	3	0	47	47	0	0	47	
	10.00	55.00	40.00	25.00	30.00	40.00	35.00	33.60	48.10	34.60	20.00	25.00	0.00	33.60	100.00	0.00	0.00	33.60	
Medium (6-10 animals)	4	7	6	7	4	8	7	43	7	25	5	5	1	43	0	43	0	43	
	20.00	35.00	30.00	35.00	20.00	40.00	35.00	30.70	25.90	30.90	33.30	41.70	20.00	30.70	0.00	100.00	0.00	30.70	
Large (> 10 animals)	14	2	6	8	10	4	6	50	7	28	7	4	4	50	0	0	50	50	
	70.00	10.00	30.00	40.00	50.00	20.00	30.00	35.70	25.90	34.60	46.70	33.30	80.00	35.70	0.00	0.00	100.00	35.70	
χ^2	22.762* (P value 0.030)								9.411 (P value 0.309)							280.000 (P value 0.000)			
Types of animals																			
Buffalo	7	8	5	7	12	9	9	57	17	29	6	4	1	57	31	13	13	57	
	35.00	40.00	25.00	35.00	60.00	45.00	45.00	40.70	63.00	35.80	40.00	33.30	20.00	40.70	66.00	30.20	26.00	40.70	
Buffalo+ IC	2	1	0	0	7	7	6	23	5	12	3	2	1	23	3	9	11	23	
	10.00	5.00	0.00	0.00	35.00	35.00	30.00	16.40	18.50	14.80	20.00	16.70	20.00	16.40	6.40	20.90	22.00	16.40	
Buffalo+ CC	8	11	14	12	1	3	2	51	5	34	6	6	3	54	12	20	19	51	
	40.00	55.00	70.00	60.00	5.00	15.00	10.00	36.40	18.50	42.00	40.00	50.00	60.00	38.60	25.50	46.50	38.00	36.40	
Buffalo+ IC+CC	3	0	1	1	0	1	3	9	0	6	0	0	0	6	1	1	7	9	
	15.00	0.00	5.00	5.00	0.00	5.00	15.00	6.40	0.00	7.40	0.00	0.00	0.00	4.30	2.10	2.30	14.00	6.40	
χ^2	53.162** (P value 0.001)								13.246 (P value 0.351)							25.240** (P value 0.001)			

Particulars	Categories according to Taluka								Categories according to land holding						Categories according to herd size			
	Vyara	Valod	Dolvan	Songadh	Uchchhal	Nizar	Kukarmunda	Total	Landless	Marginal (< 1 ha)	Small (1-2 ha)	Medium (2-4 ha)	Large (>4 ha)	Total	2-5 animals	6-10 animals	> 10 animals	Total
	n=20	n=20	n=20	n=20	n=20	n=20	n=20	n=140	n=27	n=81	n=15	n=12	n=5	n=140	n=47	n=43	n=50	n=100
Extension Contact																		
No Contact	3	18	17	10	14	14	14	90	18	54	10	7	1	90	39	29	22	90
KVK	15.00	90.00	85.00	50.00	70.00	70.00	70.00	64.30	66.70	66.70	66.70	58.30	20.00	64.30	83.00	67.40	44.00	64.30
AH	1	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1	1
Department	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	3.70	0.00	0.00	0.00	0.00	0.70	0.00	0.00	2.00	0.70
ATMA Project	1	0	0	1	0	0	1	3	1	2	0	0	0	3	0	2	1	3
	5.00	0.00	0.00	5.00	0.00	0.00	5.00	2.10	3.70	2.50	0.00	0.00	0.00	2.10	0.00	4.70	2.00	2.10
	0	0	0	0	2	0	0	2	1	1	0	0	0	2	0	0	2	2
	0.00	0.00	0.00	0.00	10.00	0.00	0.00	1.40	3.70	1.20	0.00	0.00	0.00	1.40	0.00	0.00	4.00	1.40
Dairy Co-Operative	11	2	2	8	4	6	4	37	5	21	5	3	3	37	5	12	20	37
NGO	55.00	10.00	10.00	40.00	20.00	30.00	20.00	26.40	18.50	25.90	33.30	25.00	60.00	26.40	10.60	27.90	40.00	26.40
	0	0	0	1	0	0	0	1	0	1	0	0	0	1	1	0	0	1
	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.70	0.00	1.20	0.00	0.00	0.00	0.70	2.10	0.00	0.00	0.70
KVK + ATMA	4	0	1	0	0	0	0	5	0	2	0	2	1	5	1	0	4	5
	20.00	0.00	5.00	0.00	0.00	0.00	0.00	3.60	0.00	2.50	0.00	16.70	20.00	3.60	2.10	0.00	8.00	3.60
ATMA + Dairy Co-op	0	0	0	0	0	0	1	1	1	0	0	0	0	1	1	0	0	1
	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.70	3.70	0.00	0.00	0.00	0.00	0.70	2.10	0.00	0.00	0.70
χ ²	77.067** (P value 0.001)								27.664 (P value 0.442)						29.964** (P value 0.008)			

