

ANALYZING THE ENTREPRENEURIAL BEHAVIOUR AND THE PERCEPTION OF FARMERS IN THE KOLLAM DISTRICT OF KERALA IN APPLYING DAIRY FARM MANAGEMENT

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ABSTRACT

Commercial dairy farming has a fine prospect for employment throughout the year being a source of liquidity. Due to the increase in milk demand, dairy farming is represented as one of the most important occupations and is also considered an entrepreneurial activity based on the commercial basis. By considering this fact, the present study was conducted in the Kollam district of Kerala to study the perception of dairy farmers in adopting management practices and the effects of socio-economic factors on these practices. Additionally, the relationship of these factors with the Entrepreneurial behavior of the dairy farmers is presented. A total of 150 respondents were selected in the Kollam district of Kerala. For this paper, the proposed hypotheses have been exploited to create a structured questionnaire. Moreover, the analysis is performed by utilizing the Statistical Package for the Social Sciences (SPSS) for the attained data. The results revealed that the socio-economic factors significantly influence the management practices, and entrepreneurial behavior of dairy farmers depending on their innovativeness, and information seeking behavior on the dairy farm. Also, the study reveals that the majority of dairy farmers had innovativeness and information-seeking behavior with index values of 68.88 and 66.845, respectively. Finally, the analysis concludes that dairy farmers disagree with few scientific management practices and also, possess a medium level of entrepreneurship behavior.

Keywords: Entrepreneurship, Dairy Farm, Kerala Management Practices, Socio-Economic Factors.

Abbreviation	Acronym
SCC	Somatic Cell Count
BMPs	Beneficial Management Practices
NY	New York
WI	Wisconsin
OGF	Organic, grass-fed
ECR	Energy Conversion Ratio
DTM	Dairy Tourism Model
HeECR	Human-Edible Gross Energy Conversion Ratio
SS	Sum of Squares
EBI	Entrepreneurial Behavior Index
NDRI	National Dairy Research Institute

INTRODUCTION

Globally, in order to extend the entrepreneurial base, entrepreneurship has been believed as an effective tool for those who have poverty-stricken financial resources or managerial backgrounds. Generally, the exact meaning of entrepreneurship is that one, who starts, manages, organizes the activities, and controls the business affairs unit by combining the production factors to supply the goods and services. An entrepreneur's origination is based upon intimately intertwined social, religious, cultural, psychological, and economic factors in communities (Amarnath & Samvel, 2008). For the rural economy, dairy farming is considered a crucial factor that has a high probability to make employment and income by increasing the yield of milch animals. For entrepreneurship progress in India, the production of milch animals is considered the hopeful sector. India is mainly an agrarian society wherein animal husbandry plays a significant role in an agricultural economy. In the socio-economic development of India, animal Husbandry acts as a backbone. The livestock distribution is highly reasonable compared to that of land. Livestock farming needs minimum capital and when compared with agriculture, the management and production expenses are minimum for livestock farming. Therefore, animal husbandry is performed by all farmers despite their economic status and the livestock sector development would be more comprehensive. Generally, dairy farming is a significant section of the worldwide food system, introducing nutritional, economic, and social advantages to a huge percentage of the global population (Belay *et al.*, 2012).

Agriculture can perform only during a specific period of the season, whereas dairy presents a steady income and off-season work and makes the rural population employed all over the year. With a higher livestock population (512.05 million), India is blessed with extra-large livestock diversity that encompasses approximately 57 % of the world's buffalo and 16% world's cattle population all over the world. Nevertheless, still the country faces a production failure due to the rise in demand from the rising population other than lower Indian cattle productivity (Berton *et al.*, 2020). As per the report of 2015, the population of milch animals is 676 thousand in Kerala. Also, in Kerala, the per capita milk availability reduces from 234 g/day in the year 2001-2002 to 203 g/day. In the year 2014-2015, milk production reduced from 2718 tonnes to 2711 tonnes while comparing with the year 2001 to 2022 as per Report, 2015. This might be because of the non-flexibility of scientific dairying practices. In Kerala; the dairy sector faces several constraints, such as high cost of inputs, low level of fodder development, and non-availability of grazing lands. Despite these negative aspects, it had established at least one institution to offer veterinary assistance in all panchayats in the state. Official figures released by the government indicate that the milk production of the state is soaring despite the reduction in the cattle population. In peri-urban areas, to make the dairy business highly advantageous primarily, the dairy farmers should have adequate knowledge and adopt enhanced dairy farming technologies (Chandrasekar *et al.*, 2017).

