

A STUDY ON SOCIO-ECONOMIC CHARACTERISTICS OF DAIRY FARMERS IN TELANGANA STATE

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ABSTRACT

Dairy farming plays an important role in social and economic livelihood of the farmers of Telangana state. An investigation was carried out to study the cost of milk production in buffaloes of dairy farmers in Karimnagar, Khammam and Rangareddy districts of Telangana. The data was collected from 240 farmers spread over 24 villages in 6 mandals in the selected districts. The 240 respondents were interviewed as per the questionnaire. The statistical data revealed that 51.66 per cent of the respondents belonged to middle age group and 28.75 per cent of the respondents were educated up to secondary level (up to 10th class). Majority (42.91%) of the respondents belonged to backward caste. Most of the respondents belonged to medium sized family. Majority (62.08%) of the respondents had nuclear family. Majority (39.16) of the respondents have medium herd size of animals and 40 per cent respondents were having annual income of medium level (Rs.75,000-150,000). Most (76.66%) of the respondents had membership in at least one organization, 35 per cent were marginal farmers, 67.91 per cent respondents followed agriculture + dairying as main source of income. Majority 48.75 per cent had extension contacts with gopalamitra, paravet, VAS/AD (AH).

Keywords: Age, education, social status, family, land holding, farming system, herd size, annual income.

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INTRODUCTION

Dairying in India is closely knitted as an integral part of agriculture, playing an indispensable role in the upliftment of rural poor. Indian livestock production systems are characterized by low inputs and low yields. Landless, marginal and small farmers own about 68 per cent of livestock and contribute

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largely to the livestock economy. Apart from ensuring nutritional security to the families owning dairy animals, dairy sector also offers promising employment opportunities and economic returns on a regular basis. Dairy sector is an important source of secondary income for over 80-90 million milk producers in the country. Cattle and buffalo production systems are still largely traditional based and are giving way to the organized and commercial production systems wherein quality and profitability are given due importance. In spite of dependence on traditional dairy farming, the dairy sector in India has grown substantially over the years with an annual growth rate of above 4 per cent.

India ranks first among the world's milk producing nations since 1998 and has the largest bovine population in the world. Milk production in India during the period 1950-51 to 2019-20, has increased from 17 million tons to 198.4 million tons as compared to 187.7 million tons during 2018-19 recording a growth rate of 5.70 per cent. The per capita availability of milk in the country which was 130 grams per day during 1950-51 has increased to 406 grams per day in 2019-20. This represents sustained growth in the availability of milk and milk products for growing population (DAHD&F, GoI 2020).

Telangana, the youngest state in the country stands at 8th position in livestock population with a population of 34.18 lakhs milch animals including exotic, crossbreed and indigenous cows and buffaloes compared to 28.97 lakhs in 2014-15. Telangana state stands 13th position in milk production with 5.61 MT of milk production during 2019-20

as compared to 4.2 MT in 2014-15. A majority of the milk produced in the state is being procured by the private dairies.

MATERIALS AND METHODS

Space study

A simple random sampling technique was employed to select the districts, mandals, villages and respondents for the present study.

Study area

The study was conducted in the selected mandals of the three districts which were chosen for the study with regard to collection of information pertaining to socio-economic characteristics of dairy farmers. From each district, two mandals and from each mandal four villages were selected. The identification of mandals and villages in the respective mandals of the respective district was done with the help of local Animal Husbandry Department and TSDDCFL, based on the prevalence of dairy activities in those areas.

Selection of respondents

A list of farmers in the selected villages, with dairying as major/subsidiary source of income was taken from the local milk society/AH department personnel. While selecting respondents due care was taken to ensure that they were evenly distributed in the village. Ten dairy farmers were selected randomly from each village. The selected respondents were interviewed with the help of predesigned interview schedule and the data were collected. The data was collected from 240 farmers spread over 24 villages in 6 mandals in the selected districts.

