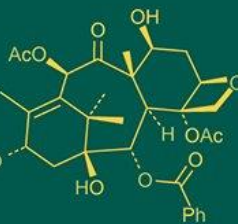
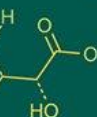
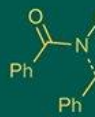


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Constraints in different dairy based farming systems in Tamil Nadu

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Abstract

A total sample size of 360 farmers were selected among top three milk producing districts in NE agro climatic zone of Tamil Nadu viz., Tiruvannamalai, Cuddalore and Villupuram. Though dairy farming providing employment to 80 million rural households in India, it has its own constraints. Almost all the dairy farmers possess dairy along with agriculture, sheep, goat, poultry and others. In this scenario, it is essential to assess which dairy based system is more beneficial along with the constraints perceived by the dairy farmers in the study area. Information relating to various problems were collected from the sample farmers and ranked their constraints in the order of importance. The opinion of the farmers were analysed by Garrett's ranking technique. Regarding production constraints, lack of technical knowledge was perceived as the most serious constraint with the Garrett mean score of 83.17, followed by unavailability of pasture land ranked second with the mean score of 79.05. Analysis of financial constraints shows that, high feed cost was the most critical constraint registering a Garrett mean score of 89.25, whereas high cost of animals was ranked second with the mean score of 83.61. Concerning marketing constraints, low price for milk was most serious issue faced by the farmers with a Garrett mean score of 93.18 and exploitation by the middleman ranked second with mean score of 89.37 indicating reduction in farmers share.

Keywords: Dairy based farming system, constraints, Garrett score, ranking

Introduction

India reigns supreme as the largest producer of milk in the world contributing to about 25 percent of the global milk production in 2025. The production of milk has gone up more than five fold since independence resulting in near doubling of per capita availability of milk. The per capita availability of milk now stands at 471 grams per day far above the global average of 322 grams. In 2024-2025 the livestock sector contributes 30.23 percent of agricultural GVA and 5.5 percent of the national economy (DAHD, Annual Report 2024-2025). Tamil Nadu, the southern most state of India is one of the major milk producing state. The state ranks 11th in milk production (10.81 million tonnes, 2023-24), 2nd in egg production (22.33 billion in 2023-24) and 6th in meat production (0.68 million tonnes in 2023-24). The per capita availability of milk in Tamil Nadu is 384 g/day and 291 eggs/year, both exceeding ICMR recommendations, while per capita meat availability is 9.9 kg/year. A positive growth trend was observed for livestock production during the last decade. The co-operative dairying has effectively tapped the milk production potential in dairy development. Dairying has now emerged as an important income generating activity and a source of mass employment in rural arena. Farming system is a complex of inter related enterprises containing crops, dairy, sheep, goat, pigs, poultry, fishery etc., which interact among themselves. The judicious mix of the crops and animal enterprises must be based on the principle of minimizing the competition for resource and maximizing the returns among various enterprises (Behera and Mahapatra, 1999) [2].

Though dairy farming is providing employment to 80 million rural households, it has its own constraints. In resource poor Indian conditions, the farmers who are pursuing dairy as a single occupation is very meagre. Almost all the dairy farmers possess dairy along with agriculture, sheep, goat, poultry or others. In this scenario, it is essential to assess which dairy based system is more beneficial in different areas along with their constraints.

Methodology

Five farming systems were predominantly identified in the study area and they are as classified as Farming System-I (Only Dairy), Farming System-II (Dairy + Agriculture), Farming System-III (Dairy + Sheep/Goat), Farming System-IV (Dairy + Poultry) and Farming System-V (Dairy + Agriculture + Poultry). To analyse the constraints perceived by the farmers in production, financial and marketing, a list of constraints were enlisted and ranked using Garrett's ranking technique. By using this technique, the order of merits given by the respondents was changed into ranks by using the following formula

$$\text{Percent position} = \frac{100 (R_{ij} - 0.5)}{N_j}$$

Where,

R_{ij} = Rank given for i^{th} factor by j^{th} individual

N_j = Number of factors ranked by j^{th} individual

The percent position of each rank was converted into scores by referring table given by Garrett (Garrett and Woodworth, 1969) [4]. Then for each factor, the scores of individual respondents were added together and divided by the number of respondents for whom scores were added. These mean scores for all the factors were arranged in descending order and the constraints were ranked.