Hence, several efforts are in progress to produce and distribute enhanced livestock practices or technologies to advance the productivity of livestock. Socioeconomic factors affect improved dairy management practices and decision-making processes. Thus, these factors will affect dairy production and management as well as to a certain extent acceptance level of the farmers. Without a good understanding of these factors, it would be very difficult to be involved in the dairying business (Prinrcjot *et al.*, 2015). In general, it is important to take into consideration socio-economic factors that influence the improvement of mean, standard deviation, percentiles, frequencies, and smallholder dairy production. In the light of the above background, there is a need to understand the fundamentals of the present production parameters on dairy improvement in the study area for the development of appropriate and low-cost

technologies which is compatible with the socio-economic characteristics of the farmers and utilized to the advantage of the farmers to improve dairy production.

The main contribution of this paper is as follows:

1. This study was performed in the Kollam district of Kerala state to know the views of farmers in practicing dairy management based on their socio-economic characteristics and their relationship with entrepreneurial behavior.
2. The present study included 150 respondents to evaluate their perception of dairy management practices and socio-economic characteristics.
3. The data collection is performed by presenting the questionnaire to the dairy farmers of the Kollam district in Kerala. Moreover, the statistical analysis is performed with the aid of the SPSS software.

The paper is arranged as follows: section 2 describes the literature review associated the dairy farm and entrepreneurial behavior. Section 3 describes a framework for the proposed hypothesis and section 4 demonstrates the result and discussion using the SPSS. At last, section 5 summarizes the conclusion of the study (George *et al.*, 2018).

RELATED WORKS

In this heading, various works on dairy farm management practices and the entrepreneurial behavior of the farmers were discussed.

Lai *et al.*, (2018) examined how dairy managers categorize the management areas in their operations for further growth. From seven dairy farm management areas, a questionnaire was carried out, including the areas, such as milking production, calf, financial planning, crop, risk, marketing of milk, and labour management. From the analysis, it was determined that well-built farms already placed higher prominence on employees and labour management showed that they prioritized financial management for their achievement, while small farms lacked management on areas outside of milking and production management. Sandrucci *et al.*, (2019) surveyed 173 dairy goat farms in Northern Italy. It was performed to present a modernized view of practices in farm management. Additionally, the relationships between the herd traits, management factors, and milk production and excellence with a specific concentration on milk SCC and milk protein or fat deterioration condition were analyzed. Regarding the deterioration condition of milk protein and fat, the authors found that there was a requirement to better understand the phenomenon genesis and its alleviation schemes. Additionally, the factors other than feeding deserve large awareness, particularly the high SCC influence. The influence of farm-specific BMPs on a set of complete environmental impacts was characterized by Kim *et al.*, (2019) and quantified for two representative dairy farms in the Great Lakes region (“*a large 1500-cow farm in NY and a smaller 150-cow farm in WP*”). Even though this study recognized the adaptation of sustainable dairy production practices on individual impact profiles advantageous, trade-offs between different impacts made the analysis highly complicated while considering the environmental impacts. A comparative study was conducted by Roy and Meena (2020) to evaluate the conventional diverse dairy farm management practices followed by the dairy farmers. This survey was conducted in the Karnal district of Haryana. For this analysis, the management practices concerning the daily activities, calf management, milk management, and feed and fodder management, were taken.

Fodor *et al.*, (2018) examined the relationship between reproductive performance and management practices in Holstein cows on huge commercial dairy farms. In Hungary, the survey on cow management practices was conducted between May 2015 and November 2015 in 34

huge Holstein-Friesian dairy herds. Here, the relationship among reproductive performance and management practices was analyzed by mixed-effects techniques. Snider *et al.*, (2021) conducted a study with the objectives of assessing information concerning present producer knowledge and production practices as well as recognizing agronomic and social factors, which might influence the production of milk on OGF dairy farms in the United States. The outcomes of this study exhibited a requirement to model production and financial benchmarks which assists OGF dairy producers in enhancing the management practices such that the economic supportability is improved. Berton M *et al.*, (2020) evaluated the effect of diverse Alpine farming systems on production efficiency (gross ECR), environmental footprint, and competition amid feed and food (potentially HeECR). The outcomes obtained were exploited to aid schemes and policies, which aim at the endorsement of effectual incorporation among mountain areas and dairy farming systems. Minhaj *et al.*, (2019) studied constraints perceived by the farmers in the Doda district of Jammu and Kashmir. Here, implementation of enhanced animal husbandry practices was performed. By employing a simple lottery technique, four blocks were randomly chosen. The productivity was enhanced by the adoption of animal husbandry practices. Additionally, they presented the systemic model to generate empirical data on several socio-economic factors and constraints related to the adoption of scientific animal husbandry approaches.

Vanessa and Leo-Paul (2017) conducted a case study by utilizing in-depth semi-structured interviews. It was performed to look into the entrepreneurial schemes that were sustainable to family farms. In the dairy farms in Australia, the west Victorian area, the study was conducted and the findings recommended that family farms can raise their regional determination and international standing by concentrating on their social, collaborative, and sustainable entrepreneurial schemes. The study of the constraints faced by farmers in dairy adoption as entrepreneurship. In this study, 45 commercial dairy farmers of Punjab were selected through a stratified random sampling technique and interviewed with a pre-tested questionnaire. The study revealed that all the farmers entered into a profession after getting training in dairy farming. Carolien *et al.*, (2018) exposed that the dairy farmers in the developing countries still were production oriented. They mostly focused on expanding dairy production. The farmers, who had high proficiency levels, had high positive regarding their future, were highly inclined to change, and were highly content with their income of family and farm outcome. It shows that investing entrepreneurial competencies might assist farmers to cope with the challenges they were facing and keep their farms feasible.