Table 1. Geographic profile of the study area

Sl. No.	Parameters	Karimnagar	Khammam	Rangareddy
1.	Area (Km ²)	2,128	4,360	5,031
2.	Latitude and Longitude	18.43694° N 79.124167° E	17.2473° N 80.1514° E	17.3891°N 77.8367° E
3.	Average rainfall (mm)	907	972.28	806.0
4.	Average Temperature (°C)	27.7	33.6	39.4
5.	Population (as per 2011 census)	1,005,711	1,401,639	2,446,265
6.	Literacy (%)	69.16	65.95	71.95
7.	Soil type	Sandy loam and red/chelkas interspersed with black cotton soils.	Red and laterite soils	Red soils
8.	Animal Husbandry	Rearing of dairy, sheep, goat, poultry, pig		
9.	Fodder grown	APBN, CO1, CO4, Jowar, Maize	Jowar, maize, APBN, CO1	Jowar, maize, para grass, APBN, CO1
10.	Agriculture	Cotton, Maize Chilli, Groundnut, Paddy, Wheat, Sugarcane, Turmeric, pulses	Cotton, Paddy, Maize, Greengram, Mango, Sugarcane and Chillies	Paddy and ground nut, sorghum, and cotton

Data collection

The data were collected through the personal interview method. An interview schedule was prepared keeping in view the objectives of the study and it was common for all respondents. In formulating the questions and statements of the schedule, the investigator has gone through the available literature and sought the opinion and guidance of the experts in the subject concerned, field veterinarians, scientists and progressive farmers in addition to Chairman and Members of the advisory committee. Data was collected through informal and friendly visits to the farmer's homes and farms in the early and late hours of the day.

Socio-economic characteristics of dairy farmers

Age: Age was defined as the number of years completed by the respondents at the time of interview. Age of the selected respondents was ascertained with the help of direct questioning and documentary proof if available with them and was categorized into three groups.

- a. Young age (≤ 35 years)
- b. Middle age (36-50 years)
- c. Old age (Above 50 years)

Education: The actual level of education as reported by the respondents was taken as the literacy level. The respondents were classified into an illiterate, primary, secondary, intermediate and higher levels.

Category	Literacy level
Illiterate	Can't read and write
Primary level	Up to 7 th class
Secondary level	8 th -10 th class
Intermediate level	Intermediate
Higher level	Graduate and above

Social status: The social status of an individual as reported by respondent was taken into account. Four social groups were identified as ST, SC, BC and Others.

Type of family: Family type was ascertained by knowing their way of living as joint or nuclear. The information was collected and grouped as below:

- a. Joint type
- b. Nuclear type

Size of family: Family size was operationalized as the number of members in a family at the time of investigation. The information was collected and categorized as under:

- a. Small family size (1-3 members)
- b. Medium family size (4-6 members)
- c. Large family size (> 6 members)

Land holding: It refers to the number of acres of land possessed by the livestock owners at the time of investigation and were categorized as follows:

Category	Area of land (acres)
Landless	0.00 acres
Marginal farmer	Up to 2.5 acres dry or 1.25 acres wet
Small farmer	2.5 to 5.0 dry or 2.5 acres wet
Large farmer	Above 5.0 acres dry

Farming System: It is the practical involvement of the farmers in dairy farming and other activities.

- Only dairy
- Agriculture + dairy
- Dairy + labour
- Dairy +other livestock species

Herd size: In the present study, herd size has been formulated taking into account, the number of buffaloes, cross bred cows and indigenous cows owned by the farmer at the time of visit.

Annual income: Income was operationally defined as the income gained by the individual through different activities undertaken by him and was taken as reported by the farmer.

Extension contact: It refers to the frequency of contact made by the dairy farmer with the extension agencies/persons like gopalamitra, paravet, VAS/AD (AH), for securing advice on dairy farming.

Social involvement: It refers to the degree of involvement of dairy farmers with informal

organizations either as a member or as an office bearer.