Results and Discussion

Table 1: Production constraints

Constraints		FS 1	FS 2	FS 3	FS 4	FS 5
		Garretts Score (RANK)				
	Production constraints					
1	Lack of Technical Knowledge	85.64 (1)	79.82 (1)	73.92 (1)	69.23 (5)	73.27 (1)
2	Breeding problem	81.59 (2)	61.78 (4)	79.41 (4)	71.82 (4)	63.19 (6)
3	Unavailability of pasture land	78.51 (4)	64.02 (2)	78.12 (2)	81.92 (1)	64.37 (5)
4	Poor production of Animals	61.39 (7)	61.82 (5)	72.76 (5)	68.65 (6)	60.63 (8)
5	Un availability of paddy straw	79.64 (3)	61.47 (7)	69.91 (7)	76.73 (2)	62.79 (7)
6	Inadequate Veterinary Facility	71.40 (5)	65.73 (3)	66.52 (3)	76.01 (3)	67.93 (4)
7	Inadequate of laborer	59.72 (8)	75.19 (6)	60.41 (6)	62.93 (8)	71.05 (3)
8	Disease Outbreak	64.28 (6)	68.25 (8)	60.84 (8)	65.72 (7)	72.43 (2)

Table 1 depicts the Production constraints in the study area. Lack of Technological knowledge was the most severe constraint perceived by the farmers in all the farming systems except farming system-IV with a mean score of 85.64, 79.82, 73.92 and 73.27 in FS-I, FS-II, FS-III and FS-V respectively. Similar findings was noticed in buffalo farming study by Pradheeshwaran *et al.* (2024) [8]. This findings suggests that farmers lack exposure to efficient management practises, improved feeding methods, breeding technologies, disease prevention measures and also efficient utilization of resources. The overwhelming nature of this constraint indicates the importance of farmer training programmes, strengthening of extension services and skill

development initiatives. Land availability was identified as the most significant constraint in FS-IV with a mean score of 81.92 and also ranked second in FS-III. This could be due to increased urbanization, fragmentation of land area and conversion of grazing land to other uses. Grazing area is one of the prime components that determines livestock fodder needs and productivity. Lack of fodder and grazing facility is the prime constraint in buffalo farming was observed by Kathiravan (2011) [5].

Inadequate veterinary facilities consistently showed up among the top ranked constraints across all farming systems with a mean score of 65.73, 66.52, and 76.01 in FS-II, FS-III, and FS-IV respectively. The score indicates that the farmers experience difficulty in availing timely veterinary care, vaccination and treatment facilities which would lead to decreased production and financial loss. Breeding problem constituted another major issue particularly in FS-I, FS-II, FS-III and FS-IV where they ranked second in FS-I and fourth in other farming systems respectively. Difficulties in obtaining AI facilities, superior bulls for breeding may contribute to lower breeding efficiency and performance. Unavailability of breeding bull was considered as an important constraint in dairy farming as said by Kumar *et al.* (2014) [6]. Non availability of paddy straw was ranked third in FS-I and second in FS-IV which demonstrates the importance of feed deficit in livestock based systems. Paddy straw is a major crop residue serving as an important feed resource and their shortage can have a negative impact on animal nutrition especially during dry seasons.

Labour shortage was the most significant constraint in FS-V, where it ranked third with a mean score of 71.05. Integrated farming systems are generally labour intensive as they have to manage multiple enterprises simultaneously. Migration of labours, increasing wage rates may further enhance this problem. Outbreak of diseases were ranked second in FS-V but received relatively inferior ranks across all farming systems. This indicates integrating multiple livestock enterprises may have higher chances of disease transmission due to greater interaction of animals with each other along with complexity in managing them. Poor production of animals was ranked moderately low to lowest throughout all the farming systems. Although low production of animals was recognized as a concern, they observed it as an effect of other underlying constraints such as inadequate technical knowledge, shortage of feed, breeding issues and insufficient veterinary support.

Table 2: Financial constraints

Constraints		FS 1	FS 2	FS 3	FS 4	FS 5
		Garretts Score (RANK)				
	Financial constraints					
1	High Cost of Feed	91.53 (1)	76.53 (3)	87.51 (1)	84.81 (1)	74.38 (3)
2	High Cost of Animal	74.18 (5)	74.51 (4)	84.83 (2)	80.19 (2)	73.92 (4)
3	Lack of Availability of Finance	81.76 (3)	71.54 (5)	75.29 (4)	79.04 (3)	71.23 (5)
4	High Veterinary Cost	83.19 (2)	68.91 (6)	74.90 (5)	70.16 (6)	69.16 (6)
5	High Capital Requirement	78.89 (4)	79.36 (1)	79.21 (3)	76.23 (4)	78.02 (1)
6	High wage Rate	66.39 (6)	78.14 (2)	65.19 (6)	71.87 (5)	76.36 (2)

