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Factors influencing transition in bovine composition of Karnataka

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Abstract

The study was conducted to identify and analyse the major factors influencing the shift in bovine composition in Karnataka. Over the years, the state has witnessed a significant transformation in its livestock structure, characterized by a decline in indigenous cattle and buffaloes and an increase in crossbred cattle. This change has been largely driven by economic, biological, infrastructural, and institutional factors. Primary data were collected from 160 dairy farmers across Belgaum and Mysore districts. Using Garrett's Ranking Technique, 19 factors governing the transition in bovine composition were ranked according to their level of influence. The results revealed that profitability was the most dominant factor motivating farmers to adopt crossbred cattle, followed by the high cost of feed and fodder and scarcity of labour. Constraints such as lack of green fodder, mechanization of agriculture, and non-availability of grazing land further limited the maintenance of indigenous breeds. Moderate influence was observed for factors like early reproductive ability, input responsiveness, and favourable government schemes, while institutional and infrastructural factors such as access to finance and veterinary services were found to have lesser impact. The least influential factors were related to awareness and adaptability, indicating limited influence of extension and training efforts. The study concludes that economic and resource-based factors are the primary drivers of transformation in bovine population dynamics. Therefore, policies should emphasize improving profitability, reducing input costs, and ensuring sustainable feed and fodder availability, while simultaneously conserving indigenous breeds to maintain genetic diversity and long-term sustainability.

Keywords: Bovine population, Garrett's ranking technique, crossbred cattle, economic factors, indigenous breeds, Karnataka

Introduction

The livestock sector forms an integral part of India's agrarian economy by providing food, employment, draught power, and manure, and serving as a source of income and livelihood security. India possesses the world's largest bovine population and is the leading producer and consumer of milk. However, significant structural changes have occurred in recent years, marked by a decline in indigenous cattle and buffaloes and a steady rise in crossbred cattle. In Karnataka, similar trends are observed, where factors such as agricultural mechanization, high feed and fodder costs, scarcity of labour, and reduced grazing lands have driven farmers toward crossbred animals, which are perceived to be more productive and profitable. Although crossbreeding has enhanced milk production, it has simultaneously raised concerns about the sustainability and genetic erosion of native breeds.

To understand these transitions, the present study identifies and ranks the key economic, biological, infrastructural, and

institutional factors influencing the shift in bovine composition in Karnataka using Garrett's Ranking Technique. The findings provide insights for formulating policies that balance productivity enhancement with conservation of indigenous breeds.

Materials and Method

Data Source and Preparation

Karnataka state is located in the South Western region of India. The state corresponds to the Carnatic region. Karnataka is bordered by the Arabian Sea to the West, Goa to the North West, Maharashtra to the North, Telangana to the North East, Andhra Pradesh to the East, Tamil Nadu to the South East, and Kerala to the South West. The study was conducted in Belgaum and Mysore district of Karnataka. The primary data on factors governing transition were collected from 80 dairy farmers of each districts comprising the sample size of 160 dairy farmers. A total of 19 constraints governing transition were used for analysis.

Garrett's Ranking Technique provides the alter of orders of constraints and compensation into numerical scores. Garrett's formula for converting ranks into percent is:

$$\text{Percent Position} = 100 \times (R_{ij} - 0.5) / N_j$$

Where,

R_{ij} = rank given for i^{th} constraint by j^{th} individual;

N_j = number of constraint ranked by j^{th} individual.

The per cent position of each rank will be converted into scores referring to the table given by Garrett (1981).

Results and Discussion

The study aimed to identify and prioritize the major factors influencing the transition and dynamics in bovine composition in Karnataka, using Garrett's Ranking Technique. Data were collected from 160 dairy farmers across Belgaum and Mysore districts, and 19 constraints were evaluated based on their degree of influence. The Garrett Score (G.S.) values indicate the relative importance of each factor, where a higher score represents greater influence in driving changes within the bovine population structure.

