Full Length

# FACTORS INFLUENCING THE INTENSITY OF CONSTRAINTS IN DAIRY FARMING DUE TO LUMPY SKIN DISEASE

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**ABSTRACT**

*The study was undertaken to identify and prioritize the constraints faced by dairy farmers due to lumpy skin disease. Primary data were collected from 80 dairy farmers across four districts of the Cauvery delta zone of Tamil Nadu, namely Tiruchirappalli, Thanjavur, Tiruvarur and Nagapattinam, using a structured and pre-tested interview schedule through the personal interview method. A Likert scale was employed to assess the intensity of constraints, and scores were computed to prioritize them. A multiple linear regression model was used to determine the socio-economic and farm-related factors associated with the intensity of constraints perceived by the dairy farmers due to lumpy skin disease. The study's findings revealed that the foremost constraint perceived by the dairy farmers was the lack of vaccination programme, followed by the low price offered for diseased animals and the distant veterinary hospitals. The results of the regression analysis indicated that among the ten variables included, education, farm size, and age were found to have a negative and significant influence on the intensity of constraints, whereas the proportion of animals affected had a positive and significant influence. These findings underscore the importance of strengthening veterinary infrastructure, improving disease surveillance and enhancing farmer awareness to effectively mitigate the impact of lumpy skin disease and promote sustainable dairy farming.*

**Key words:** Constraints, lumpy skin disease, dairy farmers

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## INTRODUCTION

The livestock sector particularly dairy farms plays an important role in sustaining the livelihoods of millions of families across the world, especially in developing countries like India. In 2022-23, the contribution of livestock sector was 05.50 per cent and 30.23 per cent to national and agricultural Gross Value

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Added respectively. Dairy sector proves to be the backbone of rural economy among all the agricultural commodities in India. Among various livestock products, Milk contributed 66.76 per cent of the total value of output from livestock sector. The total milk production in India was 239.30 million tonnes with per capita availability of 471 grams per day per person which makes India the world leader in milk production (BAHS, 2024).

Lumpy skin disease is a highly infectious, economically significant transboundary disease affecting bovines. It is caused by the lumpy skin disease virus, which belongs to the genus Capripox virus in the family Poxviridae, with the Neethling strain serving as the prototype. The disease leads to a slowdown in genetic improvement, reduced work efficiency, loss of draught power, abortions in pregnant cows, a sharp decline in milk yield during infection, reproductive problems such as infertility and sterility, permanent hide damage and prolonged debilitation in cattle. Pritchett *et al*. (2005) reported that disease outbreaks can lead to multiple impacts, including loss of sales and income, increased costs related to control measures such as quarantine and movement restrictions, and changes in consumer behavior within the animal feed industry.

Several constraints are faced by the farmers during the lumpy skin outbreaks. Therefore, recognizing and understanding these constraints is vital for developing effective control strategies against lumpy skin disease. The findings of this study will provide valuable insights for policymakers, veterinarians and extension personnel to design suitable interventions that help to reduce the challenges faced by dairy farmers due to this disease.

## MATERIALS AND METHODS

The study was carried out in four districts of the Cauvery delta zone of Tamil Nadu viz., Tiruchirappalli, Thanjavur, Tiruvarur and Nagapattinam were selected as top districts in terms of bovine population according to Tamil Nadu 2019 livestock census. From these districts, a total of 80 dairy farmers (20 from each district) were selected using a multistage random sampling technique. Primary data were gathered through personal interviews with the selected farmers using a well-structured and pre-tested interview schedules to ensure accuracy and reliability of the information collected.

### Constraints perceived by the dairy farmers, Likert's scaling system with a 5-point

### Continuum scale

For every identified constraint, farmers were requested to rate its severity using an ordered Likert scale. The scale included five response options, each assigned a numerical value, ranging from 1 for the least favourable response to 5 for the most favourable one.

