

ASSESSMENT OF ANIMAL WELFARE USING BEHAVIORAL INDICATORS IN DAIRY ANIMALS

J. G. Kalaria^{1*}, H. M. Patel¹, M. M. Islam², P. H. Agravat³, J. H. Patel⁴

¹MVSc Scholar, Department of Livestock Production Management, College of Veterinary Science and Animal Husbandry, Kamdhenu University, Navsari, Gujarat, India, ²Associate Professor and Head, Department of Livestock Production Management, College of Veterinary Science and Animal Husbandry, Kamdhenu University, Navsari, Gujarat, India, ³Assistant Professor, Department of Livestock Production Management, College of Veterinary Science and Animal Husbandry, Kamdhenu University, Navsari, Gujarat, India, ⁴Associate Professor and Head, Livestock Farm Complex, College of Veterinary Science and Animal Husbandry, Kamdhenu University, Navsari, Gujarat, India

*Corresponding author's email: kalariajanakg05@gmail.com

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Abstract

During the recent times concerns regarding animal welfare have been coming into limelight. Gen-Z consumers are wanting more information on how their diet is coming from farm to table, besides this, there is also rising demand for sustainable animal production. Considering all these facts it is of utmost importance that production animals are raised with maximum possible standards so as to derive best possible animal production. This review article discusses some of the behavioural indicators in dairy animals which are indicative of animal welfare status on-farm. Earlier concepts focussed on understanding animal behaviour and reducing negative experiences for farm animals but recent advances also emphasize the importance of adding positive experiences to animals' life. Future prospects in the field of animal welfare should be directed towards enhancing animals' well-being by eventually outweighing positive experiences as compared to negative one.

Keywords: Animal welfare, Behavioural cues, Dairy Animals, Stress

Introduction

With the rising trend in dairy animal husbandry [1, 2, 3] there is increased concern about dairy animal welfare and sustainable production [1,4]. India ranks 1st in milk production in the world due to its enormous strength of dairy animals (cattle, buffalo and goat; highest population of these 3 animals individually in the world) [22, 23]. Owing to this huge strength of dairy animals, there are instances where production potential of the animal is misused and animal welfare is neglected. One reason for this; a large uneducated mass which isn't aware of animal welfare. Another reason being the careless nature of the educated ones. More than 80

percent of low producing indigenous animals are with small and marginal farmers and landless labours in form of small herds [24]. This can be taken as an advantage as small herds are easier to observe for animal welfare concerns over large herds. In this article, the key issue is to identify the signs that an animal shows when its welfare is compromised such that necessary arrangements could be made by human intervention so as to enhance the overall experience of a dairy animal.

Concept of Animal Welfare

Animal welfare can be defined as physical and mental state of an animal in

relation to its surroundings [Terrestrial Animal Health Code, WOA]. The five freedoms (freedom from hunger and thirst; freedom from discomfort; freedom from pain, injury and disease; freedom to express normal behaviour; freedom from fear and distress) [Farm Animal Welfare Council, 1979] forms the base for animal welfare supported scientifically by the five domains (nutrition, environment, health, behaviour, and mental state) [Terrestrial Animal Health Code, WOA]. Most of the Indian livestock owners are poor, illiterate and come from socially backward classes who tend to undervalue the importance of animal welfare in animal production as a result of lack of knowledge. Livestock is reared as a means to convert low quality feed to high quality products ignoring the animals' mental status. These days, animal welfare is discussed in public forums supported by consumers concern about their food production [5]. On closely observing the animals' behaviour and intensity of their expressions, a deeper understanding of animal welfare and their quality of life could be obtained [6]. Are the animals satisfied with the quality of life they are being getting or are they showing signs of discomfort [6]? These are important questions for welfare of dairy animals [6]. Behavioural cues of the animal must never be ignored as they provide valuable insight so as to maximise animal production. Any kind of negative experience may eventually lead to reduced final output. How can one identify such stressing cues or on contrary, provide positive experiences to animals? A need to divulge in a more species-specific behavioural study which could address these questions satisfactorily is required. In addition to this, a 'whole animal' study model can be used so as to effectively correlate those cues with animals' surroundings [6].