The results (Table 1) revealed that "Profitability" was ranked as the most influential factor with a Garrett score of 81.02, signifying that farmers are primarily motivated by the economic returns associated with milk production. The results obtained by Sunil *et al.* (2016) [6] clearly indicated that cross bred milk production yielded significantly higher profit of Rs. 5.57 per litre compared to Rs. -0.49 in case of indigenous and Rs. 4.03 in case of buffalo production. Rebasiddanavar *et al.* (2022) [3] recorded that on an average per day during lactating period, cross bred cow yielded milk of 8.77 litres compared to local cows (3.78). The high cost of feed and fodder (79.03) emerged as the second major constraint, reflecting the rising input costs that affect profitability and sustainability. The scarcity of labour (72.93) and productivity differences among breeds (71.41) were also found to be important considerations in farmers' decisions to shift towards crossbred cattle. These factors indicate the changing socio-economic environment in rural areas, where migration and labour shortages are influencing herd composition. Lack of green fodder throughout the year (68.01), increasing mechanization of agriculture (65.42), and non-availability of grazing land (61.02) further emphasize the growing limitations on traditional cattle-rearing systems. Shrinking landholdings (59.03) also constrain farmer's ability to maintain large herds, compelling them to prefer fewer but more productive animals. These results were in line with Balaraju *et al.* (2017) [1], who reported mechanization of agriculture, shrinking grazing land for cattle, comparison of milk production and feed and fodder cost between indigenous cattle and crossbred were the major causes for decreasing indigenous cattle population with the mean score of 2.39, 2.33, 2.27, 2.22, respectively.

Moderate scores were observed for factors such as early reproductive ability (52.62), input responsiveness (52.06), and favorable government schemes (48.78). These indicate that while biological and institutional factors play a role, their influence is secondary to economic and resource-based constraints. The similar results were cited by Kolekar *et al.*

(2023) [4]. Indigenous breeds usually used to have better tolerance to environmental changes and resistance to pests and diseases compared to cross bred cows.

Lower Garrett scores were observed for availability of quality semen (47.35), access to veterinary care (48.26), and access to finance (46.14), suggesting that although infrastructural and institutional support exist, they are not the primary determinants of farmers decisions. The least influential factors were poor mass media or extension contact (30.33), non-participation in training programmes (29.99), adaptability to changing environmental conditions (18.75), and resistance to diseases (17.51). These findings imply that awareness creation and farmer education have not yet been strong drivers of transformation in the sector.

Table 1: Constraints faced by dairy farmers in Karnataka

Sl. No.	Factors	G.S.
1	Profitability	81.02
2	High cost of feed and fodder	79.03
3	Scarcity of labour	72.93
4	Productivity	71.41
5	Lack of green fodder throughout the year	68.01
6	Increasing mechanization of agriculture	65.42
7	Non availability of grazing land	61.02
8	Shrinking landholding size	59.03
9	Early reproductive ability	52.62
10	Input responsive nature of species	52.06
11	Favorable governmental schemes	48.78
12	Access to veterinary care and aids	48.26
13	Availability of quality semen	47.35
14	Unavailability of improved technology	46.43
15	Easy access to finance	46.14
16	Poor mass media or extension agency contact	30.33
17	Non-participation in training programmes	29.99
18	Adaptability to prevailing/changing environmental conditions	18.75
19	Resistance to diseases	17.51

These factors affected the widespread shift away from indigenous breeds, confirmed by previous studies (Khalandar *et al.*, 2019; Patil *et al.*, 2019) [2, 10], is broadly linked to their lower milk productivity compared to crossbreds. Economic factors, including government milk price incentives that favor high-yield animals and changing agricultural practices that reduce fodder availability, have collectively driven this decline.

The general decline in the buffalo population is often associated with management challenges and resource constraints. However, the positive growth in certain districts is driven by strong local consumer demand for high-fat buffalo milk and evidence suggesting that buffalo dairying can be highly profitable in these specific agro-ecological and market contexts (Rebasiddanavar *et al.*, 2022; Sharma *et al.*, 2022) [3, 5].

Conclusion

The analysis of factors influencing the transition and dynamics in the bovine population of Karnataka revealed that economic considerations are the dominant drivers of change. The study clearly indicated that profitability is the foremost factor motivating farmers to shift from indigenous to crossbred cattle, followed closely by the high cost of feed and fodder and scarcity of labour. These findings highlight

that farmers decisions are primarily guided by income potential and cost-related constraints rather than by institutional or infrastructural influences.

Furthermore, limitations such as reduced grazing land, shrinking landholdings, and lack of green fodder throughout the year have made it difficult to sustain traditional rearing practices. Although biological and institutional factors like reproductive efficiency, availability of veterinary services, and access to finance do play a role, their impact is relatively less pronounced.

The study by Balaraju *et al.* (2017) ^[1] indeed found that establishing a separate organized market, granting incentives and encouraging organic farming with mean scores of 2.63, 2.54 and 2.48 respectively were considered necessary interventions for the conservation of indigenous cattle. These factors were among the major suggestions revealed by field veterinarians to help preserve indigenous cattle populations, reflecting the importance of market structures, incentives, and organic livestock farming practices in conservation efforts.

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