Kuppusamy *et al.*, (2021) studied the aim of women-led entrepreneurship in dairying. This study was performed by utilizing a structured interview schedule. Also, this study consist of 162 respondents, working as field addition functionaries and agro-based entrepreneurs across the country and academicians. Mahesh *et al.*, (2019) conducted a study to recognize the scope for modelling the DTM. In 2016-2017, the study was performed in ICAR-NDRI, Karnal milking parlour premises. Here, the respondents were the milking parlour visitors. From 100 visitors, the data was gathered and the result of the study was perturbed, where the majority of the respondents state that dairy tourism was not completely evolved conception as other niche tourism. The perception of visitors regarding dairy tourism was different (GOI, 2018; Maurice *et al.*, 2017).

ANALYZING THE PERCIPIENCE OF DAIRY FARMERS IN MANAGEMENT PRACTICES AND THEIR ENTREPRENEURIAL BEHAVIOR IN RELATION TO SOCIO-ECONOMIC FACTORS

Research Problem

Dairy farming presents a source of daily income with a comparatively minimum level of risk. In India, numerous dairy farmers grow animals on a small scale in the usual manner. If the farmers scientifically run their businesses, then their productivity will be enhanced. Additionally, dairy farming can be considered an entrepreneurial activity on a commercial basis as the most important occupation in the urban regions, in which the milk demand is higher. In dairy farming, most farmers are not aware of the recent techniques. Therefore, rather than make a profit few farmers will lose their investment. In dairy farming, to assure utmost profits and production, the farmers should use appropriate business plans and superior dairy management practices. From the opinion of the dairy experts, one of the main issues faced by dairy farmers is animal welfare and hygiene and the next one is raw milk marketing and dairy products. Hence, this states a major gap between the private organizations and dairy farmers prioritizing smallholder farmers' issues. The dairy owners mostly face constraints in the adoption of reproduction practices, health care, and diseases management practices, financial and economic requirements, and difficulties in milking, marketing, storage, and distribution in the area. This paper considers the hypothesis that socio-economic characteristics influence dairy farm management.

Research Questions

The main aim of this paper is to exhibit the farmer's views on dairy farm management practices and the influence of the socio-economic factors on the entrepreneurship development of the dairy farmers of Kollam district, the state of Kerala, India. Therefore, the key objective of the study is to identify the insight views of farmers toward the farm management practices; salient impacts of socio-economic factors on entrepreneurship development in the study area and to establish the productive prospects of a progressive dairy farm in the study area.

1. What are the management practices followed by the farmers in the dairy farm to yield maximum production?
2. Do socio-economic factors play a vital role in dairy farm management?
3. Can scientific management practices help dairy farmers to manage the farm efficiently?
4. How to assess the level of entrepreneurship of dairy farmers?

RESEARCH HYPOTHESES

H₁: *The major constraint faced by dairy farmers depends on socio-economic factors, like the higher cost of cattle feed and veterinary services.*

The lack of finance for management practices, higher cost of raw material for dairy animal sheds and insufficient housing, and lack of appropriate knowledge of milk production economics are some of the socio-economic factors and the important constraints selected to propose this hypothesis.

H₂: *To make more efficient and sustainable milk production on a dairy farm, an assessment of the socio-economic characteristics of farmers is necessary.*

The socio-economic characteristics of farmers affect the management practices, like the usage of milking machines, labour charges, etc, in milking production. Hence, this hypothesis intends to analyze the impact of socio-economic factors on sustainable milk production.

H₃: *Socio-economic factors, such as income, and education contribute to health and feed management practices in dairy farms.*

Hygiene, waste management, organic farming, and animal vaccination are a few significant practices to be followed in health management. However, these factors depend on the socio-economic characteristics of farmers based on their income, availability of grasslands, etc. Hence, the hypothesis explains the importance of these characteristics in health and feed management practices.

