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Assessment of herd composition, herd dynamics and breeding suitability of cattle maintained in selected gaushalas of Karnataka

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Abstract

Gaushalas play a major role in providing shelter to abandoned, stray, old and non-productive cattle while contributing to cattle welfare and conservation of indigenous bovine genetic resources. However, scientific information on herd composition, herd dynamics and breeding suitability of cattle maintained in gaushalas is sparse. The present study was undertaken to assess the herd composition, herd dynamics and breeding suitability of cattle maintained in selected gaushalas of Karnataka.

A pre-tested questionnaire, personal interviews, available farm data, and direct field observations were used in a survey that was conducted in 21 gaushalas in selected districts of Karnataka. Data were collected on breeding activities, age and sex composition, herd size, ownership patterns, and the breeds of cattle that were supposedly kept. An external physical examination was used to assess the breeding fitness of animals of breeding age.

The study indicated considerable variation in herd size, management systems and breeding practices among the surveyed gaushalas. Religious organizations and charitable trusts oversaw the majority of gaushalas. The major proportion of the herd was composed of adult females, while natural service was the most common breeding method. Although information on cattle breeds reportedly maintained was documented, systematic breed-wise herd records were generally unavailable. A significant percentage of animals of breeding age had favourable physical traits appropriate for breeding, as determined by an external physical examination. Nonetheless, it was determined that poor animal identification, record keeping, and scientific breeding practices were major drawbacks.

The study provides baseline information on herd composition and breeding suitability of cattle maintained in gaushalas. It highlights the need for systematic animal identification, herd recording and scientific reproductive management to strengthen the role of gaushalas in cattle conservation and sustainable livestock development.

Keywords: Gaushala, herd composition, herd dynamics, breeding suitability, external physical examination, indigenous cattle conservation, Karnataka

1. Introduction

Gaushalas play a significant role in providing shelter and care to abandoned, stray, aged and infirm cattle, besides contributing to animal welfare and conservation of indigenous bovine genetic resources. In recent years, gaushalas have drawn greater attention for their potential to conserve native cattle, promote organic farming, and support sustainable livestock production (NITI Aayog, 2023) [5]. However, the performance of gaushalas in achieving these objectives depends mainly on scientific herd management, proper healthcare, reproductive management, and systematic record-keeping.

The importance of gaushalas in India has been further increased by the growing number of abandoned and unproductive cattle resulting from agricultural mechanisation, dwindling grazing resources, and shifting farming systems (DAHD, 2019) [1]. The majority of gaushalas receive animals through donations, rescue operations, or voluntary surrender by owners, resulting in diverse cattle populations with varying age, sex, and health status. Successful management of these herds requires precise data on herd composition, herd dynamics, and

animal breeding suitability.

Previous studies have documented that gaushalas' management practices vary significantly from one another. While Mandi and Subash (2022) ^[3] noted differences in housing, feeding, sanitation, and veterinary care, Mandi *et al.* (2019) ^[2] revealed variations in herd size, infrastructure, and management techniques among gaushalas in Karnataka. Singh *et al.* (2023) ^[6] indicated that organized herd management and planned use of available animal resources are essential to promoting the sustainability of gaushalas, while Singh *et al.* (2022) ^[7] emphasised that adoption of scientific management practices improves animal welfare and herd health.

Assessment of herd composition and herd dynamics provides valuable information on herd structure, age and sex wise distribution, replacement patterns and breeding practices, which are required for planning effective management and conservation programmes. Similarly, assessing breeding-age animals based on external physical examination aids in identifying animals that could be suitable for inclusion in organized breeding programmes. However, published information on herd composition, herd dynamics and breeding suitability of cattle maintained in gaushalas of Karnataka remains limited, particularly under field conditions where systematic herd records and pedigree information are generally unavailable. Therefore, the present study was undertaken to assess the herd composition, herd dynamics and breeding suitability of cattle maintained in selected gaushalas of Karnataka with the following objectives: to assess the herd composition of cattle maintained in selected gaushalas with respect to herd size, age and sex composition, to document the cattle breeds reportedly maintained and breeding practices followed in the surveyed gaushalas and to assess the breeding suitability of breeding-age animals based on external physical examination. The information generated from the study is expected to provide baseline data for improving scientific herd management and strengthening the role of gaushalas in cattle conservation initiatives.

2. Materials and Methods

2.1 Study area and selection of gaushalas

The study was carried out in 21 gaushalas located in Gadag, Koppal, Bagalkot, Dharwad and Haveri districts of Karnataka. The gaushalas were purposively selected to represent different management systems and geographical regions. The study covered institutions managed by religious organizations and charitable trusts.