Behavioural Assessments

Diary animals can be assessed via 2-way method for determination of their welfare status. The qualitative and the quantitative monitoring of behavioural indicators. Firstly,

qualitative assessments see behaviour as a lively and revealing process [7][8][9][10][11]. Various parameters such as gait, interaction with herd mates, time for lying down, body posture during sitting, body posture during sitting down and standing up, etc. supports the idea. As a result, qualitative behaviour assessment may be a reliable tool for on field monitoring of social interactions in dairy cows [12]. Quantitative assessments involve 'social licking', 'sniffing head', 'sniffing body', 'gentle pushing', 'moderate pushing', 'head butting', 'fighting' and their correlation with qualitative parameters helps categorise animal as calm, nervous, indifferent, active [12]. Scarcity of basic resources such as food, water and resting areas create a scenario of stress accompanied by aggression [13]. Some unavoidable farm activities such as vaccination induces stress and pain in animals, but, in general positive experiences ought to outweigh negative experiences during animals' life [14].

Behavioural cues so as to satisfy animals' needs are very obvious. One just has to be a curious observant. Early weaning in dairy animals and pail feeding of milk can be stressful for young ones leading to the development a stereotypic behaviour such as cross-sucking. It also enhances the incidence of abscess at ears and navels due to sucking along with reduced body weight of calves at weaning. Furthermore, cows suffered from self- and inter-sucking had low body condition score, prolonged calving intervals, and signs of discomfort behaviour due to developed subclinical mastitis as a result of such stereotypic behaviours [15].

Tongue rolling is another stereotypic behaviour in dairy animals which reveals mixed signals. One such study showed positive correlation between the frequency of tongue rolling and lactation performance in dairy cows, however, from a production performance point of view, tongue-rolling indicates rumen discomfort in cows, and cows can reduce their discomfort by expressing tongue-rolling behaviour frequently [16]. Some scientists even mention it as a sign of

deprivation of food and boredom in different age groups of cattle [17]. Furthermore, housing pattern, temperature-humidity index and stocking density also play role in determining stress level in animals. Loose housing systems provide dairy cows' a space for movement and to express their natural behaviours [12]. This freedom of movement can be a key to diagnose animal health. For instance, evidencing lameness in farm animals can be taken as a cue to monitor hoof health and nutrition being offered on-farm. Observance of long hours of standing in dairy animals suggests a need to improve housing facility on farm. The Canadian code of practice [National Farm Animal Care Council and Dairy Farmers of Canada, 2009] recommends "building stalls that provide adequate room for cows to lay down for at least 12 h per day". Lying time has been experimentally being used as an indicator of lameness. One such study indicated that lameness is preceded by a period of reduced lying but once cows have become lame, they spend more time lying down [18][19].

The behavioural cues revealing stress can further be confirmed by biochemical evaluation of stress hormone i.e. cortisol profile of animals. A higher cortisol level was observed in intensively managed cows, indicative of higher physiological stress in such animals [20]. Owners practising intensive housing can provide animals with few hours of grazing a day so as to facilitate them to display their natural behaviours.

Animal welfare researches tend to put more emphasis on decreasing poor welfare practices which is a good thing but incorporation of positive welfare indicators would be a cherry on top as far as animal welfare is concerned. Exploration, feeding, lying and resting behaviour, allelomimetic

behaviour, qualitative behavioural assessment (QBA) has been studied in various animals and are taken as positive welfare indicators. In addition to this, exploration, feeding and allelomimetic behaviour tend to have a positive relationship and are also positively linked to space allowance and environmental stimulation. QBA has been the most used indicator for determining on-farm welfare of dairy animals [21].

Conclusion

To summarize, farm animal wellbeing and welfare should be utmost priority of animal owners so as to maximise production. Five Freedoms of Animal Welfare should be taken as a basis for developing on farm protocols such that at no time welfare of animals is compromised. It being a demanding task; long hours of visual examinations and close relationships with animals is being required. Task of supervision becomes comparatively easy in small-sized herds (most livestock owners in India) as compared to large-sized herds (commercialized dairy farms in most developed countries). Taking this as an advantage India can surpass most other countries in terms of animal welfare eventually increasing the value of its animal products. Different behavioural cues help us determine whether the animal is nervous, aggressive, calm and playful which can be taken as a sign to make necessary corrections in management practices. Welfare should be seen as minimising negative experiences and increasing positive experiences during animals' life. At last, animal welfare is a collective and continuous process which involves various parameters such as feeding, breeding, housing, healthcare and behaviour so as to reap economic benefits without overusing the production potential of animals.

References

- Broom, D. (2021). Farm animal welfare: A key component of the sustainability of farming systems. *Veterinarski glasnik*, 75(2), 145-151.
- FAOSTAT. Dairy Production and Products: Products (fao.org). Available online: <https://www.fao.org/dairy-production/products/products/en/> (accessed on 7 April 2026).