H₄: *Socio-economic characteristics had a significant relationship with the extent of adoption of scientific dairy farming practices.*

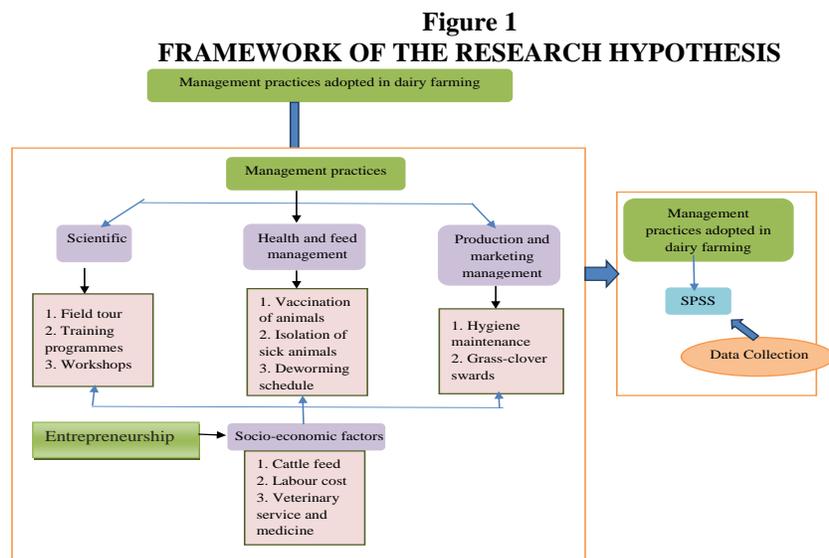
Adopting scientific management practices on the dairy farm is essential to determine the extent to which the information gained from the training programs has been applied on the farm. Thus, this hypothesis is proposed to analyze how the socio-economic characteristics of dairy farmers affect scientific dairy farming practices.

H₅: *Entrepreneurial behaviour is inclined by socio-economic traits, like land holdings and income, of dairy farmers.*

Landholding and annual income of dairy farmers had a positive and noteworthy relationship with their entrepreneurial behaviour. The reason to propose this hypothesis is that respondents with higher holdings would have more opportunities and possibility to attempt and adopt several management practices; thus, depending on their socioeconomic characteristics.

FRAMEWORK OF HYPOTHESIS

Figure 1 demonstrates the perception of farmers in management practices, such as scientific, health, and feed management, production, and marketing management practices, used in dairy farming and the relationship of socio-economic factors in Entrepreneurship behavior (Planning Commission, 2012).



Variable Definition

Dependent variables: This is something that depends on certain factors. In our research work, production and marketing practices, health and feed management practices, and scientific management practices are considered dependent variables (Gunaseelan *et al.*, 2017).

Independent variables: The socio-economic factor is considered the independent variable in this study.

RESEARCH METHOD

The research technique helps to formulate the objectives and findings and, the presentation of the results from the data collected throughout the study time. The main aim of the research approach is to direct the researcher in each phase to attain the study principles objective. Generally, the phases included in the study consist of a review of the literature, the formation of the research question, developing the hypotheses, and techniques to collect the data, and data analysis. Thus, the primary data collection is performed and the study exploited first-hand information to identify the research issues and the topics. To better comprehend the dairy farm management practices and socioeconomic with entrepreneurship, this study blends a descriptive and qualitative as well as quantitative methodology. The descriptive technique is a kind of research approach that looks into the characteristics of people and things. This technique is employed in the data collection stage to recognize and predict the correlations between and within the variables. By employing quantitative and qualitative analysis techniques, thoughts, concepts, views, and beliefs of the study object are linked. The main aim of this program is to develop improved dairy animal husbandry skills and also to gain an enhanced knowledge of managing a commercial dairy farm based on different management practices and entrepreneurship activities.

DATA COLLECTION

This work has undergone a primary source of data collection. A structured questionnaire was employed as an instrument of data collection. The required sample was collected by distributing the structured questionnaire to 150 dairy farmers in the Kollam district of Kerala. Also, the variables used for testing the proposed hypothesis were collected using a questionnaire. Each question was kept mandatory. The analysis of the collected data was carried out using SPSS to reveal descriptive statistics, such as mean values, frequencies and percentages, and descriptive statistics (Lazar, 2014).

Population of the Study

In descriptive studies, it is a general practice to initially recognize a research population before the direct observation of a sample obtained from it. The population should be described in a manner such that those who are to be involved and excluded are defined clearly. The study has been carried out in the Kollam district of Kerala in India. The required information has been obtained to study the dairy farmer's perception of adopting management practices and the effects of socio-economic factors on these practices. Also, 150 respondents responded to the provided questionnaire.

ANALYSIS AND DISCUSSION

This study is based on the research questions and hypotheses to examine the management practices adopted in the dairy farms in Kollam district, Kerala. Five hypotheses were developed to validate the results. The proposed hypothesis uses SPSS for the analysis of the performance. The questionnaire part comprises four sections: a) production and marketing practices b) Health and feed management practices c) Scientific management practices and d) Socio-economic factors.