5 = Very severe constraint, 4 = Severe constraint, 3 = Moderate constraint, 2 = Low constraint, 1 = Not constraints

To evaluate the overall severity of constraints experienced by farmers, the individual scores for each constraint were combined to form a composite score reflecting the intensity of constraints for each respondent. A multiple linear regression model was then applied to determine the socio-economic and farm-related factors influencing this intensity. The details of the variables included in the model are presented in Table 1. This method enabled the analysis of the combined effects of various independent variables on the perceived severity of constraints among dairy farmers, offering a comprehensive understanding of the main factors contributing to their challenges.

A multiple linear regression analysis was used to estimate the model. The variables used in this model are depicted in Table1 .

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots + \beta_{11} X_{11} + \mu$$

Where, Y = Intensity of constraints / Constraints score $X_i$ = Independent variables,

$\alpha$ = Intercept, $\beta_i$ = Regression coefficients to be estimated, $\mu$ = stochastic disturbance term.

## RESULTS AND DISCUSSION

Factors influencing intensity of constraints due to lumpy skin disease are shown in Table 2. The analysis revealed that lack of vaccination programme (389) was reported to be the foremost constraint indicating inadequate preventive measures against disease outbreaks. Similar findings were reported by Ashfaq *et al.* (2020) who noted that disease outbreaks, along with the insufficiency and ineffectiveness of vaccination against endemic diseases, were significant constraints for disease control. The results further emphasized that higher distance to veterinary hospitals (346) was observed to be a major constraint. Similar observation was reported by Lakshmi and Nagaraja*.,* (2022), dairy farmers in both rural and urban areas experienced challenges arising from the lack of easily accessible veterinary facilities. Inadequate control measures for viral infection was also a critical constraint with the score of 324, indicating farmers concern over the inefficiency of existing preventive and control strategies to manage the disease.

Low price offered for diseased animals (373), were also considered as major constraints by the farmers, indicating that animals affected by lumpy skin disease experience a sharp decline in market value, leading to considerable economic losses to the farmers. Poor fertility performance (294) of dairy animals was also regarded as the critical issue for farmers, indicating that reproductive inefficiency remains a major problem in dairy herds.

The results of regression analysis used to identify the factors influencing intensity of constraints due to lumpy skin disease are shown in Table 3. A multiple linear regression model was used to determine the factors associated with the intensity of constraints due to lumpy skin disease in dairy farming. The adjusted coefficient of multiple determination (adjusted $R^2$) was found to be

0.911, which indicated that the independent variables explained 91.1 per cent of the variation in the dependent variable. The F value (18.915**) of the function was found to be significant at the one per cent (P<0.01). Among the ten variables, education was significant at one per cent level (P<0.01). Farm size, age and proportion of animals affected were significant at five percent level (P<0.05). Farm size, age and education have negative significant influence suggesting that large farm size, higher age and more educational level reduced the intensity of constraints.

As the large scale farmers are more aware about the symptoms of lumpy skin disease compared to small scale farmers, they might have perceived lessor intensity of constraints. Also higher education level reduced the severity of constraints due to higher knowledge level. Similar results were reported by Shreepali (2023). Smith *et al.* (2021) found a statistically significant relationship between farmers' education levels and their perception of disease related risks in livestock in a study on Rift Valley fever in Rwanda. Age of the respondent had a negatively significant effect, indicating that age of farmer increases the intensity constraints was found to be decreased. The proportion of animal affected positively influence the dependent variable suggesting higher proportion of animal affected increase the intensity of constraints.

## CONCLUSION

The study concluded that the foremost constraint perceived by the dairy farmers due to lumpy skin disease was the lack of vaccination programme followed by the low price offered for diseased animals and the higher distance of veterinary hospitals inadequate control measures for viral infection and poor fertility performance. The results on the factors influencing the intensity of constraints revealed that education, farm size and age had a negative influence, indicating that larger, better educated and middle age farmers experienced fewer constraints. In contrast, a higher proportion of diseased animals increased the severity of constraints. These findings emphasized the critical role of socio economic factors in shaping farmers' capacity to effectively manage lumpy skin disease. Strengthening disease surveillance, improving access to veterinary healthcare and ensuring timely vaccination coverage can substantially reduce the impact of the disease. Furthermore, enhancing farmers' awareness through training and extension programmes on disease prevention and control measures would help to minimize economic losses and promote sustainable dairy farming.

