

# Challenges and Solutions for Implementing Humanitarian Slaughter of Cattle in Brazil: A Focus on Animal Welfare

Wanessa Soares Luiz Silva, André Reuter Lima Mota, Henrique Lopes Miranda, Felipe Rodrigues Pinto, Livia Santos da Rocha, Elane Soares da Silva Dalmasio, Ledivan Honofrio Marchiori, Lucas Prates da Silva Trindade, Luan Ferreira da Silva, Daniel Rodrigues Silva

Received: 28 Sep 2024,

Receive in revised form: 24 Oct 2024,

Accepted: 02 Nov 2024,

Available online: 08 Nov 2024

©2024 The Author(s). Published by AI  
Publication. This is an open-access article under  
the CC BY license

(<https://creativecommons.org/licenses/by/4.0/>).

**Keywords—** Humane slaughter, Cattle, Animal welfare.

**Abstract—** This study aimed to identify the main obstacles and solutions for the implementation of humane slaughter standards for cattle in Brazil, analyzing the challenges and proposing strategies to improve animal welfare in livestock production. A literature review was used to summarize the existing scientific and regulatory literature on the subject that addresses different aspects of the Brazilian context. The main challenges identified were the lack of adequate infrastructure and equipment, the lack of training programs, cultural resistance to humane practices, insufficient financial incentives and limited monitoring. The lack of appropriate infrastructure and lack of training were identified as direct causes of animal suffering and low quality of the slaughter process, while economic and cultural barriers hinder the acceptance and adoption of the standards. The analysis suggests that the full implementation of these standards requires a systemic approach that integrates financial incentives, awareness campaigns, robust monitoring and government support for training and infrastructure. In conclusion, the study highlights that an effective transition to humane practices depends on coordinated actions that address challenges in an interdependent manner, providing an environment where standards can be applied in a sustainable and ethical manner. The recommendations provide support for the formulation of public policies that promote animal welfare and meet market demands, positioning the Brazilian livestock sector in a competitive and responsible manner.

## I. INTRODUCTION

Animal welfare is an increasingly present topic in academic, social and ethical debates, especially in relation to livestock production. According to Fraser (2024), the concept of animal welfare encompasses ensuring the physical and psychological conditions of animals, so that they can express their natural behavior, avoiding unnecessary suffering.

This field of study has become central due to society's growing awareness of animal rights and the impact of human practices on the lives of these beings, especially with regard to their breeding and slaughter.

In Brazil, one of the largest producers and exporters of beef in the world, animal welfare in livestock farming is a relevant aspect for the sustainability of the production chain and for meeting the demands of international markets, which require increasingly higher

ethical standards (Brasileiro; Souza; Brasileiro- Assing , 2024).

One of the main focuses of these requirements is related to the humane slaughter of cattle, which aims to minimize the suffering of animals during the slaughter process, ensuring practices that reduce stress and pain (Souza; Ribeiro, 2021).

According to Moraes *et al.* (2024), humane slaughter, also called slaughter with humane methods, is regulated by international bodies, such as the World Organization for Animal Health (OIE), and includes a series of procedures to ensure that the slaughter of animals is done ethically, with minimal suffering.

In Brazil, Normative Instruction No. 3 of 2000 of the Ministry of Agriculture, Livestock and Supply (MAPA) establishes the parameters for the handling and slaughter of animals in accordance with welfare standards (Venâncio *et al.*, 2024).

Despite technological and regulatory advances in the livestock sector, the effective implementation of animal welfare practices, especially in relation to the humane slaughter of cattle, still faces significant challenges. In many cases, there is a gap between current regulations and practical implementation in slaughterhouses, resulting in procedures that can cause avoidable stress, pain or suffering to animals. In addition, there is a disparity in information and guidance between different regions and producers, which compromises the uniformity of recommended practices.