- No involvement
- Membership in one organization
- Membership in more than one organization
- Holding position in organization

RESULTS AND DISCUSSION

The data recorded during the experiment was tabulated, statistically analysed, interpreted and discussed here under.

Most of the dairy farmers belonged to the middle age group and their percentages were 52.50, 52.5 and 50.0 in Karimnagar, Khammam and Rangareddy respectively. These findings are almost similar to the results given by Islam *et al.*, (2006); Prakash *et al.*, 2011; Gami *et al.*, (2013); Bashir and Kumar, 2013; Surkar *et al.*, (2014); Jadav *et al.*, (2016); Khan and Chander, (2016); Mane *et al.*, 2016; Saha *et al.*, (2010); Pathade *et al.*, (2017); Kalyani, 2018; Ashok babu, 2019; Akansha, 2019; Manish, 2020; Sandeep, 2020; and Kiran Kumar, 2021 who reported that majority of dairy farmers belonged to middle age category. This data probably might indicate that middle aged were considered to be mature for undertaking innovations by virtue of their adequate experience and enthusiasm to earn additional income from dairy management thereby to improve the livelihood status.

Majority of the farmers studied up to secondary level (up to 10th class) followed by illiterate, primary level (up to 7th class),

intermediate, and graduate & above and read & write. Their average percentages were 28.75, 23.75, 19.16, 13.75, 8.75 and 5.83 respectively. These results were in agreement with the findings of (Sandeep, 2012; Singh *et al.*, 2011 and Akanksha, 2019) who reported that majority of the farmers were literate and studied up to secondary education.

Majority of dairy farmers belonged to a backward caste followed by other caste, scheduled caste and scheduled tribe in study area. The results might be attributed to the traditional nature of livestock rearing by certain communities as an age-old family practice. These findings are almost similar to the results given by Ashok babu, (2019). This result is in conformity with the findings of (Manivannan *et al.*, (2009); Ahirwar *et al.*, (2010); Sabapara *et al.*, (2014); Khan and Chander, (2016) and Kalyani, (2018) who reported that the majority of the dairy farmers belonged to backward caste.

The data shows that 62.08 per cent of the farmers had nuclear type of families while 37.90 per cent had joint families. These results are in accordance with the report of (Mande and Thombre, 2009; Saha *et al.*, 2010; Vishwas, 2016; Chandrasekar *et.al.*, 2017; Manish, 2020 and Kiran Kumar, 2021) who also observed that majority of the farmers belonged to nuclear families.

Majority of the farmers possessed medium sized families (4-6 members) with 45, 54 and 52 percentages in Karimnagar, Khammam, and Rangareddy districts respectively. These findings are almost similar to (Desai, 2005; Saha *et al.*, (2010), Surkar *et*

al., (2014); Khan and Chander, (2016) ; Mane *et al.*, (2016); Chandrasekar *et al.*, (2017); Kalyani, 2018 and Ashok babu, (2019). The results obtained in the study might be indicative of the present trend of keeping the family sizes within the economically manageable proportions.

Majority of dairy farmers were marginal farmers category followed by large, small and landless farmers in the three districts. This finding is in agreement with the results of Chandrasekar *et al.*, (2017); Pathade *et al.*, 2017 and Ashok babu, (2019) who reported that majority of farmers were of marginal farmers category in their study area.

Majority of the farmers depended on agriculture as the main source of livelihood and also maintained livestock, especially buffaloes and cow as these enterprises are interdependent on each other. These findings were in accordance with Akila and Senthilvel, (2012); Vekariya *et al.*, (2016); Ashok babu, 2019 and Kiran Kumar, 2021.