Financial constraints perceived by the farmers in the study are given in the Table 2. High cost of feed was found to be the most severe constraint in FS-1, FS-III and FS-IV with a Garrett score of 91.53, 87.51 and 84.81 respectively. With respect to FS-II and FS-V, financial constraint was ranked second with a mean score of 76.53 and 74.38 respectively. Steady high scores across all farming systems suggest that increasing feed cost significantly affect profitability and management decisions of the farm. High feed cost was also identified as a prime constraint in dairy farming stated by Akila (2012) [1]. High purchase cost of animals was considered as a major financial constraint in FS-III and FS-IV with a mean score of 84.83 and 80.19 respectively where they ranked second. Similar concerns were also observed in FS-I, FS-II and FS-V with a mean score of 74.18, 74.51 and 73.92 respectively with comparatively lower rankings. This finding indicates that initial expenditure on purchase of animals remains a considerable challenge across all farming systems mainly in livestock based enterprises. Access to credit and finance was another important constraint in FS-I and FS-IV with a mean score of 81.76 and 79.04 respectively where they ranked third whereas less ranks was observed in other farming systems with substantial scores indicating financial availability issues persist across farming systems regardless

of their size and production.

Veterinary expenses was ranked second in FS-I with a mean score of 83.19 reflecting the significance of health care expenses. However, they received lowest rank in other farming systems with less mean scores of 68.91, 74.90, 70.16, and 69.16 in FS-II, FS-III, FS-IV and FS-V respectively. This difference suggests that health care expenditure is more critical in FS-I which may be due to higher dependence on livestock or high disease management measures. High capital requirement was identified as the most prime constraint in FS-II and FS-V with a mean score of 79.36 and 78.02 respectively where it ranked first. It was also considered important in FS-III, FS-IV and FS-I with a mean score of 79.21, 76.23 and 78.89 respectively. Persistent high scores indicates considerable investment on infrastructure, equipment's and purchase of animals which acts as a hurdle to expand the farm size and modernization. With regard to labour cost, it showed contrasting patterns among all farming systems where it ranked second in FS-II and FS-V with a mean score of 78.14 and 76.36 respectively which indicates labour scarcity and greater demand for wages in these systems. In contrast they got lower rank in FS-I with a mean score of 66.39 where family labour is more predominant.

Table 3: Marketing constraints

Constraints		FS 1	FS 2	FS 3	FS 4	FS 5
		Garretts Score (RANK)				
	Marketing constraints					
1	Low Price for milk	94.65 (1)	91.73 (1)	93.53 (1)	92.73 (1)	90.43 (1)
2	Exploitation of Middle man	91.54 (2)	86.15 (2)	92.07 (2)	90.43 (2)	84.65 (2)
3	Lack of storage facility	85.91 (3)	80.47 (3)	85.19 (3)	86.34 (3)	81.87 (3)
4	Delayed payment from Co-operative society	80.52 (4)	78.93 (4)	84.67 (4)	83.91 (4)	79.26 (4)
5	Lack of Marketing Facility	80.03 (5)	76.03 (5)	81.65 (5)	79.27 (5)	75.18 (5)
6	Improper Assessment of Milk Fat	79.18 (6)	73.84 (6)	71.69 (6)	74.19 (6)	74.91 (6)

Marketing constraints perceived by the farmers are given in Table 3. Garrett ranking analysis revealed that the sequence of marketing constraints is almost same across all the farming systems (FS-I to FS-V) along with the order of ranking is same in each system. However, the severity of constraints varies slightly among different farming systems. Low procurement price for milk surfaced as the most severe constraint across all farming systems. The highest mean score was observed in FS-I followed by FS-III, FS-IV, FS-II and FS-V with Garrett score of 94.65, 93.53, 92.73, 91.73 and 90.43 respectively. The farmers across all farming systems experienced greater dissatisfaction regarding milk prices. The results are in line with Pradheeshwaran *et al.* (2024) [8]. Exploitation by middleman was consistently ranked second among all farming systems. The problem was most severe in FS-III followed by FS-I, FS-IV, FS-II and FS-V with a mean score of 92.07, 91.54, 90.43, 86.15 and 84.65 respectively. Higher scores in FS-I, FS-III and FS-IV suggest greater dependence on intermediaries and low bargaining power of farmers across all the systems. Similar results were found by Meganathan *et al.* (2010) [7]. Lack of storage facilities occupied third rank throughout the farming

systems and the mean score is high is FS-IV followed by FS-I, FS-III with mean score of 86.34, 85.91, 85.19 respectively. Lower scores in FS-V (81.87) and FS-II (80.47) indicates relatively better access to storage facilities or low perceived severity of the problem.