In view of this, the research problem that arises is: *What are the main obstacles to the effective implementation of humane cattle slaughter standards in Brazil, and how can animal welfare practices be improved in the context of livestock production?*

This problem seeks to understand the barriers that prevent the full adoption of humane practices in cattle slaughter, analyzing the technical, economic, social and cultural aspects that influence this issue. In addition, it proposes to investigate how the adoption of technologies, team training and awareness of animal welfare can contribute to overcoming these obstacles, promoting more ethical and sustainable livestock farming.

From an academic perspective, this research contributes to the enrichment of the literature on animal welfare, especially with regard to humane slaughter practices. Although studies on the subject already exist, there is a lack of more comprehensive analyses that consider the challenges and solutions specific to the Brazilian reality, one of the largest beef exporters in the world. Thus, this study may serve as a basis for future research that seeks to

develop new methodologies, technologies or management strategies that reduce animal suffering and optimize industrial processes.

Scientifically, the research is relevant because it addresses critical issues in modern livestock farming, such as the need to reduce animal suffering without compromising production efficiency. The adoption of humane slaughter practices is directly related to the quality of the meat and the acceptance of the product by consumers, both in the domestic and foreign markets. The research, therefore, offers a significant contribution by providing data and analyses that can assist in the formulation of public policies and the development of more effective regulations for the sector.

In this context, this study aimed to identify the main challenges and solutions related to the implementation of humane cattle slaughter standards in Brazil. This research was developed through a qualitative approach, with an exploratory and descriptive character, based on a literature review. This method is suitable for a detailed and in-depth understanding of concepts, regulations and practices related to animal welfare and humane cattle slaughter. Therefore, the bibliographic study was carried out with the objective of gathering, analyzing and interpreting secondary data extracted from scientific publications.

## II. OBSTACLES TO THE IMPLEMENTATION OF HUMANITARIAN SLAUGHTER STANDARDS

Animal welfare is a field of study that assesses the living conditions of animals, considering aspects such as health, behavior and emotions. According to Broom (2011), animal welfare refers to the state of the individual in its attempts to cope with the environment in which it is inserted, encompassing physiological, behavioral and emotional mechanisms. The assessment of welfare uses indicators such as the presence of natural behaviors, absence of pain and disease, as well as behavioral and physiological responses to the environment.

Scientific studies have demonstrated the importance of providing environments that allow the expression of natural behaviors to improve animal welfare. Ceballos and Sant'Anna (2018) highlight that applied ethology, the study of animal behavior, is essential to identify behavioral indicators of welfare, allowing the implementation of practices that meet the specific needs of each species.

The analysis of the obstacles to the implementation of humane cattle slaughter standards in Brazil, as discussed by Carvalho (2021), Roça (2021), Couto, Coqueiro and

Martins (2020), and Almeida (2024), reveals a network of interconnected and mutually reinforcing challenges, creating a complex and restrictive scenario for the adoption of adequate animal welfare practices. The literature indicates that these obstacles form a cycle that perpetuates inadequate practices, indicating that a fragmented approach would be insufficient to deal with the magnitude and interdependence of these problems.

The methods of humane slaughter and bloody strangulation will differ mainly in relation to stunning, time and techniques during slaughter operations, number of animals slaughtered per day, tools used in slaughter and the efficiency of bleeding, subjects that will be discussed throughout the work (Mendonça; Caetano, 2017, p. 1197).

Animal welfare during slaughter is a central issue addressed by Mendonça and Caetano (2017), as well as in specific regulations, such as Normative Instruction No. 3, of January 17, 2000, of the Ministry of Agriculture, Livestock and Food Supply (MAPA) in Brazil. The regulation differentiates humane slaughter methods and bloodless jugulation mainly in relation to stunning practices, execution time, techniques used, number of animals slaughtered and bleeding efficiency. The regulation highlights the need for procedures that minimize animal suffering, which is consistent with studies that point to the importance of the environment and handling practices for welfare. At the same time, practices such as stunning ensure that animals do not experience pain and distress at the time of slaughter, reflecting a commitment to ethical and sustainable principles discussed in the scientific literature.

