

EVALUATING ANIMAL WELFARE IN THE CONTEXT OF SUSTAINABLE LIVESTOCK FARMING IN ROMANIA

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REVIEW ARTICLE

Abstract

Animal welfare represents a fundamental component of sustainable livestock production, with ethical, economic, and environmental implications. This study is based on the premise that improving housing and management conditions for farm animals in Romania is not only an ethical responsibility but also a potential competitive advantage for farmers within the European market. The aim of this study is to assess the current status of animal welfare in the context of sustainable livestock farming in Romania by analysing the national context, current farming practices, existing gaps, and key challenges, in order to identify potential directions for improving animal welfare and enhancing livestock sustainability. The study is based on recent scientific literature, as well as official statistical data and relevant national and European reports. The findings indicate that the Romanian livestock sector remains characterised by a fragmented structure, dominated by small-scale farms with limited technical and financial capacity, which hinders the uniform implementation of European animal welfare standards. The results highlight key aspects of the national livestock sector, including farming practices, welfare indicators, sustainability challenges, and the relevant EU and national regulatory framework. Overall, the paper identifies both strengths and limitations in the implementation of animal welfare measures within sustainable livestock systems in Romania.

Keywords: sustainable livestock farming; animal welfare; livestock farming practices; small-scale farms; European Union European regulations; Romania regulations.

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INTRODUCTION

In recent decades, the increasing global demand for animal-derived products enhanced pressure on livestock systems to produce more efficiently and sustainably, with minimal environmental impact. At the same time, ethical and societal concerns regarding the animal farming conditions have led to the inclusion of animal welfare as a key criterion in assessing the sustainability of animal production systems (Boyle, 2025).

Animal welfare refers to the physical, behavioral, and psychological state of animals within production systems, encompassing adequate nutrition, housing conditions, health management, and the ability to express natural behaviors. Recently, this dimension has gained increasing importance in sustainability debates, being recognized as a fundamental component of a responsible and ethical production system (Sardar et al., 2021).

At the European Union level, the legislative framework for animal welfare is founded on the principle that animals are sentient beings, capable of feeling and having emotions. More than a secondary component, animal welfare is increasingly recognized in the scientific literature as a pillar of sustainability in animal production systems, with ethical, economic, and environmental implications. This underscores the need for agricultural development strategies and farmer support policies to explicitly incorporate animal welfare criteria within sustainability frameworks (Boyle, 2025). At global level, according to Our World in Data, over 80 billion land animals or 77–124 billion if including farmed fish, are slaughtered every year for meat production, the vast majority in industrialized farms, often under conditions that raise serious ethical questions. slaughtered annually. These highlight the scale of opportunities to reduce animal suffering through enhancing farming standards. (Ritchie, et al., 2023).

Romania is holding a distinctive position within the European livestock sector, although it has a long-standing agricultural tradition and substantial populations of cattle and sheep, the adoption of animal welfare standards has progressed unevenly, with notable disparities between large commercial farms and subsistence farm smallholdings. According to data from the National Institute of Statistics, from Romania over 82% of cattle and 94% of sheep and goats are kept in holdings without legal status, thus challenging efficient monitoring and consistent enforcement of animal welfare regulations. (INS, 2024),

Recent data indicates that Europeans endorse animal welfare and sustainable farming practices and willing to pay accordingly for animal based products (European Commission Eurobarometer, 2023; Novel Research, 2023).

Moreover, the scientific literature indicates that animal welfare is closely linked to multiple dimensions of sustainability. Healthy animals managed according to welfare principles tend to exhibit higher productive performance and more efficient resource use. At the same time, social and ethical considerations regarding animal treatment influence public perception and acceptance of animal-derived products, thereby affecting the long-term competitiveness of livestock systems. Building on these realities, the present bibliographic study aims to conduct an analysis of the scientific literature and official data regarding animal welfare in Romanian farming. The aim of this paper is to assess the status of animal welfare within the framework of sustainable livestock farming in Romania by analysing the national context, current farming practices, existing gaps and challenges, and identifying potential pathways for improving animal welfare and enhancing the sustainability of livestock production.

MATERIAL AND METHOD

The current knowledge on the role of animal welfare in sustainable livestock systems have been synthesized, next to the current status of animal welfare in the context of sustainable livestock farming in Romania. The study is based on an analysis of the scientific literature and official case studies addressing animal welfare and farming sustainability. Data were selected based on its relevance, prioritizing studies linking animal welfare with productivity, resource efficiency, environmental impact, and social acceptance of animal

products, as well as works on policies and standards for commercial farms. A comprehensive literature search was performed between July 2025 and April 2026 using the databases Scopus, Web of Science, PubMed, and Science Direct. Additional information was obtained from official reports and statistical databases, including those of the National Institute of Statistics (INS), Eurostat, the National Sanitary Veterinary and Food Safety Authority (ANSVSA), the Ministry of Agriculture and Rural Development (MADR), the Agency for Payments and Intervention in Agriculture (APIA), the European Commission, and Our World in Data. as well as reports from relevant international organizations (Humane World for Animals, European Court of Auditors) were analysed. The last search was conducted in April 2026.