Percentage Analysis

Evaluation of production and marketing management practices: Table 1 describes the percentage assessment of production and marketing management practices. Here, 84.7% of respondents strongly agree that the purchasing of animals from reliable sources with a veterinary doctor's consultation is valid. Then, 98.6% of respondents agree to ensure milk collection and transportation without undue delay (Jaiswal *et al.*, 2018). Also, 99.33% of respondents agree that exploiting a milking machine on a dairy farm is highly effective. While 40.7% of respondents agree that cows spending more time a day on grazing enhances the yield, 59.33% strongly agree with the point. Conducting milk quality tests to assure safety is strongly agreed by 69.33% of respondents. When most of the production and marketing practices are agreed upon by the respondents, a moderate state is found in a case: 61.33% of respondents agree, 25.33% of respondents either agree or disagree and 13.33% of respondents strongly agree with maintaining a person (or group of people) in charge of quality management on the dairy farm.

Questions	Comments	Agree	Disagree	Moderate	Strongly agree	Strongly disagree
Q1	Purchasing animals from reliable sources with veterinary doctors' consultation is valid	15.3	-	-	84.7	-
Q2	Ensure milk collection and transportation without undue delay	98.6	-	-	1.33	-
Q3	Using a milking machine on the dairy farm is more effective	99.33	-	-	0.666	-
Q4	Cows spending more time a day on grazing improves the yield	40.7	-	-	59.33	-
Q5	Conducting milk quality tests assures safety	30	-	-	69.33	-
Q6	Maintaining a person (or group of people) in charge of quality management on the dairy farm is recommended	61.33	-	25.33	13.33	-

Evaluation of Health and Feed Management Practices

The percentage assessment of health and feed management practices is summarized in Table 2. It is found that 59.33% of respondents disagree that organic farming improves milk production, and 40.66% of respondents strongly disagree with the statement. 58.66 % of respondents agree that cleaning the animals with a good quality of water helps to maintain

hygiene, and 40.66% of respondents strongly agree with the statement. The statement “*clean and properly disinfect all materials and premises to avoid the risk of sick*” is agreed by 60.666% of respondents and strongly agreed by 39.33% of respondents. 67.33% of respondents agree and 32.66% of respondents strongly agree that following a suitable waste management plan keeps the environment neat. The statement “*Keeping and maintaining herd health and reproduction records*” is disagreed by 40% of respondents, and strongly disagreed by 38% of respondents. Meanwhile, 22% of respondents either agree or disagree with the statement. 76% of respondents agree and 24% of respondents strongly agree that the vaccination of animals is a must (Raina *et al.*, 2016).

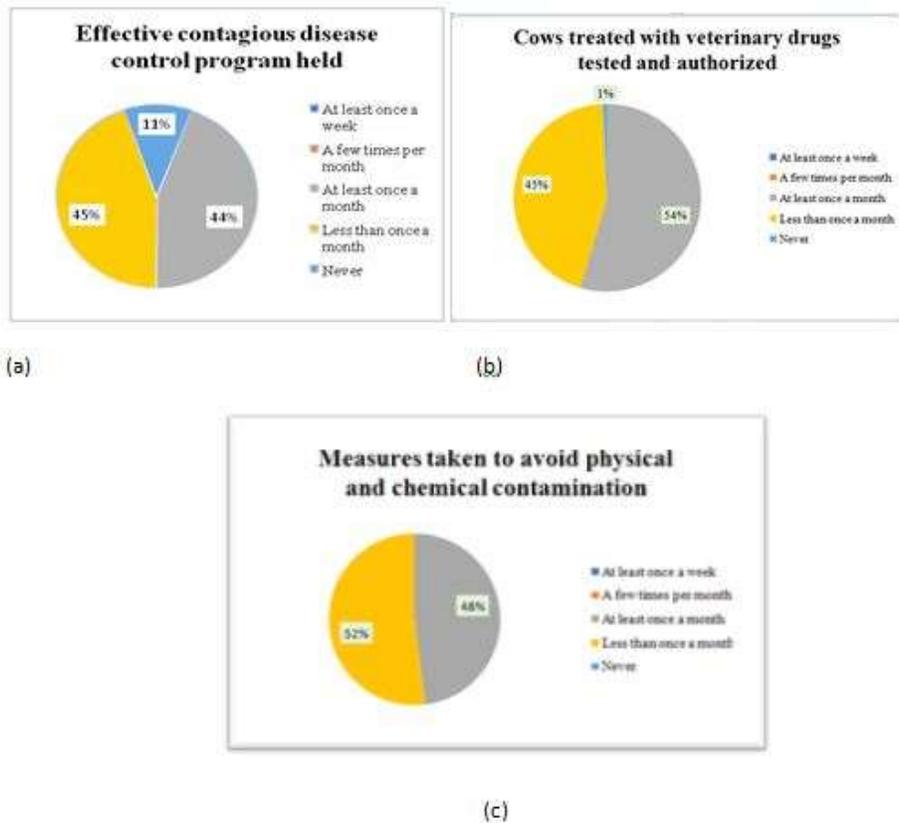
Questions	Comments	Agree	Disagree	Moderate	Strongly agree	Strongly disagree
Q1	Organic farming improves the milk production	-	59.33	-	-	40.66
Q2	Cleaning the animals with a good quality of water helps to maintain hygiene	58.66	-	-	40.66	-
Q3	Clean and properly disinfect all materials and premises to avoid the risk of sick	60.666	-	-	39.33	-
Q4	Following a suitable waste management plan keeps the environment neat	67.33	-	-	32.66	-
Q5	Keep and maintain herd health and reproduction records	-	40	22	-	38
Q6	Vaccination of animals is a must	76	-	-	74	-

Evaluation of Scientific Management Practices

This section has been divided into two sets of practices I and II, as one of them is on the option given based on the frequency, while the other is based on the farmer’s opinion.