Upon critical analysis, it is clear that the regulation is in line with the animal welfare principles discussed by Mendonça and Caetano (2017) and Amaral *et al.* (2019), but its applicability and monitoring may still represent a challenge, especially considering the high volume of daily slaughters in some operations. Effective compliance with these guidelines requires that facilities and staff training be in line with modern practices and adequate equipment, as the absence of such conditions may compromise the expected result for animal welfare.

Legal requirements represent an important advance, but their effectiveness is directly linked to practical implementation and strict control, suggesting a continuous need for adaptation and investment in the sector

to achieve the animal welfare standards recommended by scientific studies and established by regulations (Amaral *et al.*, 2019).

The lack of adequate facilities and equipment is a key issue, as highlighted by Carvalho (2021). The lack of appropriate infrastructure for procedures such as effective stunning directly compromises animal welfare and leads to a slaughter process that does not meet humane standards. Without the necessary equipment, animals experience additional stress and suffering, which, in addition to ethical issues, also affects meat quality and slaughterhouse performance.

Carvalho (2021) and Roça (2021) argue that this deficiency is exacerbated by the lack of effective oversight. Even with Ordinance No. 365 of 2021, which establishes guidelines on minimum infrastructure and management, the practical implementation of these standards depends on significant financial resources. This creates a scenario in which small and medium-sized slaughterhouses, which make up a large part of the sector, face difficulties in meeting the required standards due to the limited capacity to mobilize resources.

Couto, Coqueiro and Martins (2020) expand on this analysis by pointing out that adapting to animal welfare standards is financially unfeasible for many producers. The costs involved range from structural reforms in slaughterhouses to the acquisition of high-value equipment, such as stunning guns and adequate restraint systems. This scenario exposes a disparity between legal requirements and the economic reality faced by many producers and slaughterhouses in Brazil. By demanding high standards without providing financing or support mechanisms, the system creates an impasse where full compliance with standards becomes impractical for the smallest participants in the sector, which contributes to the persistence of inadequate and unsustainable practices.

Another crucial aspect is worker training, discussed by Roça (2021), which is essential for the practical application of humane slaughter standards. The lack of training programs leads to the application of ineffective or even cruel practices, which intensify animal suffering and harm the performance of slaughterhouses.

Roça (2021) notes that Normative Instruction No. 12 of 2017 seeks to accredit entities to provide training, but its applicability is limited by the lack of dissemination and national adoption. This scenario indicates that simply establishing guidelines for training is not enough without the support of broad programs and incentives that promote real awareness about animal welfare.

The literature suggests that the lack of training not only derives from the lack of financial resources, but also

from the low perception of the importance of animal welfare in the production chain, as discussed by Almeida (2024). This point implies that training initiatives must be aligned with a cultural and educational effort that reinforces the ethical and practical value of animal welfare.

Almeida (2024) also explores the impact of cultural resistance on the implementation of standards. In many regions, traditional handling and slaughter practices remain resistant to the adoption of more humane methods, becoming an additional challenge to the advancement of animal welfare. This resistance is, in part, the result of a lack of awareness and understanding of the benefits of these practices for both public health and product quality.

Furthermore, Almeida (2024) suggests that in areas where cultural resistance is stronger, the introduction of training programs may be seen as intrusive or unnecessary, reinforcing a view that animal welfare is a dispensable concept in the livestock context. This situation points to the need for educational and informational campaigns that demonstrate the positive impact of humane practices on the quality and commercial value of products.

The literature also indicates that the lack of adequate oversight is a critical element that contributes to the disconnect between legislation and the reality of slaughterhouses, as noted by Carvalho (2021). Insufficient oversight makes animal welfare standards merely formal, with no real impact on the practice of the sector. The scarcity of human and financial resources to carry out consistent inspections and the lack of trained personnel to identify violations make regulations vulnerable to ineffectiveness.