Table-5 Constraints faced by the dairy farmers during Buffalo calf rearing

Sr.No.	Particulars	No. of respondent	Percentage	Rank
1	Inadequate knowledge of balanced feeding	56	40.00	6
2	High cost of starter/feed	66	47.14	5
3	Non-availability of feed / fodder	45	32.14	8
4	Unavailability of concentrate mixture	24	17.14	9
5	Non-availability of pasture land / fodder	16	11.43	11
6	Scarcity of water during summer	11	7.86	13
7	Inadequate knowledge of scientific housing	77	55.00	3
8	Lack of facilities like funds, land, construction materials etc. for construction of shed	16	11.43	12
9	High cost of medicines	1	0.71	16
10	Inadequate knowledge of vaccination schedules and control of diseases	118	84.29	1
11	Inadequate supply of medicines from veterinary hospitals/ dispensaries	8	2.14	15
12	Non-availability of veterinary services	48	34.29	7
13	Lack of awareness about development programmes	72	51.43	4
14	Lack of finance	20	14.29	10
15	Non-remunerative milk price	106	75.71	2
16	Labour problem	3	2.14	14
17	Electricity problem	1	0.71	17

These findings are contradiction to the findings of Marbaniang *et al.*, (2014), Sabapara *et al.*, (2014), Singh *et al.*, (2021) and Singh *et al.*, (2022). Low level of extension contact of the respondents might be due to their lack of awareness regarding the need and benefits of contacting various extension agencies.

Constraints in the adoption of improved calf rearing practices

There are certain factors that restricted the dairy farmers from adoption of

improved management practices. These constraints are usually area and farmer specific. Hence, an attempt was made to study the management constraints of dairy animal owners of Tapi district. For doing so dairy farmers were asked about the nature and type of constraints faced by them in the adoption of various management practices and the results are presented in [Table-5]. The first major constraint was 84.29 percent of the dairy farmers had inadequate knowledge of vaccination schedule and control of diseases.

The second major constraint was, 75.71 percent of the dairy farmers got non-remunerative price for milk. The third major constraint was, 55.00 percent of the dairy farmers had inadequate knowledge about scientific housing. The fourth major constraint was, 51.43 percent of the dairy farmers lacked awareness about development programmes. The fifth major constraint was (47.14%) high cost of starter/feed, followed by inadequate knowledge of balanced feeding (40.00%), non-availability of veterinary services (34.29%), non-availability of feed/fodder (32.14%), unavailability of concentrate mixture (17.14%), lack of finance (14.29%), non-availability of pasture land/fodder (11.43%), lack of facilities like funds, land, construction materials etc. for construction of shed (11.43%), scarcity of water during summer (7.86%), labour problem (2.14%), inadequate supply of medicines from veterinary hospitals/ dispensaries (2.14%), high cost of medicines (0.71%) and electricity problem (0.71%) were the constraints faced by the dairy farmers. These findings are contrary to the findings of Patel *et al.*, (2013), Narayan *et al.*, (2014) [22], Patel *et al.*, (2016), Chakravarthi *et al.*, (2017) [23], Singh *et al.*, (2017), Kumar *et al.*, (2017), Singodia *et al.*, (2019) [24], Adhikari *et al.*, (2020), Meena *et al.*, (2020) [25], and Bhattacharjee *et al.*, (2021) [26]. This is due to the majority of the tribal population in the district and lack of awareness due to the low level of extension programme reached to the dairy farmers.

Conclusion

Based on the findings of the present investigation following conclusions have been drawn. The findings of this study revealed that most of the respondents involved in dairying belonged to middle age group. Dairy farmers owned indigenous, crossbred cattle and buffaloes in different combinations. About two third of the dairy farmers were functionally literate. Majority of the dairy farmers were found to be from the ST category and medium-sized joint families. About half of the dairy farmers in the study area have marginal land holdings. Majority of the dairy farmers in the study area practiced agriculture and dairy as their source of livelihood and did not have any extension contact. Dairy Farmers faced some problems in the adoption of improved management practices which might be solved by providing adequate facilities either by the Department of Animal Husbandry or dairy cooperatives of the region.

Application of research: Very sporadic research has been conducted, specifically on buffalo calf management practices at the farmers' level, therefore it is imperative to ascertain the management practices of calves followed by buffalo owners under village conditions so that a need-based extension programme may be launched to make them aware, to increase their knowledge and to increase the adoption of scientific calf health management practices.

Research Category: Animal Husbandry

Abbreviations: KVK-Krishi Vigyan Kendra
ATMA-Agricultural Technology Management Agency
NGO-Non-Government Organization

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Study area / Sample Collection: Tapi District of Gujarat, India

Cultivar / Variety / Breed name: Nil

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