- FAO. Dairy and Dairy Products- OECD-FAO Agricultural Outlook 2019–2028. Dairy Production and Products: Products (fao.org). Available online: <https://www.fao.org/dairy-production-products/products/en/> (accessed on 7 April 2026).
- Dwyer, C. M. (2020). Can improving animal welfare contribute to sustainability and productivity? *Black Sea Journal of Agriculture*, 3(1), 61–65.
- WOAH. 2024. Animal welfare: a vital asset for a more sustainable world. Paris, 8 pp. <https://doi.org/10.20506/woah.3440>. Licence: CC BY-SA 3.0 IGO.
- Wemelsfelder, F. (2007). How animals communicate quality of life: the qualitative assessment of behaviour. *Animal welfare*, 16(S1), 25–31.
- Stevenson-Hinde, J., 1983. Individual characteristics: a statement of the problem. In: Hinde, R.A. (Ed.), *Primate Social Relationships: An Integrated Approach*. Blackwell Scientific Publications, Oxford, pp. 28–34.
- Feaver, J., Mendl, M., & Bateson, P. (1986). A method for rating the individual distinctiveness of domestic cats. *Animal Behaviour*, 34(4), 1016–1025.
- Kessler, M. R., & Turner, D. C. (1999). Effects of Density and Cage Size on Stress in Domestic Cats (*Felis Sil Vestris Catus*) Housed in Animal Shelters and Boarding Catteries. *Animal Welfare*, 8(3), 259–267.
- Wemelsfelder, F., Hunter, E. A., Mendl, M. T., & Lawrence, A. B. (2000). The spontaneous qualitative assessment of behavioural expressions in pigs: first explorations of a novel methodology for integrative animal welfare measurement. *Applied animal behaviour science*, 67(3), 193–215.
- Wemelsfelder, F. (2001). The inside and outside aspects of consciousness: complementary approaches to the study of animal emotion. *Animal Welfare*, 10(S1), S129–S139.
- Rousing, T., & Wemelsfelder, F. (2006). Qualitative assessment of social behaviour of dairy cows housed in loose housing systems. *Applied Animal Behaviour Science*, 101(1–2), 40–53.
- Bouissou, M. F., Boissy, A., Neindre, P. L., & Veissier, I. (2001). The social behaviour of cattle. In *Social behaviour in farm animals* (pp. 113–145). Wallingford UK: cabi Publishing.
- Report: Farm Animal Welfare in Great Britain: Past, Present and Future, 2009.
- Mahmoud, M. E., Mahmoud, F. A., & Ahmed, A. E. (2016). Impacts of self-and cross-sucking on cattle health and performance. *Veterinary world*, 9(9), 922.
- Li, C., Chen, X., Fang, T., & Gu, X. (2024). Do cows with stereotypic tongue-rolling behaviour cope better with their environment? *Frontiers in Veterinary Science*, 11, 1404539.
- Binev, R. (2022). Tongue rolling stereotypy in cattle-etiological, epidemiological and clinical investigations. *Bulgarian Journal of Veterinary Medicine*, 25(1).
- Chapinal, N., De Passille, A. M., Weary, D. M., Von Keyserlingk, M. A. G., & Rushen, J. (2009). Using gait score, walking speed, and lying behavior to detect hoof lesions in dairy cows. *Journal of dairy science*, 92(9), 4365–4374.
- Proudfoot, K. L., Weary, D. M., & Von Keyserlingk, M. A. G. (2010). Behavior during transition differs for cows diagnosed with claw horn lesions in mid lactation. *Journal of dairy science*, 93(9), 3970–3978.
- RAJADURAI, A., Rajamanickam, K., Kumaravelu, N., Vijayakumar, P., & Elango, A. (2026). Comparative Assessment of Dairy Cattle Welfare Under Intensive and Semi-Intensive Management Systems in Tamil Nadu, India.
- Papageorgiou, M., & Simitzis, P. E. (2022). Positive welfare indicators in dairy animals. *Dairy*, 3(4), 814–841.

Basic Animal Husbandry Statistics, 2025, Department of Animal Husbandry and Dairying Ministry of Fisheries, Animal Husbandry and Dairying Government of India.
20th Livestock Census, 2019, Department of Animal Husbandry and Dairying Ministry of Fisheries, Animal Husbandry and Dairying Government of India.
Annual Report 2024-25, Department of Animal Husbandry and Dairying Ministry of Fisheries, Animal Husbandry and Dairying Government of India.

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