Thus, although formally established, standards do not guarantee a concrete transformation in slaughter practices without solid institutional support. The literature review indicates that, in order to be effective, standards require a support base that includes not only the presence of inspectors, but also the ongoing training of these professionals to ensure effective control.

In summarizing these perspectives, the literature suggests that the challenges are interdependent and that isolated approaches would likely have little impact on improving animal welfare. The lack of infrastructure and equipment, lack of training, cultural resistance and insufficient oversight create a system where barriers reinforce each other, making any significant progress difficult.

The complexity of the obstacles indicates that effective change requires an integrated effort that promotes financial incentives, expands awareness and training programs, and strengthens oversight. This integrated system would act to break the cycle of difficulties, allowing animal

welfare practices to advance in a sustainable and ethical manner in the Brazilian context.

### III. STRATEGIES TO IMPROVE ANIMAL WELFARE PRACTICES IN LIVESTOCK FARMING

The literature suggests that implementing animal welfare practices requires an integrated set of actions that include training, subsidies, monitoring, awareness-raising and research. Each of these interventions addresses specific aspects of the needs and challenges of the livestock sector, and a critical analysis of these points allows us to identify the complementarity between the recommendations, as well as the challenges and limitations.

First, Silva (2018) emphasizes the importance of comprehensive training programs. The lack of training in the sector is often associated with handling practices that end up causing stress and suffering to animals, whether during transportation or at the time of slaughter. An adequate training program not only provides practical instructions, but also raises awareness among workers and producers about the ethical and economic relevance of animal welfare.

The lack of this awareness, as observed by Almeida (2024), maintains a gap between local practices and market demands. Silva (2018) highlights that training programs also have the potential to improve operational efficiency and product quality, aspects that directly influence access to more demanding markets.

The issue of financial incentives, discussed by Lotti and Junior (2023), emerges as a response to the economic challenges faced by small and medium-sized producers. These authors argue that, without financial support, improvements in infrastructure and equipment to meet animal welfare standards become unfeasible for a large part of the sector. This point of view complements Silva's (2018) analysis by suggesting that, without incentives, training alone would not be enough.

Lotti and Junior (2023) reinforce that subsidies and credit lines enable compliance with standards, but also encourage a gradual change in the production culture, aligning with the objective of creating a more sustainable system. However, these authors also indicate that the impact of subsidies depends on efficient allocation and a clear fiscal policy, since insufficient or poorly targeted incentives could increase disparities between large and small producers.

Furthermore, Mendes and Martins (2022) highlight the importance of a robust monitoring system. Without effective monitoring, animal welfare standards



tend to lose their practical effect, becoming mere recommendations without consistent application. The literature suggests that monitoring is not just a matter of control, but an educational element that reinforces the value of established standards.

Mendes and Martins (2022) argue that a more rigorous inspection system could correct irregularities, promote compliance with standards, and educate stakeholders about the importance of animal welfare. However, implementing effective inspection faces logistical and financial obstacles, especially in remote regions where coverage may be patchy. Their analysis suggests that inspection needs to be accompanied by an incentive structure so that producers feel motivated to adhere to recommended practices.

Raising awareness among the public and those involved in the sector, as mentioned by Fraser (2024), is an essential measure to consolidate animal welfare as a cultural value. Cultural resistance, often observed in the livestock sector (Almeida, 2024), can be mitigated with campaigns that demonstrate the benefits of humane practices not only for animals, but also for producers and consumers.

Fraser (2024) emphasizes that awareness about animal welfare is linked to the image of the sector, since the demand for ethical products is growing both in the domestic and international markets. Analysis of these data suggests that educational campaigns could improve the acceptance of animal welfare standards and position Brazilian livestock farming in more demanding markets, expanding its economic reach.

Finally, Couto, Coqueiro and Martins (2020) argue that investing in research adapted to regional realities is a long-term strategy to sustain animal welfare practices. They note that management practices appropriate in one region may be ineffective or inadequate in others, due to climatic, structural and cultural variations.