Most of the dairy farmers (39.16%) had medium herd size (6-10 animals) whereas 33.33 per cent farmers were possessing small herd size (1-5 animals) and 27.50 per cent farmers had large herd size (>10 animals). In the entire study area, majority of the farmers-maintained buffaloes followed by cattle. This shows consumer's preference for buffalo milk. Farmers were getting a higher price for buffalo milk compared to cow milk in the study area as fat per cent in the buffalo milk was fetching more price. These findings were similar to the reports of Modi *et al.*, (2010); Nishi *et al.* (2011); Bashir and Kumar, 2013 and Kalyani, 2018 who observed that the majority of the

Table 1. Age of dairy farmers

Sl. No.	Category	Karimnagar	Khammam	Rangareddy	Total
		N=80	N=80	N=80	N=240
		(%)	(%)	(%)	(%)
1.	Young age (< 35 years)	16 (20)	13 (16.25)	22 (27.5)	51 (21.25)
2.	Middle age (35-60 years)	42 (52.5)	42 (52.5)	40 (50)	124 (51.66)
3.	Old age (>60 years)	22 (27.5)	25 (31.25)	18 (22.5)	65 (27.08)

Figures in parenthesis indicate percentage

Table 2. Educational qualification of dairy farmers

Sl. No.	Category	Karimnagar	Khammam	Rangareddy	Total
		N=80	N=80	N=80	N=240
		(%)	(%)	(%)	(%)
1.	Illiterate	16 (20)	16 (20)	25 (31.25)	57 (23.75)
2.	Can read & write	4 (5)	5 (6.25)	5 (6.25)	14 (5.83)
3.	Primary level (up to 7 th class)	11 (13.75)	25 (31.25)	10 (12.5)	46 (19.16)
4.	Secondary level (up to 10 th class)	30 (37.5)	19 (23.75)	20 (25)	69 (28.75)
5.	Intermediate level	12 (15)	6 (7.5)	15 (18.75)	33 (13.75)
6.	Graduation & above	7 (8.75)	9 (11.25)	5 (6.25)	21 (8.75)

Figures in parenthesis indicate percentage

Table 3. Social status of dairy farmers

Sl. No.	Category	Karimnagar	Khammam	Rangareddy	Total
		N=80	N=80	N=80	N=240
		(%)	(%)	(%)	(%)
1.	Open Category	41 (51.25)	15 (18.75)	36 (45)	92 (38.33)
2.	Backward Class	32 (31.06)	42 (40.77)	29 (28.15)	103 (42.91)
3.	Scheduled Caste	07 (8.75)	10 (12.5)	08 (10)	33 (13.75)
4.	Scheduled Tribe	0 (0)	5 (6.25)	7 (8.75)	12 (5)

Figures in parenthesis indicate percentage

Table 4. Type of the family of dairy farmers

Sl. No.	Category	Karimnagar	Khammam	Rangareddy	Total
		N=80	N=80	N=80	N=240
		(%)	(%)	(%)	(%)
1.	Joint family	30 (37.5)	40 (50)	21 (26.25)	91 (37.9)
2.	Nuclear family	50 (62.5)	40 (50)	59 (73.75)	149 (62.08)

Table 5. Size of the family of dairy farmers

Sl. No.	Category	Karimnagar	Khammam	Rangareddy	Total
		N=80	N=80	N=80	N=240
		(%)	(%)	(%)	(%)
1.	Small size (1-3 members)	20 (25)	12 (15)	16 (20)	48 (20)
2.	Medium size (4-6 members)	45 (56.25)	54 (67.5)	52 (65)	151 (62.91)
3.	Large size (> 6 members)	15 (18.75)	14 (17.5)	12 (15)	41 (17.08)

Table 6. Land holding of dairy farmers

Sl. No.	Category	Karimnagar	Khammam	Rangareddy	Total
		N=80	N=80	N=80	N=240
		(%)	(%)	(%)	(%)
1.	Landless	5 (6.25)	3 (3.75)	5 (6.25)	13 (5.41)
2.	Marginal (up to 2.5 acres dry or 1.25 acres wet)	36 (45)	26 (32.5)	22 (27.5)	84 (35)
3.	Small (2.5 to 5 dry or 2.5 acres wet)	25 (31.25)	29 (36.25)	17 (21.25)	71 (29.58)
4.	Large (> 5 acres)	14 (17.5)	22 (27.5)	36 (45)	72 (30)