The analysis focused on Romania's specific context, including aspects related to the structure of the livestock sector, the level and causes of stress in animals, current farm practices, national funding mechanisms for animal welfare, and the challenges faced by small-scale farms. The main keywords used in the bibliographic search included "animal welfare", "stress in livestock", "sustainable livestock production", "livestock farming in Romania", "animal welfare in Romanian farms" and other. The scientific literature and data was analyzed by comparing and synthesizing results, highlighting common findings, differences, and key conclusions. This approach allows the identification of current trends and emphasizes how animal welfare influences the sustainability of livestock systems.

RESULTS AND DISCUSSIONS

Overview of animal welfare and sustainability in Romanian livestock farming

Trends and key statistical indicators of the Romanian livestock systems. Romania's livestock sector is characterised by a fragmented structure, dominated by small and medium-sized farm holdings. According to data from the National Institute of Statistics (INS, 2024), as of 1 December 2024, Romania ranks second in the EU for sheep and goats (after Spain) and tenth for cattle (Table 1). Also it marked a concerning trend as the decline in pig numbers having fallen to just 53.7 % of their 2006 levels and a 38% reduction in cattle numbers over the past 18 years. Besides, over 82% of cattle and 94% of sheep and goats are

held in holdings without legal status, reflecting the traditional and subsistence trait of the sector (INS, 2024). The most recent data published by the National Institute of Statistics showed that, as of June 1, 2025, cattle numbers increased by 0.7% compared to the same date in 2024, reaching 1.84 million head, marking the first positive trend after several years of continuous decline. The breeding stock also increased by 1.7%, suggesting a slight recovery in the sector (INS, 2025). The sheep and goat population reached 11,869.5 thousand head in 2024, representing a 41.2% increase compared to 2006, with Romania maintaining its position as the second-largest holder in the European Union for these species, after Spain (INS, 2024).

Table 1

Livestock size in Romania

Species	No. (thousand heads)	Trend & relevant observation
Cattle 🐄	1,809.4	Long-term decrease of approximately 38% compared to 2006
Pigs 🐷	3,242.6	Long-term decrease of approximately 53.7% compared to 2006
Sheep and goats 🐑🐐	11,869.5	Long-term increase of approximately 41.2% compared to 2006
Poultry 🐔	76,415.7	Slight decrease compared to previous year

(based on data from INS, 2024)

From an animal welfare perspective, a particularly concerning issue is the situation in Romania's industrial poultry farms. According to the campaign "The Hidden Lives of Farm Animals" (Humane World for Animals, 2025), around 4.8 million laying hens are kept in enriched cages, while over 300.8 million chickens are slaughtered annually at just six weeks of age. Additionally, in intensive farming systems, pregnant sows are confined for weeks in metal crates that do not allow them to turn around (Humane World for Animals, 2025).

Animal welfare in Romania within the European regulatory framework. The European Commission is committed to improving the living conditions of animals in the EU through a legislative framework based on the Five Freedoms and the recognition of animals as sentient beings. European legislation transposes the Five Freedoms: freedom from

hunger and thirst; freedom from discomfort; freedom from pain, injury and disease; freedom to express normal behaviours; and freedom from fear and distress. In 2025, the Commission's Vision for Agriculture and Food reaffirmed the commitment to revising legislation on the welfare of farm animals, including the phasing out of cages. In September 2025, a 12-week public consultation received over 700 responses (European Commission, 2025). At the European level, public pressure to ban the use of cages in animal farming increased significantly in 2025. Over 200,000 citizens submitted their opinions during the public consultation organized by the European Commission, approximately three times more than in the similar consultation held in 2023. Although the revised legislation was not included in the 2026 work program, the Commission announced that it will be presented by the end of 2026 (European Commission, 2025).

In Romania, the national regulatory framework is primarily overseen by the National Sanitary Veterinary and Food Safety Authority (ANSVSA), which is responsible for implementing European standards through specific sanitary-veterinary regulations and orders. ANSVSA throughout the County-Level Veterinary and Food Safety Directorates (DSVSA) carries out the official controls required by European and national legislation. Order no. 10/2023 issued by ANSVSA sets minimum requirements for the protection of cattle in commercial holdings, specifying the minimum requirements e.g. for cattle farming regarding the space allocated per animal according to size, the mandatory daily inspection of herds, conditions for watering and feeding, mandatory veterinary services, as well as the prohibition of using electric shocks for behavioural control (ANSVSA, 2023). Special Report No. 31/2018 of the European Court of Auditors (ECA) clearly highlighted that in Romania, similarly to Germany tail docking in pigs remains a common practice in intensive farming systems, despite being prohibited under European legislation. ECA auditors found that even in farms receiving financial support under animal welfare measures, pigs had their tails docked and did not have sufficient access to enrichment materials, as required by law. This situation underscores the significant gap between the existing regulatory framework and its practical implementation in Romania

(European Court of Auditors, Special Report No. 31/2018).

However, the uniform implementation of these rules remains challenging due to the fragmented structure of Romania's livestock sector. Most holdings are small-scale, with limited staff and technical capacity to fully comply with legislative requirements, representing a major challenge for national agricultural policies in the field of animal welfare (ANSVSA, 2024).