**Table.1. Specification of the variables used in the model**

| α | Constant term | |
|---|---|---|
| $X_1$ | Proportion of animal affected | In numbers |
| $X_2$ | Gender | 0-Male, 1-Female |
| $X_3$ | Land holding | 1-Landless, 2-Marginal, 3-Small, 4-Large |
| $X_4$ | Investment/animal | Rs.68911.19 |
| $X_5$ | Experience | Number of years |
| $X_6$ | Education | 1-Illiterate, 2-Primary, 3-Secondary, 4-Collegiate |
| $X_7$ | Age | Number of years |
| $X_8$ | Occupation | 1-Dairying as Primary occupation, 2-Dairying as Secondary occupation |
| $X_9$ | Farm size | Small (1-3), Medium (3-6), Large (>6) |
| $X_{10}$ | Labour cost | Rs. 61365.63 |

**Table.2. Constraints in dairy farming due to lumpy skin disease**

| S. No | Constraints | Constraints score | Rank |
|---|---|---|---|
| 1. | Lack of equipment / medicine in government veterinary hospital | 172 | 16 |
| 2. | Unavailability of timely veterinary services | 175 | 15 |
| 3. | Avoidance of treatment of animal during early stage | 162 | 18 |
| 4. | Availability of separate house for diseased animals | 250 | 9 |
| 5. | No veterinary hospitals nearby | 346 | 4 |
| 6. | Increased transport costs | 201 | 12 |
| 7. | Lack of proper care in treatment by para veterinarian | 191 | 13 |
| 8. | Lack of vaccination programme | 389 | 1 |
| 9. | Govt. awareness programme for prevention and control of disease | 288 | 3 |
| 10. | Non availability of improved breeds | 246 | 8 |
| 11. | Poor fertility performance | 294 | 5 |
| 12. | Scarcity of green fodder during crop season | 235 | 7 |
| 13. | Non availability of concentrate feed | 179 | 14 |

| | | | |
|---|---|---|---|
| 14. | Difficulty in following vaccination schedule | 171 | 17 |
| 15. | Lack of motivating agencies | 215 | 10 |
| 16. | Inadequate control measures for viral infection | 324 | 6 |
| 17. | Unawareness of supplies and services offered by the state and central government | 212 | 11 |
| 18. | Low price offered for diseased animals | 373 | 2 |

**Table.3. Factors associated with lumpy skin disease in dairy farming**

| Xi | Variables | Unstandardized Coefficients | Standardized Coefficients | t-Statistics | P value |
|---|---|---|---|---|---|
| | | B | Beta | | |
| $\beta_0$ | (Constant) | 62.411 | | 11.967 | 0.000 |
| $X_1$ | Farm size | -0.405* | -0.371 | -2.831 | 0.017 |
| X2 | Age of the respondent | -0.118* | -0.287 | -2.474 | 0.016 |
| $X_3$ | Experience in dairy farming | -0.060 | -0.162 | -1.425 | 0.159 |
| $X_4$ | Education of household head | -1.276** | -0.247 | -3.839 | 0.002 |
| $X_5$ | Primary occupation of Household head | 0.841 | 0.110 | 0.892 | 0.376 |
| $X_6$ | Gender of household head | 1.980 | 0.257 | 0.086 | 0.406 |
| $X_7$ | Land holding | 0.663 | 0.169 | 1.435 | 0.156 |
| $X_8$ | Labour charges | 1.528E-05 | 0.080 | 0.331 | 0.741 |
| $X_9$ | Investment/animal | -2.067E-05 | -0.105 | -0.769 | 0.445 |
| $X_{10}$ | Proportion of animal affected | 0.098* | 0.101 | 2.105 | 0.040 |
| Dependent variable: Constraints in dairy farming due to lumpy skin disease | | | | | |
| F- Value=18.915** n=80 | | | | | |
| $R^2$=0.929 | | | | Adjusted $R^2$=0.911 | |

** *Significant at one percent level*
**Significant at five percent level*

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