2.2 Data collection

Data were collected through field visits using a pre-tested structured questionnaire, personal interviews with gaushala managers or caretakers, verification of available records and direct observation of animals and management practices. The survey schedule was prepared based on the objectives of the study and earlier surveys conducted in Karnataka (Mandi *et al.*, 2019; Mandi and Subash, 2022) ^[2, 3].

Information collected included ownership pattern, herd size, cattle breeds reportedly maintained, herd composition, herd dynamics and breeding activities.

2.3 Herd composition and herd dynamics

Each gaushala's total cattle population was recorded, and the age and sex distribution of the herd was recorded. Animals were categorised as calves, young stock, and adults based on information from caretakers or records that were accessible. Wherever possible, data on herd dynamics, including sources

of animals, was documented.

Based on data from management and observations, the cattle breeds reportedly kept in each gaushala were recorded. Breed-wise numerical analysis was not undertaken since most gaushalas lacked systematic breed identification and breed-wise herd records.

2.4 Management and breeding practices

Information on record keeping and breeding practices was collected. Details regarding breeding methods, breeding bulls maintained, use of natural service or artificial insemination and maintenance of breeding records were also documented

2.5 Assessment of breeding suitability

Based on an external physical examination, the breeding-age animals that were present during the survey were assessed for eligibility for breeding. General health, body condition, structural conformation, foot and limb soundness, movement, and the existence of obvious physical anomalies were all assessed. Whenever required, the external genitalia of bulls were examined for gross abnormalities; in females, udder development and general physical health were also taken into account.

Based on external physical examination, animals with normal body condition, sound conformation, and no noticeable physical defects were considered fit for breeding. This evaluation was limited to field observations and did not include laboratory investigations and detailed reproductive examination.

2.6 Statistical analysis

Descriptive statistics were used to analyze the data. In order to describe herd composition, herd dynamics, and breeding suitability, frequencies, percentages, and means were computed, and the results are presented in tables.

3. Results

3.1 Distribution and management of surveyed gaushalas

A total of 21 gaushalas located in five districts of Karnataka were included in the study (Table 1). The highest number of gaushalas surveyed was from Bagalkot District (8), followed by Dharwad (5), While Gadag and Koppal districts contributed three gaushalas each and Haveri district contributed two gaushalas.

The surveyed gaushalas were managed either by charitable trusts or religious institutions (Table 2). Of the 21 gaushalas, 12 (57.14%) were managed by trusts, whereas 9 (42.86%) were managed by religious institutions. Trust-managed gaushalas predominated in Gadag, Koppal, Haveri and Dharwad Districts, while religious institutions managed the majority of Gaushalas in Bagalkot District.

3.2 Herd size and cattle breeds reportedly maintained

The total herd strength of all surveyed gaushalas was 3,190 cattle (Table 2). Highest number was recorded in Koppal district (1,302 Animals), followed by Bagalkot (983), Gadag (476), Dharwad (291), and Haveri (138).

Data indicated that the herds comprised predominantly non-descript cattle along with several recognized indigenous breeds. The commonly reported breeds included Khillar, Hallikar, Gir, Malnad Gidda and Amrit Mahal, while Sahiwal, Kankrej, Deoni, Ongole, Bargur, Kasargod and Red Sindhi were maintained in a few gaushalas. Crossbred cattle were also reported in all the surveyed districts. However, systematic breed-wise population records were not available;

therefore, quantitative breed-wise analysis was not undertaken.

3.3 Herd composition

The herd composition of cattle maintained in the surveyed gaushalas is presented in Table 3. Of the total 3,190 animals, 1,775 (55.64%) were cows, 589 (18.46%) were female calves, 375 (11.76%) were male calves, 330 (10.34%) were bulls, and 121 (3.79%) were bullocks.

Cows constituted the largest proportion of the herd across all districts, whereas bullocks represented the smallest category. The predominance of cows indicates that the surveyed gaushalas primarily served as shelters for abandoned, rescued, and non-productive female cattle.

3.4 Herd dynamics and breeding activities

The primary ways in which cattle entered the gaushalas under study were thru owner abandonment or donation, rescue of stray cattle by gaushala management, transfer of stray cattle by district administration and direct purchase of animals. The relative contribution of these sources varied among the gaushalas depending on their management policy and local circumstances.

Natural service was the only breeding method practiced in the surveyed gaushalas. Artificial insemination was not routinely adopted. Breeding was largely unplanned and indiscriminate in most gaushalas due to the absence of structured breeding programmes and systematic animal records. However, a few gaushalas managed by religious institutions, maintained

breeding bulls representing different indigenous breeds to facilitate natural service.