Table 7. Farming system of dairy farmers

Sl. No.	Category	Karimnagar	Khammam	Rangareddy	Total
		N=80	N=80	N=80	N=240
		(%)	(%)	(%)	(%)
1.	Only dairy	05 (6.25)	08 (10)	30 (37.5)	43 (17.91)
2.	Agriculture + dairy	60 (75)	63 (78.75)	40 (50)	163 (67.91)
3.	Dairy + other livestock species	15 (18.75)	09 (11.25)	10 (12.5)	34 (14.16)

Table 8. Herd size of animals maintained by dairy farmers

Sl. No.	Category	Karimnagar	Khammam	Rangareddy	Total
		N=80	N=80	N=80	N=240
		(%)	(%)	(%)	(%)
1.	Small (1-5 animals)	30 (37.5)	40 (50)	10 (12.5)	80 (33.33)
2.	Medium (6-10 animals)	33 (41.25)	29 (36.25)	32 (40)	94 (39.16)
3.	Large (> 10 animals)	17 (21.25)	11 (13.75)	38 (47.5)	66 (27.5)

Table 9. Annual income of dairy farmers

Sl. No.	Category	Karimnagar	Khammam	Rangareddy	Total
		N=80	N=80	N=80	N=240
		(%)	(%)	(%)	(%)
1.	Low Income (<Rs.75000)	28 (35)	35 (43.75)	15 (18.75)	78 (32.5)
2.	Medium Income (Rs.75000-Rs.150000)	35 (43.75)	31 (38.75)	30 (37.5)	96 (40)
3.	High Income (>Rs.150000)	17 (21.25)	14 (17.5)	35 (43.75)	66 (27.5)

Table 10. Social involvement of dairy farmers

Sl. No.	Category	Karimnagar	Khammam	Rangareddy	Total
		N=80	N=80	N=80	N=240
		(%)	(%)	(%)	(%)
1.	No involvement	2 (2.5)	12 (15)	8 (10)	22 (9.16)
2.	Membership in one organization	70 (87.5)	60 (75)	54 (67.5)	184 (76.66)
3.	Membership in > 1 organization	0 (0)	0 (0)	10 (12.5)	10 (4.16)
4.	Holding position in organization	8 (10)	8 (10)	8 (10)	24 (10)

Table 11. Extension contact of dairy farmers

Sl. No.	Category	Karimnagar	Khammam	Rangareddy	Total
		N=80	N=80	N=80	N=240
		(%)	(%)	(%)	(%)
1.	Gopala Mitra	7 (8.75)	5 (6.25)	8 (10)	20 (8.33)
2.	Para vet	12 (15)	11 (13.75)	13 (16.25)	26 (10.83)
3.	VAS	25 (31.25)	28 (35)	24 (30)	77 (32.08)
4.	Gopala Mitra+ Para Vet+ VAS	46 (39.31)	46 (39.31)	35 (29.91)	117 (48.75)

respondents had medium herd size followed by small and large herd size.

Majority (40%) of the farmers had medium annual income (Rs. 75000-1,50,000) followed by low (Rs. < 75000) and high (Rs. > 1,50,000) income category farmers comprising of 32.5 per cent and 27.5 per cent, respectively. The income levels showed that the farmers were sufficiently satisfied with the income levels and were keeping the livestock to supplement the available sources and preferred more than one income source. These results were similar to the findings of Manivannan *et al.*, (2009); Mane *et al.*, (2016); Pathade *et al.*, (2017) and Kalyani, (2018) who stated that majority of dairy farmers belonged to medium annual income group category.

