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DEMOGRAPHIC AND SOCIO-ECONOMIC ATTRIBUTES OF DAIRY FARMERS IN IDUKKI DISTRICT OF KERALA

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ABSTRACT

The socio-economic characteristics of dairy farmers shape production practices, technology adoption, and the sustainability of dairy systems. This study profiles 150 farm households in Idukki, Kerala (small = 60; medium = 60; large = 30) selected by stratified random sampling, featuring information on age, gender, family composition, education, landholding, experience, and family labour participation. Descriptive statistics and chi-square tests assessed patterns and associations. Most respondents were 40–60 years (56.67%), followed by >60 years (30.00%) and <40 years (13.33%); farm size and age were significantly associated ($\chi^2 = 20.50$, $p < 0.001$), with younger farmers concentrated in large farms. Men comprised 78.67% of respondents; nearly all households were married, and family labour was pivotal. Education clustered at secondary level, and landholdings were fragmented, with a majority at ≤1 acre among small/medium farms. Findings underscore a dual structure: resource-constrained smallholders versus younger, better-educated operators at larger scale—implying targeted interventions in fodder access and skills to sustain high-altitude dairying.

Keywords: dairy production; socioeconomics; smallholders; education; landholding; family labour; Idukki

INTRODUCTION

Dairy farming forms an integral part of the rural economy in Kerala, providing nutritional security, supplementary income, and livelihood opportunities to small and marginal farmers. Within Kerala, Idukki district stands out as a highland region where dairy farming has become a crucial

livelihood strategy owing to limited scope for crop-based agriculture, fragmented landholdings, and favourable climatic conditions for crossbred cattle rearing. The socio-economic and demographic characteristics of dairy farmers play a decisive role in shaping their production practices, resource use, and overall efficiency.

Previous studies have highlighted the importance of farmer attributes such as age, education, landholding, and farming experience in influencing technology adoption, investment behaviour, and herd management efficiency (Kaur et al., 2012; Kumar et al., 2014). In Kerala, George (2016) and Sasidharan et al. (2023) reported that socio-economic variables significantly affected housing and feeding management, as well as adoption of scientific practices. Similarly, Farhana et al. (2024) noted that demographic variations, including age distribution and education levels, influenced dairy farming decisions in island ecosystems such as Lakshadweep.

Despite a growing body of research across India, comprehensive documentation of the socio-economic and demographic profile of dairy farmers in highland Kerala remains limited. Understanding these parameters is particularly relevant in Idukki, where dairy farming has emerged as a stabilising force amidst declining plantation and spice-based incomes. Profiling farmers by age, gender, education, landholding, family structure, and experience can provide insights into the opportunities and constraints faced in sustaining dairying as a viable livelihood.

The present study, therefore, was undertaken to examine the socio-economic and demographic characteristics of dairy farmers in Idukki district. By systematically analysing these parameters across farm size categories, the study focussed on identifying patterns that influence farm management and resource allocation, thereby contributing to a more nuanced understanding of the human dimensions of dairy farming in the highland district of Kerala.

MATERIALS AND METHODS

The study was conducted in Idukki district of Kerala, a high-altitude region (750-2695 m above mean sea level) characterised by fragmented landholdings and mixed farming systems where dairying plays a vital role in household livelihoods. A stratified random sampling approach was adopted to ensure representation across different farm sizes. The sample comprised 150 dairy farmers selected from all five taluks of the district. From each taluk, two milk societies were chosen, and from each society, two large, four medium, and four

small farms were randomly selected based on herd size.

Primary data were collected using a pre-tested and structured interview schedule administered directly to the farmers. The schedule captured detailed information on demographic characteristics (age, gender, family size, and family composition) and socio-economic parameters (education level, landholding size, primary occupation, experience in dairying, and income sources). Care was taken to include respondents from all five taluks of Idukki to capture geographic variation.

The data collected were subjected to both descriptive and inferential statistical analyses. Frequencies and percentages were computed to present the distribution of socio-economic and demographic variables across farm categories. The Chi-square test was employed to examine the association between categorical variables such as farm size and age class, education, and landholding. Analysis of Variance (ANOVA) was applied where appropriate to test for statistical significance across continuous variables like experience in dairying and family size. All statistical analyses were carried out using SPSS software (Version 24, IBM Corp., USA).

RESULTS AND DISCUSSION

The demographic and socio-economic attributes of dairy farming households in Idukki district are presented in Table 1.

Farmers were predominantly middle-aged (40–60 years; 56.67%), followed by older (>60 years; 30.00%) and younger (<40 years; 13.33%) groups. A significant association was observed between farm size and age (χ^2=20.50, $p<0.001$), with younger farmers more visible in large farms (36.67%) compared to small and medium farms dominated by older operators. This suggested a generational shift toward commercial dairying among younger households, echoing findings from Gujarat and Jammu and Kashmir where youth entry was linked to better access to credit and technology (Hamadani et al., 2023; Patel et al., 2025). Conversely, older farmers' concentration in smallholdings reflected capital and succession constraints, consistent with the findings Sasidharan et al. (2023).