3.5 Breeding suitability based on external physical examination

Based on an external physical examination, breeding-age cows were evaluated for breeding suitability; the results are presented in Table 4. Based on their overall health, body condition, structural conformation, and absence of noticeable physical anomalies, 696 (39.21%) of the 1,775 cows that were inspected were deemed suitable for breeding.

Among the districts, Koppal district has the most breeding-suitable cows (270), followed by Bagalkot (226), Gadag (85), Dharwad (75), and Haveri (40). While a substantial number of cows were deemed appropriate for breeding, many of them were ruled unsuitable due to their elderly age, poor physical condition, or obvious physical flaws detected during the assessment.

Table 1: District-wise gaushalas considered for study and their management

Sl. No.	District	No of Gaushalas under study	Management of gaushalas by	
			Trust	Religious Institution
1	Gadag	3	2	1
2	Koppal	3	2	1
3	Bagalkot	8	3	5
4	Haveri	2	2	0
5	Dharwad	5	3	2
Total		21	12	9

Table 2: District wise total no of animals in gaushalas under study

Sl. No.	District	No of animals	Breeds maintained
1	Gadag	476	Non-descript, Khillar, Hallikar, Gir, Malnad Gidda, Amrith Mahal & Crossbreds.
2	Koppal	1302	Non-descript, Khillar, Hallikar, Gir, Malnad Gidda, Amrith Mahal, Sahiwal, Kankrej, Deoni & Crossbreds.
3	Bagalkot	983	Non-descript, Khillar, Hallikar, Gir, Malnad Gidda, Amrith Mahal, Kankrej, Deoni, Ongole, Bargur, Kasargod & Crossbreds.
4	Haveri	138	Non-descript, Khillar, Hallikar, Gir, Malnad Gidda & Crossbreds.
5	Dharwad	291	Non-descript, Khillar, Hallikar, Gir, Malnad Gidda, Amrith Mahal, Red Sindhi, Deoni & Crossbreds.
Total		3190	

Table 3: Herd composition in gaushalas under study

Sl. No.	District	No of animals	Cows	Male Calves	Female calves	Bulls	Bullocks
1	Gadag	476	305	76	46	19	30
2	Koppal	1302	704	151	262	152	33
3	Bagalkot	983	540	121	211	79	32
4	Haveri	138	69	14	18	25	12
5	Dharwad	291	157	13	52	55	14
Total		3190	1775	375	589	330	121

Table 4: Breeding suitability of breeding-age cows based on external physical examination in the surveyed gaushalas

Sl. No.	District	Total No. of animals	No. of cows examined	Cows suitable for breeding	Percentage (%)
1	Gadag	476	305	85	27.87
2	Koppal	1302	704	270	38.35
3	Bagalkot	983	540	226	41.85
4	Haveri	138	69	40	57.97
5	Dharwad	291	157	75	47.77
Total		3190	1775	696	39.21

Some of the important aspects observed in the study area are

- The Goshalas in the study area were maintained by trusts and also many religious institutions.
- Cows comprised more than half the herd, Bullocks were least.

- Goshalas were mainly run for purposes of compassion, religious considerations and rehabilitation.
- Only few goshalas in the study area took interest regarding value addition to products like dung, urine etc.
- Unlike many other goshalas (specially of North India), the one in study area need to gear up regarding cattle

improvement and conservation of breeds of the region.

- There is a great possibility of improving the livestock wealth of Gaushalas if suitable interventions are assessed and provided at appropriate time.

4. Discussion

The present study provides an overview of herd composition, herd dynamics and breeding suitability of cattle maintained in selected gaushalas of Karnataka. Although gaushalas have traditionally functioned as shelters for abandoned and unproductive cattle, they are increasingly being recognized as potential centres for conservation of indigenous cattle genetic resources. The findings of the present study indicate considerable variation in herd size, management practices and breeding activities among the surveyed gaushalas.

More than half (57.14%) of the surveyed gaushalas were managed by charitable trusts, while the remaining were managed by religious institutions. This observation agrees with the reports of Mandi *et al.* (2019) ^[2] and Mandi and Subash (2022) ^[3], who documented that most gaushalas in Karnataka are administered by charitable trusts or religious organizations with financial support primarily derived from public donations. Such institutions are generally established with the objective of providing care and protection to abandoned, rescued and aged cattle rather than functioning as organized livestock production units. As a result, depending on their financial resources and management priorities, gaushalas frequently differ in the availability of technical personnel, scientific record keeping, and planned breeding programs.