Majority of the respondents i.e., 87.50, 75.0 and 67.50 per cent were involved in one organization in Karimnagar, Khammam and Rangareddy, respectively. In study area, 10 per cent of dairy farmers were holding position in one organization followed by 9.16, and 4.16 percentage of dairy farmers having no involvement in any organization and having membership more than one organization respectively. The present investigation is similar to the finding of (Ashok babu, 2019) whose observations were almost similar.

Majority of respondents (48.75%) had extension contacts with more than one technical personnel like Gopala Mitra, Paravet and VAS/AD (AH), followed by respondent's contacts with then 32.08 per cent only with VAS/AD (AH), only with para veterinarians (10.83%), and 8.33 per cent with Gopala Mitras. These findings are nearly

similar to the result of (Ashok babu, 2019) whose observations were almost similar.

CONCLUSION

It is concluded that 51.66 per cent of the respondents belonged to middle age group and 28.75 per cent of the respondents were educated up to secondary level (up to 10th class). Majority (42.91%) of the respondents belonged to backward caste. Most of the respondents belonged to medium sized family. Majority (62.08%) of the respondents had nuclear family. Most (39.16) of the respondents have medium herd size of animals and 40.0 per cent respondents were having annual income of medium level (Rs.75,000-Rs.150,000). Most (76.66%) of the respondents had membership in at least one organization, 35.00 per cent were marginal farmers, 67.91 per cent respondents followed agriculture + dairying as main source of income. Majority 48.75 per cent had extension contacts with gopalamitra, paravet, VAS/AD (AH).

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REFERENCES

- Ahirwar, R.R., Ashok, S. and Qureshi, M.I. (2010). A study of managemental practices in water buffalo (*Bubalus bubalis*) in India. *Buffalo Bulletin*, **29** (1): 43 - 51.

- Akanksha. (2019). An economic analysis of production and marketing of dairy enterprise Sehore district of Madhya Pradesh. M.V.Sc (Agri) thesis Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior.
- Akila, N. and Senthilvel, K. (2012). Status of dairy farming in Karur district of Tamil Nadu. *Indian Journal Animal Research*, **46** (4): 401 - 403.
- Ashok babu. (2019). Study on housing management practices followed by dairy farmers in Northern Telangana State of India. M.V.Sc. Thesis, P.V.Narsimha Rao Telangana veterinary University Hyderabad.
- Bashir B Pand and Kumar, V.G. (2013). Milking management practices followed in selected areas of the Kottayam district of Kerala state. *Journal of Life Sciences*, **5** (1): 53 - 55.
- Chandrasekar, G.K., Satyanarayan, K., Jagadeeswary, V. and Shree, J.S. (2017). Relationship between socio-economic and psychological factors of dairy farmers with days open – A study in rural Karnataka. *International Journal of Pure and Applied Bioscience*, **5**(1): 171 - 177.
- Desai, V. (2005). An economic analysis of milk production and disposal pattern of milk in rural area of Bidar District (Karnataka). M.Sc. Thesis, NDRI (Deemed University), Karnal, Haryana.
- Gami, B.M., Gami, Y.M. and Ahlawat, A.R. (2013). Study of breeding managerial practices for Mehsana buffalo in Banaskantha district of North Gujarat. *Veterinary Science Research Journal* **4** (1): 14 - 17.
- Islam, S., Goswami, A.K., Mazumdar S Biswas and Mazumdar, D. (2006). Studies on different demographic and socio-personal characteristic of rural dairy farmers in relation to milk production. *Indian Journal of Animal Health* **45**: 17 - 20.
- Jadav, J.V., Dhandhalya, M.G. and Swaminathan, B. (2016). An economic analysis of milk production on different farm sizes in Junagadh district of Gujarat. *International Journal of Agriculture Sciences*, **8** (25): 1516 - 1518.
- Kalyani, K. (2018). Study of management practices followed by rural milk producers of Telangana state. M.V.Sc. Thesis, P.V. Narsimha Rao Telangana Veterinary University Hyderabad.
- Khan, M.A. and Chander, M. (2016). Perception of cattle and buffalo farmers towards dairy farming goals. *International Journal of Science, Environment*, **5** (5): 3271 - 3274.
- Kiran Kumar (2021). A study on economic analysis of milk production and adoption of improved animal husbandry practices by dairy farmers. M.Sc (Agri) thesis Junagadh Agricultural University.

