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Impact of farm location on dairy animal health and behaviour welfare scores in Karnataka

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Abstract

Assessing the welfare of dairy animals requires a multidimensional understanding of how management, environment, and human-animal interactions influence health and behaviour. This study evaluates the impact of farm location on dairy cattle welfare in Karnataka by comparing key welfare indicators across peri-urban farms of Bengaluru Rural district and rural farms of Kolar district. Using purposive random sampling, 60 dairy farms (30 peri-urban, 30 rural) were assessed based on the “Animal Health and Behaviour” component comprising productivity, body condition, cow comfort, cleanliness, hock injuries, human-animal relationship, lameness, mastitis incidence, reproductive efficiency, and abnormal behaviours. The overall mean welfare score (out of 40) did not differ significantly between peri-urban (20.80 ± 0.592) and rural farms (21.97 ± 0.733), indicating comparable welfare status across regions. Peri-urban farms showed marginally better Body Condition Scores, Hock Injury Scores, and Reproductive Efficiency, whereas rural farms demonstrated relatively higher scores for Average Productivity, Cow Comfort Index, Cow Cleanliness Score, Human-Animal Relationship, Lameness Score, Mastitis control, and Abnormal Behaviour. Notably, rural farms performed significantly better ($P < 0.05$) in lameness reduction and mastitis incidence, likely due to advantages such as greater open space, better floor conditions, partial grazing opportunities, and reduced dependence on milking machines. Despite minor regional differences, the overall mean welfare score of 21.38/40 reflects suboptimal welfare conditions across both systems, underscoring a pressing need for improved hygiene, enhanced stall comfort, better mastitis management, and systematic adoption of welfare-focused dairy management practices. The findings provide evidence-based insights to support future welfare guidelines and policy interventions for Karnataka’s dairy sector.

Keywords: Dairy cattle welfare, farm location, animal health, behaviour indicators, Karnataka

Introduction

The term ‘animal welfare’ is defined as the ability of an animal to cope physiologically, behaviourally, cognitively, and emotionally with its physiochemical and social living environment, including the animal’s subjective experience of its condition (Scott *et al.*, 2001)^[7]. According to the Farm Animal Welfare Council (FAWC, 1993)^[2], Five Freedoms that are required to ensure that animals are in good welfare are (1) Freedom from hunger, thirst, and malnutrition, (2) Freedom from thermal and physical discomfort, (3) Freedom from pain, injury and disease, (4) Freedom to express normal behaviour, and (5) Freedom from fear and distress.

In the year 2015, the Animal Welfare Board of India (AWBI), the statutory body of the Government of India, has issued an advisory to all state governments recommending the National Code of Practices for Management of Dairy Animals in India. The AWBI has specified that all cattle premises in the state must be registered according to the Registration of Cattle Premises Rules, 1978 under Prevention of Cruelty to Animals Act 1960. While registering and during inspections, the “National Code of

Practices of Management of Dairy Animals in India” should be used as a guideline to ensure welfare of dairy animals (ICAR, 2014)^[4].

Growing consumer awareness about animal welfare has boosted the demand for livestock products sourced from farms that maintain high welfare standards, potentially leading to increased market value and profits. However, the absence of comprehensive data on the welfare status of dairy cattle in Karnataka poses a significant obstacle to developing effective animal welfare policies. Hence the present study was undertaken to study the impact of farm location on animal health and behaviour welfare scores in Karnataka.

Materials and Methods

The purposive random sampling method was used for the selection of livestock farm households and to assess dairy cattle welfare. A total of 60 dairy cattle farms, 30 from the peri-urban region of Bengaluru Rural district and 30 from rural region of Kolar district were considered for the present study. Animal welfare was assessed at the dairy farms, comprising 60 dairy cattle farms.

The welfare score of the component “Animal Health and Behaviour” with a total score of 40, comprised: Average productivity (8), Body Condition Score (4) as per Ferguson *et al.* (1994) ^[3], Cow Comfort Index (5) as per Nelson (1996) ^[6], Cow Cleanliness Score (4) as per Whay *et al.* (2003) ^[10], Hock Injury Score (3) as per Cook *et al.* (2004) ^[1], Human-Animal Relationship (3) as per Waiblinger *et al.* (2003) ^[9], Lameness Score (4) as per Sprecher *et al.* (1997) ^[8], Mastitis incidence (4), Reproductive efficiency (3) and Abnormal behaviour (2).

Results and Discussion

The overall mean scores of the welfare indicator ‘animal health and behaviour’ in dairy farms of different regions is presented in Table 1. The mean welfare score in peri-urban and rural regions, out of total score of 40, was 20.80 ± 0.592 and 21.97 ± 0.733 , respectively. Overall mean score of the welfare indicator ‘animal health and behaviour’ in dairy farms of different regions have no significant differences were noticed in the welfare scores of peri-urban and rural dairy farms. However, farms in peri-urban region had better Body Condition Score, Hock Injury Score and Reproductive efficiency, whereas rural dairy farms had better Average productivity, Cow Comfort Index, Cow Cleanliness Score, Human-animal relationship, Lameness Score, Mastitis incidence and Abnormal behaviour. Similar findings were reported by Kumar (2016) ^[5].

Average productivity: The mean welfare score in peri-urban and rural regions, out of total score of 8, was 5.30 ± 0.215 and 5.40 ± 0.282 , respectively. No significant difference was observed among the different regions of the dairy farms. No significant differences were noticed in the welfare scores of peri-urban and rural dairy farms due to similar, superior dairy cattle found in all regions. However, rural dairy cows had slightly superior average lactation milk yield and wet average as compared to peri-urban cattle. Similar findings were reported by Kumar (2016) ^[5].