Scientific Management Practices I: Figure 2 demonstrates the percentage analysis of scientific management practices I. For the question “*is there an effective contagious disease control program held*”, 44% of respondents state that it’s held at least once a month, 45% of respondent’s state less than once a month, and 11% of respondents never. When asked whether training was conducted for personal hygiene, 100% of respondents answered never. For the question, “*are the cows treated with veterinary drugs tested and authorized*”, 45% of respondents state at least once a month, 54% of respondents stated less than once a month, whereas 1% of respondents state Never (Sharma *et al.*, 2016). While asking the question “*Are all the workers trained?*” 100% of respondents answered never. For the statement, “*are Measures taken to avoid physical and chemical contamination*”, 52% of respondents stated at least once a month, and 48% of respondents state less than once a month.

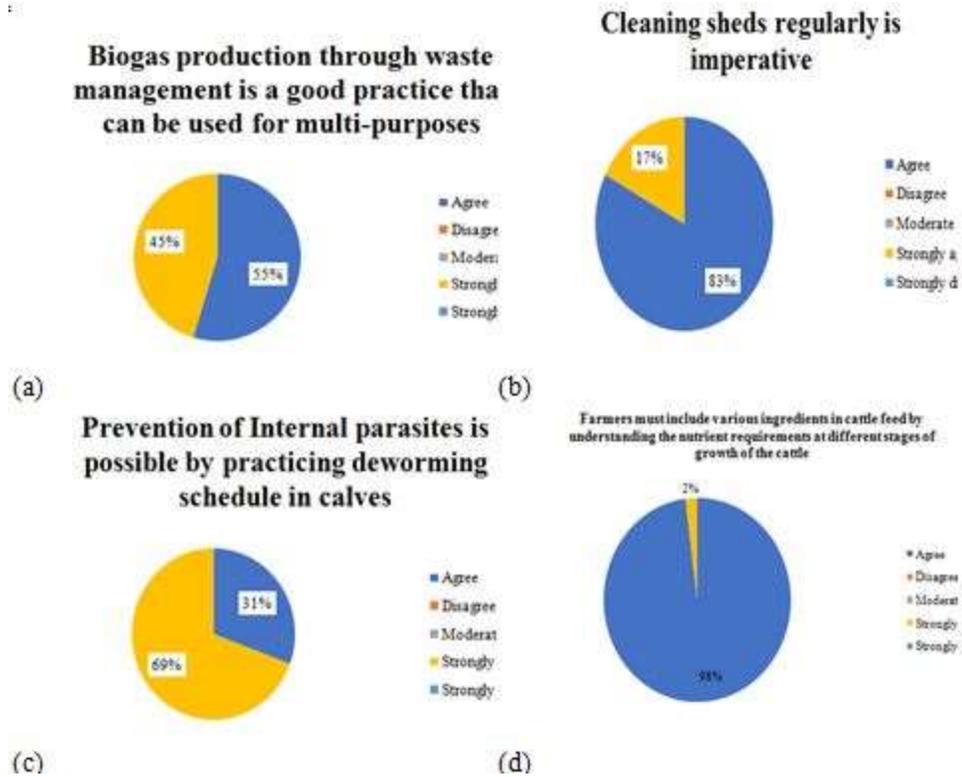
Figure 2
PIE CHART OF SCIENTIFIC MANAGEMENT PRACTICES I



Scientific Management Practices II

The percentage analysis of scientific management practices II is shown in Figure 2. Here, 100% of respondents agree to follow improved breeding practices, like Artificial Insemination (Savale *et al.*, 2017). Moreover, 55% of respondents agree with biogas production through waste management is a good practice that can be used for multi-purposes, and 45% of respondents strongly agree with the statement. For the statement “*cleaning sheds regularly is imperative*” 83% of respondents agree, and 17% of respondents strongly agree. 31% of respondents agree and 69% of respondents strongly agree that the prevention of internal parasites is possible by practicing deworming schedule in calves. The statement “*farmers must include various ingredients in cattle feed by understanding the nutrient requirements at different stages of growth of the cattle*” is agreed by 98% agree and strongly agreed by 25% of respondents.