Delay in payment from co-operative society was ranked fourth in all farming systems. The top most concern was reported in FS-III followed by FS-IV, FS-I, FS-V, and FS-II with a mean score of 84.67, 83.91, 80.52, 79.26 and 78.93 respectively. The result infers that the delay in payment was so problematic for the farmers in FS-III and FS-IV than other systems. Lack of marketing channels secured fifth rank in all farming systems with highest mean score in FS-III followed by FS-I, FS-IV, FS-II and FS-V with mean score of 81.65, 80.03, 79.27, 76.03 and 75.18 respectively. The results indicate that FS-III farmers faced greater difficulties in marketing channels which shall be due to dominant of unorganized market facilitated by agent middlemen. Improper assessment of milk fat was ranked as the last constraint across all farming systems with highest mean score observed in FS-I (79.18) followed by FS-V (74.91), FS-IV (74.19), FS-II (73.84) and FS-III (71.69).

Although this issue was perceived less, it still remains as a concern for dairy farmers.

Table 4: Major constraints faced by dairy farmers in the study area

I	Production Constraints	Garretts Score	Overall Rank
1	Lack of Technical Knowledge	83.17	1
2	Breeding problem	72.98	4
3	Unavailability of pasture land	79.05	2
4	Poor production of Animals	70.26	5
5	Un availability of paddy straw	66.73	7
6	Inadequate Veterinary Facility	77.20	3
7	Inadequate of laborer	68.28	6
8	Disease Outbreak	63.17	8
II	Financial constraints	Garretts Score	Overall Rank
1	High Cost of Feed	89.25	1
2	High Cost of Animal	83.61	2
3	Lack of Availability of Finance	78.91	4
4	High Veterinary Cost	73.29	5
5	High Capital Requirement	79.52	3
6	High wage Rate	68.95	6
III	Marketing constraints	Garretts Score	Overall Rank
1	Low Price for milk	93.18	1
	Exploitation of Middle man	89.37	2
3	Lack of storage facility	83.59	3
4	Delayed payment from Co-operative society	81.63	4
5	Lack of Marketing Facility	78.94	5
6	Improper Assessment of Milk Fat	75.27	6

Table 4 depicts the overall major constraints faced by the farmers in the study area as a whole. With regard to production constraints, lack of technical knowledge ranked as the first and prime constraint in the study area indicating lack of knowledge in feeding management, breeding techniques and modern technologies which may affect the production in dairy farming. Non availability of pasture land ranked second which might be shrinkage of grazing areas due to land fragmentation, urbanization and other agricultural practises which reduce the access to fodder resources. This situation increases dependence on feed procured from other sources which in turn raise the production cost in the farming. Inadequate veterinary facilities obtained third rank where the farmers face constraints in availing timely veterinary services, artificial insemination and health care management which can adversely affect the productivity of animals and also the overall profit of a farmer. Breeding problem was ranked as a fourth constraint in the study area where the farmers face poor AI facilities, limited availability of breeding stock and low conception rate which restrict genetic improvement and milk production. Poor production of animals ranked fifth, which shows concern regarding low milk production and reduced animal performance. This may result from poor feeding management, incidence of diseases and lack in scientific management practises. Even though other constraints like non availability of labour, unavailability of paddy straw and disease outbreak obtained lower ranks, they still remain a matter of concern among the farmers in the study area.

Among the financial constraints, high feed cost was ranked first and it is the most critical issue faced by the farmers. High price of concentrates, fodder and other feed supplements drastically reduces the profit margin in dairy farming. High cost of animals ranked second among the farmers as they need to invest more on purchasing high yielding animals which is difficult for small and marginal

farmers. High capital requirement secured third rank in the study area as they require sizable investment in infrastructure, equipment's and animal procurement creating financial barriers for the farmers. Lack of availability of finance ranked fourth, which may be due to limited access to institutional credit, complicated loan procedures which restricts the farmers to obtain financial support. Other constraints like high veterinary cost and high cost of labour fetched lower ranks respectively.

Results on marketing constraints reveal that, low price of milk was the most alarming constraint obtaining first rank among the sample dairy farmers. They often experience low price for the milk produced which mainly reflects in low profitability. Exploitation by middlemen ranked second in the study area. Involvement of intermediaries in the marketing channel can reduce the share of profit received by the producers, limiting their farm income. Lack of storage facilities obtained third rank which is mainly due to highly perishable nature of milk, inadequate cooling and storage facilities resulting in economic loss. Delayed payment from cooperatives, lack of marketing facilities and improper assessment of milk fat obtained lower ranks compared to other marketing constraints.

The findings shows that, inadequate technical knowledge, increasing feed costs and low price for milk are the most critical constraints in dairy based farming systems. These results suggests that improving farmers technical skills, reducing input costs and ensuring remunerative prices for milk are very essential for improving the sustainability and profitability in dairy based farming systems. A broad approach engaging extension services, availing credit facilities, improving veterinary services and efficient marketing channels would contribute largely to the development of livestock sector and the livelihood of dairy farmers.

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