The respondent base was male-dominated (78.67%), rising with scale (71.67% in small to 90.00% in large), while nearly all respondents were married (98.67%). Similar male predominance was reported in Kerala (George, 2016) and Sri Lanka (Wijethilaka, 2018). Yet, women's presence was higher in small farms, reflecting integration of dairy work with household routines (Savale et al., 2017).

These figures understated women's labour contributions in dairying, which are often informal and unpaid.

Education levels were modest overall, with 59.33% having secondary-level schooling, 34.67% low education (illiterate/primary), and only 6.00% higher education. Education status varied significantly across farm sizes (χ^2=23.75, p=0.006): medium farms showed a larger share of low education (48.33%), while large farms displayed more in the secondary and senior-secondary brackets (73.33% and 13.33%, respectively). Education is positively associated with cooperative participation and adoption of improved practices (Kaur et al., 2019), and the skew toward better schooling in larger farms suggested that human capital complements physical capital in enabling scale-up. The limited presence of graduates aligns with barriers to higher education in farming communities (Mohanty et al., 2023).

A majority (78.00%) reported 5–30 years of dairying experience, with no significant variation across farm sizes. However, large farms had more relatively new entrants (<10 years), suggesting younger entrepreneurs leveraging subsidies and cooperative networks (Patil et al., 2022). In contrast, small farms showed more long-serving farmers (>30 years), reflecting dairying's embedded livelihood role but also succession challenges, consistent with George (2016).

Nuclear families predominated (96.67%), with an average size of 4.09 persons. Engagement of family labour differed significantly (p<0.001), ranging from 1.18 members in small farms to 1.57 and 1.47 members in medium and large farms, respectively. Larger herds require greater task division—milking, feeding, and health care—hence drawing more family members into operations, consistent with earlier observations in Kerala and Karnataka (Kumar et al., 2014).

Land access showed a significant association with farm size (χ^2=24.45, p=0.002). Most small (71.67%) and medium farms (60.00%) owned ≤1 acre, whereas large farms more often held larger parcels (>1 acre, including 13.33% above 5 acres). These disparities echo statewide reports where fodder scarcity and land limitations constrain smallholders (Government of Kerala, 2014; Sasidharan et al., 2023). Larger holdings allow fodder cultivation, improved shed design, and manure handling—critical for scaling herds sustainably.

Overall, socio-demographic patterns highlighted a dualistic structure, where small farms are run by older, less-educated farmers with limited land and family labour, reinforcing subsistence-level dairying. The Medium and large farms attracted younger

and better-educated operators, benefit from larger land parcels, and mobilize more family labour, positioning them for commercial expansion.

These findings align with wider South Asian evidence that scale, education, and generational renewal are critical drivers of dairy intensification (George, 2016; Hamadani et al., 2023; Patel et al., 2025). Policy interventions should thus focus on land-linked fodder support for smallholders, vocational training to bridge education gaps, and recognition of women's roles to strengthen sustainability and equity in high-altitude dairying.

In conclusion, the socio-demographic profile of dairy farmers in Idukki highlighted the contrast between resource-constrained smallholders and younger, better-educated operators managing larger herds. These disparities call for targeted interventions—such as fodder security measures for small farms and skill development for emerging commercial units—to ensure inclusive and sustainable dairy development. Strengthening land-

Table 1. Demographic and socio-economic attributes of dairy farmers across farm size categories in Idukki district

Parameter	Category	Small Farms (%) (n=60)	Medium Farms (%) (n=60)	Large Farms (%) (n=30)	Overall (%) (n=150)	Significance
Age of respondent	<40 years	5.0	10.0	36.7	13.3	χ^2 = 20.50 p<0.001
	40–60 years	51.7	65.0	50	56.7	
	>60 years	43.3	25.0	13.3	30.0	
Gender	Male	71.7	80.0	90.0	78.7	ns
	Female	28.3	20.0	10.0	21.3	
Marital status	Married	100	98.3	96.7	98.7	ns
Education	Illiterate and Primary	31.67	48.33	13.33	34.67	□2 =23.75, p=0.006
	Secondary	63.33	48.33	73.33	59.33	
	Senior secondary & above	5.0	3.33	13.33	6.0	
Experience in Dairying	<5 years	8.33	5.0	6.67	6.67	ns
	5–30 years	70	85	80	78	
	>30 years	21.67	10	13.33	15.33	
Landholding	1 acre or below	71.66667	60	36.66667	60	χ^2 = 24.45 p<0.002**
	1 acre above upto 5 acres	28.33	35	50	35.33	
	>5 acres	0	5	13.33	4.67	
Number of family members involved in farm activity (Expressed as numbers)		1.18±0.05[b]	1.57±0.07[a]	1.47±0.13[a]	1.39±0.04	p<0.001

Values with different superscripts differed significantly, ns-non significant

linked fodder initiatives, vocational training, and gender-sensitive extension services will be crucial to bridging these structural gaps and promoting balanced growth in the dairy sector of Idukki district of Kerala.

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