Research enables the creation of specific solutions for the country's diverse realities, allowing animal welfare standards to be effectively implemented in different contexts. Couto, Coqueiro and Martins (2020) also suggest that innovation can facilitate the adoption of low-cost practices, which would be particularly useful for small producers facing financial constraints. In this sense, research can be seen as a tool that complements subsidies and incentives, enabling a gradual and more accessible transition to humane practices.

Therefore, it is clear that a critical analysis of the literature reveals that the success of animal welfare practices depends on a joint effort, where training, financial incentives, monitoring, awareness and research complement and reinforce each other. The isolated

implementation of any of these strategies would probably have a limited impact, given the complexity of the challenges faced by the sector.

The literature suggests that the combination of these strategies creates an environment where animal welfare standards can be effectively enforced, promoting more ethical, sustainable and competitive livestock production.

#### IV. FINAL CONSIDERATIONS

Throughout this literature review, multifaceted, interconnected and structural challenges were identified that hinder the full implementation of animal welfare standards in cattle slaughter. The study also aimed to identify these challenges and propose possible solutions, an objective that was achieved through a critical analysis of the literature and practices adopted in Brazil.

The main barriers identified were categorized into aspects of infrastructure, worker training, cultural barriers, lack of financial incentives and insufficient monitoring. The lack of appropriate facilities and equipment was identified as a significant obstacle, since many slaughterhouses lack the resources to adapt their spaces and technologies to humane slaughter standards.

The lack of adequate infrastructure causes suffering to animals, compromising the welfare principles that these standards seek to ensure. To address this issue, we suggest structured investment and government support that will allow smaller slaughterhouses to adapt to the requirements in a viable and sustainable manner.

Another important challenge identified was the lack of training and capacity building for workers. Although Brazilian legislation includes the need for training in humane animal handling, its implementation is limited by the lack of comprehensive programs and specific resources to ensure compliance across the country. Without this training, workers are left without the necessary guidance to carry out appropriate procedures, resulting in animal suffering and detriment to product quality.

This aspect is reinforced by the need for cultural change, as resistance to new practices and values focused on animal welfare is observed in several regions of Brazil, where traditional management methods prevail.

The financial issue also stood out as an obstacle to the implementation of humane slaughter standards. Many producers, especially small and medium-sized ones, face difficulties in making investments, making full compliance with the standards unfeasible. The solution to this obstacle involves public policies that offer subsidies, credit lines and

tax incentives so that these producers can implement the necessary changes.

Insufficient monitoring was another key obstacle identified. Without rigorous and ongoing monitoring, humane slaughter standards become merely formal guidelines with little practical application. In order for the standards to be effectively enforced, it is necessary to increase the resources allocated to monitoring and ensure that inspectors are well trained to identify and correct irregularities.

Finally, the study presented some recommendations for improving animal welfare practices in Brazilian livestock production. In addition to financial incentives and monitoring, the study emphasized the importance of awareness campaigns that promote a new mindset regarding animal welfare. These campaigns could highlight not only the ethical benefits but also the positive economic impacts associated with compliance with humane slaughter standards, especially in a scenario where the consumer market, both nationally and internationally, values products that respect animal welfare.

In response to the research question, it is concluded that the effective implementation of humane slaughter standards in Brazil is hindered by a combination of economic, cultural, structural and operational challenges. The literature suggests that only an integrated approach, which includes financial support, training, monitoring and awareness, will be able to overcome these obstacles and promote an effective transition to sustainable and ethical animal welfare practices.

The study's objective – to identify the main challenges and solutions for implementing humane slaughter standards in Brazil – was successfully achieved. The literature review allowed us to map the main problems and identify possible solutions, offering a broad and well-founded view of animal welfare practices in the Brazilian livestock production sector.

This analysis could serve as a basis for future investigations and public policies aimed at strengthening animal welfare in Brazil, pointing out ways for the country to adopt practices that respect the principles of humanity and efficiency in the slaughter of cattle.