Figure 3
PIE CHART OF SCIENTIFIC MANAGEMENT PRACTICES II



Evaluation of Socio-Economic Factors

Table 3 summarizes the percentage analysis of socio-economic factors. Here, the majority of the respondents (92.66%) are male, whereas 7.33% of respondents are female. All the respondents state that their farms contain below 15 lactating cows in their own dairying area. For the question, “is dairy farm the main source of income?” 80.66% of respondents answered “no” while the remaining 19.33% said “yes”. Moreover, the majority of the respondents (96%) has second source of income, while remaining (4%) do not. All the respondents said that they do not get any financial support for their dairy business and also, the cost of the cattle feed is not affordable. This clearly states that most of the management practices that require financial stability of the farmers are less affordable to the farmers. Few other factors that are responsible for entrepreneurship analysis are discussed in the following section.

Table 3
PERCENTAGE ANALYSIS OF SOCIO-ECONOMIC FACTORS

Questions	Gender	Male	Female	
Q1		92.66	7.33	-
		Below 15	15-25	Above 25
Q2	How many lactating cows in the farm?	100	-	-
		Yes	No	
Q3	Is the total dairying area you own?	100	-	-
Q4	Is dairy farm the main source of income?	19.33	80.66	-
Q5	Do you have any second source of income?	96	4	-
Q6	Is there any financial support to your dairy business?	-	100	-
Q7	Is the cattle feed cost affordable?	-	100	-

The frequency analysis of socio-economic factors, like age, education, and annual income is presented in table 4.

Age: The young age group comprised (41 to 45) and their frequency is 35.3%, whereas the middle age group comprised (46 to 54) and their frequency is 7.3%. From the Table, it is clear that the majority of the dairy farmers belonged to the old age group (55 and above) with a frequency of 57.3%. Because the adoption of several management practices is found to be higher in the old age group than in the young and middle age group.

Education: Education is one of the important components of behaviour and plays an important role in influencing the entrepreneurial behaviour of dairy farmers. Out of 150 respondents involved in the study, 41.3% completed their schooling. Also, this study exhibited that 27.3% of dairy farmers were illiterate and 31.3% of dairy farmers were graduated and above.

Annual income: In this study, the annual income of the dairy farmers ranged as low (below 50000), medium (50000 to 200000) and high (above 200000). It is observed that only 32% of dairy farmer's income is high, whereas 46% of dairy income is low and 22% of dairy farmer's income is medium.

		Frequency	Percent	Valid Percent	Cumulative Percent
Age of the dairy farmers	41 to 45	53	35.3	35.3	35.3
	46 to 54	11	7.3	7.3	42.7
	55 and above	86	57.3	57.3	100.0
	Total	150	100.0	100.0	
Education of the dairy farmers	No schooling	41	27.3	27.3	27.3
	Schooling	62	41.3	41.3	68.7
	Graduate and above	47	31.3	31.3	100.0
	Total	150	100.0	100.0	
Annual income of the dairy farmers	Low (below 50000)	69	46.0	46.0	46.0
	Medium (50000 to 200000)	33	22.0	22.0	68.0
	High (Above 200000)	48	32.0	32.0	100.0
	Total	150	100.0	100.0	

Frequency Analysis of Entrepreneurship

Entrepreneurial behavior is positively and considerably associated with factors, like innovativeness, and information-seeking behavior of farmers towards dairy farming. Moreover, the knowledge of enhanced dairy management practices is found to have a significant and positive relationship with entrepreneurial behavior. The two constraints associated with the entrepreneurial behaviour of the farmers were measured and the result is shown in Table 5 as follows.

a) Innovativeness: The innovativeness of the farmers is measured based on the scale. The majority (42.0%) of respondents had a medium level of innovativeness in this study. Moreover, 28.7% and 29.3% of respondents have low and high levels of innovativeness, correspondingly. This could be because of the fact that inadequate awareness of new technologies and skills, rigid beliefs, poor literacy, and confined habits of the dairy farmers might have prohibited them from being innovative and trying out innovative technologies.

b) Information-seeking behavior: This behavior is measured in this study based on the experience of the farmers in this field. It is revealed that 22.7% of respondents belonged to have low information-seeking behaviour in dairy farming and 27.3% of respondents belonged to a medium level of information-seeking behavior. The majority of respondents (50%) had a high level of information-seeking behavior.

The characteristics of entrepreneurship in the farmers are calculated using the EBI, which makes use of the mean score values of the attributes. It is observed that innovativeness has the highest EBI of 68.88, while the information-seeking behavior of the respondents has an EBI of 66.845.