A total of 3,190 cattle was maintained in the surveyed gaushalas, with considerable variation in herd size across districts. This variation may be attributed to differences in infrastructure, financial capacity, availability of land and fodder resources, and the geographical area served by individual gaushalas. Similar variation in herd size has been reported by Mandi *et al.* (2019) ^[2] in Karnataka and by Singh *et al.* (2023) ^[6] in gaushalas from northern India. Larger gaushalas generally receive a greater number of rescued and donated cattle and are therefore required to allocate greater resources for their management.

Information collected during the survey indicated that the majority of gaushalas maintained heterogeneous cattle populations comprising non-descript cattle along with several indigenous breeds. However, systematic breed-wise herd records were unavailable in most institutions, making quantitative breed characterization difficult. Similar observations were reported by Mandi *et al.* (2019) ^[2], who identified inadequate animal identification and record keeping as major limitations in scientific herd management. The absence of reliable herd records not only restricts accurate documentation of breed composition but also limits implementation of planned breeding and conservation programmes. Establishing standardized animal identification and recording systems would therefore be an important step towards improving the management and conservation value of gaushalas.

The herd structure observed in the present study showed that cows constituted more than half of the total cattle population (55.64%), whereas bullocks accounted for only 3.79% of the herd. The predominance of adult female cattle reflects the primary objective of gaushalas, which is to provide lifelong shelter to abandoned, aged and non-productive cows. Similar herd structures have been reported in previous studies on gaushalas in Karnataka (Mandi *et al.*, 2019) ^[2] and other parts

of India (Singh *et al.*, 2022) ^[7], where female cattle consistently represented the largest proportion of the herd. The comparatively smaller number of bullocks may be attributed to the declining requirement for draught animals following increased mechanization of agriculture and changing farming practices.

The present study also documented the major pathways through which cattle entered gaushalas. Most animals were admitted following abandonment by owners, rescue of stray cattle by gaushala management, transfer by local administration or voluntary donation. These observations are consistent with the reports of Singh *et al.* (2023) ^[6], who noted that gaushalas increasingly function as rehabilitation centres for abandoned and stray cattle rather than conventional dairy or breeding farms. The continuous inflow of animals from diverse and often unknown sources contributes to heterogeneous herd composition and poses additional challenges in disease control, nutritional management and breeding.

Natural service was the only breeding method practiced in the surveyed gaushalas, and organized breeding programmes were largely absent. In most institutions, breeding occurred indiscriminately due to unrestricted mating and lack of systematic breeding policies. However, a few gaushalas managed by religious institutions-maintained breeding bulls representing different indigenous breeds for natural service. Similar observations have been reported by Mandi *et al.* (2019) ^[2], who found that breeding management received relatively less attention compared with routine feeding and shelter management. The absence of planned breeding strategies reduces opportunities for conserving valuable indigenous germplasm and may increase the risk of indiscriminate mating among animals of different genetic backgrounds. Adoption of controlled mating, strategic use of breeding bulls and appropriate use of artificial insemination, wherever feasible, would contribute significantly to genetic improvement and conservation.

Assessment of breeding suitability based on external physical examination indicated that 696 of the 1,775 cows (39.21%) examined possessed acceptable body condition, structural conformation and general health for consideration in breeding programmes. Although external physical examination cannot replace comprehensive breeding soundness evaluation, it provides a practical field-level approach for identifying animals with desirable phenotypic characteristics. The relatively moderate proportion of breeding-suitable cows observed in the present study may be attributed to the presence of aged, debilitated and chronically unproductive animals, which constitute a major component of gaushala populations. These findings suggest that a substantial proportion of the cattle maintained in gaushalas could potentially be incorporated into organized conservation breeding programmes following appropriate health screening and reproductive evaluation.

The study also highlighted the limited emphasis placed on value addition of cattle-derived products. Only a few gaushalas utilized dung and urine for preparation of organic manure, vermicompost or other value-added products. Similar observations have been made by Singh *et al.* (2023) ^[6], who emphasized that diversification into cattle-based enterprises can improve the financial sustainability of gaushalas while simultaneously supporting organic agriculture and rural livelihoods. Strengthening such activities may reduce dependence on charitable donations and enhance long-term sustainability.

Overall, the findings of the present investigation suggest that gaushalas in Karnataka possess considerable potential to contribute to cattle conservation beyond their traditional welfare role. Scientific animal identification, maintenance of herd records, planned breeding, regular veterinary care and effective utilization of cattle by-products could substantially improve herd management and facilitate conservation of indigenous cattle genetic resources. The baseline information generated through this study may assist policymakers, livestock development agencies, and gaushala management in designing suitable interventions to strengthen the role of gaushalas in sustainable cattle conservation.

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Conflict of Interest

Not available

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