## REFERENCES

- [1] ALMEIDA, Bernardus Kelner Carvalho de et al. Animal welfare in beef cattle: literature review. *Brazilian Journal of Health Review* , vol. 7, no. 1, p. 3642-3653, 2024.
- [2] AMARAL, Jackson Barros do et al. Humane slaughter and stunning in cattle from the perspective of forensic veterinary medicine: Review. *Pubvet* , v. 13, p. 148, 2019.
- [3] BRAZIL. Normative Instruction No. 3 of January 17 , 2000. Provides for the technical regulation of stunning methods for the humane slaughter of butcher animals. Ministry of Agriculture and Food Supply, 2000.
- [4] An approach to the financial impact of promoting animal welfare in cattle production: ... the financial impact of promoting animal welfare in cattle production . *Coopex Magazine* . , v. 15, no. 02, p. 4882-4903, 2024.
- [5] BROOM, Donald M. Animal welfare. *Animal Behavior* , v. 2, p. 457-482, 2011.
- [6] CARVALHO, Camila Lopes et al. Animal welfare of cattle and pigs at slaughter: ordinance 365. *Science and animal health* , v. 9, n. 2, p. 142-161, 2021.
- [7] CEBALLOS, Maria Camila; SANT'ANNA, Aline Cristina. Evolution of animal welfare science: A brief review of conceptual and methodological aspects. *Academic Journal of Animal Science* , v. 16, p. 1-24, 2018.
- [8] COUTO, Luzia Almeida; OUZA COQUEIRO, Jéssica S. Ouza ; MARTINS, Natalia Cristina Gonçalves. Animal welfare in beef cattle farming: a systematic review. *Profiscientia* , n. 14, p. 176-193, 2020.
- [9] FRASER, David. *Understanding Animal Welfare: science in its cultural context* . Eduel , 2024.
- [10] LOTTI, Juliana Tamires; JUNIOR, Edegar Ferrarezi. ANIMAL WELFARE IN BEEF CATTLE PRODUCTION: a bibliographic review. *Interface Tecnológica Journal* , v. 20, n. 2, p. 690-699, 2023.
- [11] MENDES, Luiz Gustavo Ribeiro; MARTINS, Athila Damasceno. Rotational pasture management in beef cattle farming with emphasis on animal welfare: literature review. *Facit Business and Technology Journal* , v. 1, n. 37, 2022.
- [12] MENDONÇA, Pamela Stéfani Melo; CAETANO de Oliveira, Graciele Araújo. Slaughter of cattle: Considerations on humane slaughter and bloody jugulation . *Pubvet* , v. 11, p. 1188-1297, 2017.
- [13] MORAES, Fernanda Jacobus et al. Welfare in pre-slaughter and humane slaughter management and quality characteristics of beef: a literature review. *Brazilian Journal of Animal and Environmental Research* , vol. 7, no. 2, p. e70051-e70051, 2024.
- [14] ROÇA, Roberto de Oliveira. Humane slaughter of cattle. *Journal of Continuing Education in Veterinary Medicine and Animal Science of CRMV-SP* , v. 4, n. 2, p. 73-85, 2001.
- [15] SILVA, Daniel Ferreira da. Good animal welfare practices in beef cattle production: review. Undergraduate Course Completion Work—University of Brasília, School of Agronomy and Veterinary Medicine. 2018.
- [16] SOUZA, Suellen da Cunha; RIBEIRO, Laryssa Freitas. Application of animal welfare and humane slaughter of cattle to ensure meat quality. *GeTeC Journal* , v. 10, n. 28, 2021.
- [17] VENANCIO, Saete Andrade et al. Assessment of animal welfare in pre-slaughter and slaughter of cattle in a slaughterhouse in the Purus-Acre region. *Brazilian Journal of Animal and Environmental Research* , vol. 7, no. 2, p. e69084-e69084, 2024.