		Frequency	Percent	Valid Percent	Mean	Std. Deviation	EBI
Innovativeness (5-25)	Low (upto 10)	43	28.7	28.7	17.22	5.92557	68.88
	Medium (11 to 19)	63	42.0	42.0			
	High (above 20)	44	29.3	29.3			
Information-seeking behavior (3-15)	Low (up to 5 years)	34	22.7	22.7	10.0267	4.32403	66.845
	Medium (6 to 10 years)	41	27.3	27.3			
	High (above 10 years)	75	50.0	50.0			

Descriptive Statistics

This section demonstrates the descriptive statistics of the variables exploited in this paper. The summary statics in Table 5 demonstrates that the main purpose of understanding those variables is to know the decision-making environment for dairy farm management (Smitha *et al.*, 2019). For statistics, the average value of production and marketing is 1.69%, and the standard deviation is .26787. Moreover, from the table, it is noted that on average (2.4%), dairy farmers manage the health and feed of animals. Further, the analysis of the variables that are related to scientific management II exhibits that a low-level value of farm management is predominant in most farmers. In the context of Kurtosis, it appears that only 8.69 of dairy farmers concentrate on health and feed management. Also, the standard deviations of the study variables demonstrate that the data for the variables do not vary too far from their means and the data values vary. Regarding, the socioeconomic factors, the kurtosis, and skewness standard error values were all within ± 1 indicating that they are normally distributed.

	N	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error

Production and marketing management	150	1.6908	.26787	.072	5.192	.198	44.080	.394
Health and feed management	150	2.4222	.47985	.230	.320	.198	8.691	.394
Scientific management practices I	150	2.0340	.43285	.187	.636	.198	6.550	.394
Scientific management practices II	150	1.7320	.14624	.021	.003	.198	-.325	.394
Socio-economic factors	150	1.7065	.16001	.026	-.152	.198	-.421	.394
Valid N (list wise)	150							

ANOVA Analysis

The analysis of the production and marketing management impacting the dairy farm of Kollam district in Kerala is summarized in Table 6. From the result of the ANOVA analysis, we can state that the sum of squares (SS) between the variable is 1.307 and the residual error is 10.92 for the product management. By performing ANOVA, the degree of freedom (DF) and F ratio is considered as $F(1, 10) = 1.936$. Subsequently, the significance level of ANOVA is set as 0.05. If the probability value attained is lesser than the significance level, then the hypothesis gets accepted. For the adopted hypothesis (H_1) the probability value attained is 0.045, which is lesser than the fixed value. Hence, we can say that production and marketing management impacts the dairy farm management of Kerala. With respect to the health and feed management, we can conclude that the sum of squares between the variables is 4.776 and the residual error between the groups is 34.308. By carrying out the ANOVA, the degree of freedom (DF) and F ratio is $F(1, 10) = 2.248$. Here, in the adopted hypothesis (H_2) the probability value attained is 0.038 that is lesser than the fixed value. Therefore, we can say that Health and feed management impact the dairy farm management of Kerala (Thankachan & Joseph, 2019). In scientific management practices I, the sum of squares between the variable is 3.509, and the residual error between groups is 27.917. In terms of the degree of freedom (DF) and F ratio, it is represented as $F(1, 10) = 1.998$. Here, the probability value for hypothesis H_3 is 0.018, which is lesser than the fixed value. Hence, scientific management Practice I impacts the dairy farm management of Kerala. Regarding scientific management practices II, the sum of squares between the variable is .202, and the residual error between groups is 3.186. With respect to the degree of freedom (DF) and F ratio, $F(1, 10) = 0.942$. In the hypothesis (H_4) the probability value attained is 0.497, which is higher than the fixed value. This signifies that the scientific management Practice II does not make an impact on the dairy farm management of Kerala.

		Sum of Squares	DF	Mean Square	F	Sig.
Production and marketing management	Between Groups	1.307	10	.131	1.936	.045
	Within Groups	9.384	139	.068		
	Total	10.692	149			
Health and feed management	Between	4.776	10	.478	2.248	.018

	Groups					
	Within Groups	29.531	139	.212		
	Total	34.308	149			
Scientific management practices I	Between Groups	3.509	10	.351	1.998	.038
	Within Groups	24.408	139	.176		
	Total	27.917	149			
Scientific management practices II	Between Groups	.202	10	.020	.942	.497
	Within Groups	2.984	139	.021		
	Total	3.186	149			

CONCLUSION

The dairy business in India plays an important role in the form of income generation, employment, economical contribution, and export opportunities. In this connection dairy businesses have more opportunities to start an entrepreneurial activity and it aids to enhance the employment and constant income earning in dairying. This paper discussed the management practices, which are followed by the farmers in the dairy farm to yield maximum production and the study was carried out in the Kollam district of Kerala. Here, the entrepreneurial behaviour of the dairy farmers was evaluated by their socio-economic factors, such as innovativeness, and information-seeking behavior of the dairy farmers. A total of 150 respondents were selected and are distributed with the questionnaire. The analysis was performed using SPSS analysis. The findings of the study disclose the impact of the socio-economic factor of the dairy farmers in different management practices, wherein it is seen that the farmers do not get satisfied with most of the scientific management practices. Looking at their entrepreneurial activities, they are found to have medium level of entrepreneurship. In the future, we can discuss about the innovation and knowledge management practices of rural entrepreneurs in dairy farm management.

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