- Mande, J.V. and Thombre, B.M. (2009). Adoption of cattle rearing practices by dairy cattle owners in Latur district. *Journal of dairying, Food and Home Science*, **9**: 15 - 00.
- Mane, D.U., Dhumal, M.V., Siddiqui, M.F., Kochewad, S.A., Meena, L.R. and Kumar, S. (2016). Knowledge of dairy farmers about improved animal management practices. *Young*, **45**: 22 - 50.
- Manish. (2020). An economic analysis on production and distribution of buffalo milk in Khandwa District of Madhya Pradesh. M.Sc (Agri) thesis submitted to Banaras Hindu University.
- Manivannan, A., Narmatha, N. and Uma, V. (2009). Adoption level of calf rearing practices. *Tamil Nadu Journal of Veterinary and Animal Sciences*, **5** (2): 77 - 79.
- Modi, R. J., Prajapati, K. B., Patel, N.B. and Chauhan, H.D. (2010). Animal housing and shelter dairy animal housing pattern in rural area of milk shed of Gujarat. *Indian Journal of Dairy Science*, **63**(1): 46.
- Nishi, A.K., Sah and Ram Kumar (2011). Dairy Farmers satisfaction with dairy co-operative societies: A case study. *Indian Research Journal of Extension Education*, **11**(1): 74 -78.
- Pathade S.S., Sawant, M N, Sadashive, S.M. Pordhiya K I and Ramesh N. (2017). Study of Socio-economic and psychological characteristics of self-help group members. *Indian Research Journal of Extension Education*, 97 - 100.
- Prakash Kumar Rathod, Nikam, T.R., Sariput Landge, Vajreshwari, S. and Amit Hatey. (2011). Participation of rural women in dairy farming in Karnataka Participation Of Rural Women In Dairy Farming in Karnataka. *Indian Research Journal of Extension Education* **11**: 31-36.
- Sabapara, G.P., Fulsoundar, A.B. and Kharadi, V.B. (2014). Knowledge of dairy animal owners in improved dairy husbandry practices in Surat district of south Gujarat.
- Saha, D., Akand, A. H. and Hai, A. (2010). Livestock farmers knowledge about rearing practices in Ganderbal district of Jammu and Kashmir. *Age*, **48**: 10 - 85.
- Sandeep. P. (2012). Economics of milk production and utilization pattern in Malwa Plateau of Madhya Pradesh. M.V.Sc thesis submitted to the National Dairy Research Institute, Karnal.
- Sandeep (2020). An economic analysis of costs and returns of buffalo milk production in Gwalior District of Madhya Pradesh. M.Sc, Thesis, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior.

- Singh, G., Paul, S.S., Patil, N.V. and Das, K.S. (2011). A survey on dairy husbandry practices in Patiala district of Punjab. *Indian Journal of Animal Production and Management*, **27**: 105 - 109.
- Surkar, S.H., Sawarkar, S., Kolhe, R. P. and Basunathe, V.K. (2014). Constraints perceived by dairy farmers in quality milk production. *Agricultural Rural Development Journal*, Homepage: www.jakraya.com/journal/ard Pages, **5**: 7.
- Vekariya, S.J., Rajesh Kumar, Savsani, H.H., Kotadiya, C.R., Chaudhari, G.M. and Chatrabhuji B.B. (2016). Socio-economic profile of maldhari dairy farmers of South Saurashtra region. *Current Agriculture Research Journal*, **4** (2), 186 - 190.
- Vishwas, (2016). Production and marketing of indigenous cow and buffalo milk in Dharwad district of Karnataka – an economic analysis. M.Sc (Agri) thesis submitted to University of Agricultural Sciences, Dharwad.