Body Condition Score (BCS): The mean welfare score in peri-urban and rural regions, out of total score of 4, was 2.20 ± 0.273 and 1.87 ± 0.278 , respectively. No significant difference was observed among the dairy farms of different regions. However, peri-urban dairy farms had slightly superior BCS scores. Similar findings were reported by Kumar (2016) ^[5].

Cow Comfort Index (CCI): The mean welfare score in peri-urban and rural regions, out of total score of 5, was 3.17 ± 0.186 and 3.27 ± 0.258 , respectively. No significant difference was observed among the dairy farms of different regions. Similar findings were reported by Kumar (2016) ^[5]. This could be indicative of the crossbred dairy cows having adapted well to peri-urban conditions with lower covered and open area. The widespread use of cow mats also enhanced the welfare of cattle reared in tie stalls.

Cow Cleanliness Score (CCS): The mean welfare score in

peri-urban and rural regions, out of total score of 4, was 0.53 ± 0.208 and 0.57 ± 0.202 , respectively. No significant difference was observed among the dairy farms of different regions. No significant differences were noticed in the welfare scores of peri-urban (0.53 ± 0.208) and rural (0.57 ± 0.202) dairy farms. Similar findings were reported by Kumar (2016) ^[5]. This is indicative of the low importance given by farmers in all regions to farm hygiene and animal cleanliness.

Hock Injury Score (HIS): The mean welfare score in peri-urban and rural regions, out of total score of 3, was 0.07 ± 0.046 and 0.03 ± 0.033 , respectively. No significant difference was observed among dairy farms of different regions. Similar findings were reported by Kumar (2016) ^[5].

Human-Animal Relationship (HAR): The mean welfare score in peri-urban and rural regions, out of total score of 3, was 1.33 ± 0.194 and 1.50 ± 0.196 , respectively. There were no significant differences between the groups. Similar findings were reported by Kumar (2016) ^[5].

Lameness Score (LS): The mean welfare score in peri-urban and rural regions, out of total score of 4, was 3.57 ± 0.104 and 3.83 ± 0.069 , respectively. The mean welfare score of the rural dairy farms was significantly ($P < 0.05$) higher than the mean welfare scores obtained in peri-urban dairy farms, primarily due to better floor space, flooring type, open area, and access to grazing. In contrast, no significant differences among farms of different regions were reported by Kumar (2016) ^[5].

Mastitis incidence: The mean welfare score of peri-urban and rural regions, out of total score of 4, was 0.97 ± 0.269 and 1.87 ± 0.338 , respectively. The mean welfare score of the rural dairy farms was significantly ($p < 0.05$) higher than the mean welfare scores obtained in peri-urban dairy farms. This could possibly be due to the animals being housed in tie stalls with limited space and opportunity for free roaming in the open yard. The lack of a separate milking parlour and teat disinfection practices also exacerbate mastitis. Further, the greater use of milking machines in peri-urban areas, and the associated risks due to poor machine hygiene and maintenance, are also causative factors. In contrast, Kumar (2016) ^[5] reported significantly better welfare in peri-urban dairy farms.

Reproductive efficiency: The mean welfare score in peri-urban and rural regions, out of total score of 2, was 2.23 ± 0.213 and 2.10 ± 0.232 , respectively. No significant difference was observed among the dairy farms of different regions. Similar findings were reported by Kumar (2016) ^[5].

Abnormal behaviour: The mean welfare score in peri-urban and rural regions, out of total score of 3, was 1.43 ± 0.157 and 1.53 ± 0.142 , respectively. No significant difference was observed among the dairy farms of different regions. Similar findings were reported by Kumar (2016) ^[5].

Table 1: Mean welfare score of ‘animal health and behaviour’ component in peri-urban and rural dairy farms

Welfare indicator		Max Score		Overall	P-value
		Peri-urban	Rural		
Average productivity	8	5.30 ± 0.215	5.40 ± 0.282	5.35 ± 0.176	0.779
Body Condition Score	4	2.20 ± 0.273	1.87 ± 0.278	2.03 ± 0.195	0.396
Cow Comfort Index	5	3.17 ± 0.186	3.27 ± 0.258	3.22 ± 0.158	0.754
Cow Cleanliness Score	4	0.53 ± 0.208	0.57 ± 0.202	0.55 ± 0.143	0.909
Hock Injury Score	3	0.07 ± 0.046	0.03 ± 0.033	0.05 ± 0.028	0.561
Human-Animal Relationship	3	1.33 ± 0.194	1.50 ± 0.196	1.42 ± 0.137	0.548
Lameness Score	4	3.57 ^a ± 0.104	3.83 ^b ± 0.069	3.70 ± 0.064	0.037
Mastitis incidence	4	0.97 ^a ± 0.269	1.87 ^b ± 0.338	1.42 ± 0.222	0.042
Reproductive efficiency	2	2.23 ± 0.213	2.10 ± 0.232	2.17 ± 0.156	0.673
Abnormal behaviour	3	1.43 ± 0.157	1.53 ± 0.142	1.48 ± 0.105	0.638
Total score	40	20.80 ± 0.592	21.97 ± 0.733	21.38 ± 0.473	0.220

Note: Means within a row bearing different superscripts differ significantly ($p < 0.05$).

Conclusion

No significant differences were noticed in the overall welfare scores of dairy farms of different regions in the welfare indicator ‘animal health and behaviour’. Rural dairy farms had significantly better lameness score and mastitis incidence score compared to farms of peri urban regions. Overall, the mean welfare score of 21.38 out of 40, was on the lower side, indicating significant scope for improvement of dairy cattle welfare in the region.

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