Financial support for animal welfare and sustainable livestock farming practices in Romania. Within the National Strategic Plan (NSP) 2023–2027, Romania implements Intervention DR-06 Animal Welfare, managed by the Agency for Payments and Intervention in Agriculture (APIA). This comprises the following packages: a) Payments in favour of pig welfare; b) Payments in favour of poultry welfare.

The support represents a compensatory payment for income losses and additional costs incurred by farmers as a result of complying with animal welfare commitments. By the completion of the 2023 campaign, APIA had authorised for payment a total sum of €87,066,180, for 369 beneficiaries (APIA, 2025).

It is important to note that the total budget allocated to animal welfare under the National Strategic Plan (NSP) 2023–2027 amounts to €736.25 million for Intervention DR-06, complemented by additional direct payments: €80.95 million for dairy cow welfare (PD-07), €90.42 million for the welfare of fattening young cattle (PD-08), and €76.53 million for the extensive grazing of cattle on pastures (PD-27). (Agroinfo, 2024)

These financial allocations place Romania among the EU Member States with a substantial level of commitment to animal welfare within the 2023–2027 Common Agricultural Policy, reflecting the recognition of this area as a strategic priority for national agriculture.

Interplay between animal welfare and sustainable farming

Stress as a key indicator of animal welfare in livestock farming. Stress is one of the most important indicators of impaired animal welfare in intensive farming systems. From a physiological perspective, it triggers a hormonal cascade primarily characterized by the release of cortisol from the adrenal glands

and activation of the hypothalamic-pituitary-adrenal (HPA) axis. Cortisol, also known as the “stress hormone,” suppresses reproductive and immune functions, thereby reducing the animal's short-term biological efficiency in favour of individual survival mechanisms (Jurkovich et al., 2024).

The scientific data shows several major sources of stress in farm animals, including: (1) overcrowding in housing systems, which limits access to feed, water, and resting space; (2) thermal stress, especially during the summer, with significant negative effects on reproductive performance in pigs and cattle; (3) improper handling by farm personnel; (4) transport and mixing of animals from different social groups; (5) pain associated with procedures performed without analgesia, such as castration or tail docking; (6) lack of environmental enrichment materials, particularly in pigs (Linstädt et al., 2024).

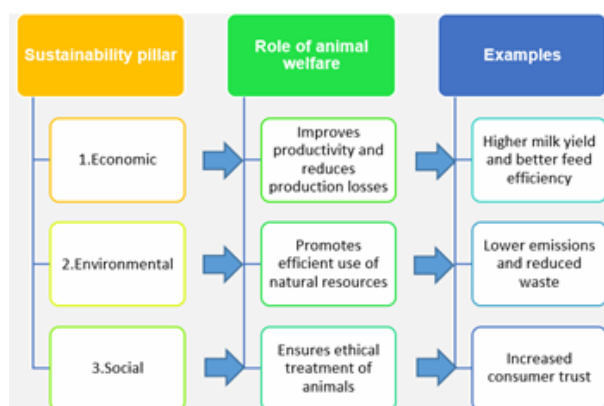


Figure 2. Contribution of animal welfare to the pillars of sustainability

(adapted from Boyle & Stevenson, 2025)

Animal welfare practices associated with feeding strategies, housing conditions, veterinary care, stress mitigation, and freedom of movement play a significant role in shaping animal health and performance. Such practices are linked to better growth rates, lower incidence of disease, reduced mortality, improved expression of species-specific behaviours, and a decrease in injury occurrence. Beyond their direct effects on animals, these improvements support broader sustainability objectives by enhancing resource-use efficiency, increasing productivity and economic returns, improving overall production outcomes, and strengthening societal acceptance of livestock production systems (Table 2).

Table 2
Animal welfare practices and their impact on sustainable livestock production

Animal welfare practice	Effect on animals	Sustainability impact
🌿 Balanced nutrition 🌿	Improved health and optimal growth	More efficient use of resources
🏠 Adequate housing conditions 🏠	Reduced stress and lower disease incidence	Increased productivity
🩺 Veterinary health management 🩺	Reduced mortality rates	Higher economic efficiency
🐾 Freedom of movement 🐾	Expression of natural behaviour	Greater social acceptance
🌀 Low-stress handling 🌀	Fewer injuries and better welfare	Improved production performance

(adapted from Sardar et al., 2023; Tuba Iram, 2024)

In intensive farms in Romania, chronic stress is intensified by several factors specific to the national context, such as excessive stocking density in old housing systems, lack of efficient ventilation and cooling systems, improper handling practices, and the absence of environmental enrichment materials in pig farming.

Data analysed by ANSVSA show that reducing poultry stocking density by only 15% leads to significant improvements in herd health, manifested by lower stress levels, increased immunity, and reduced need for medical treatments. Furthermore, in farms where ammonia levels were reduced by around 30%, a significant decrease in the incidence of respiratory diseases was observed (ANSVSA / USAMV Bucharest, cited in Agrobiznes.ro, 2025).

Gaps and challenges in livestock welfare and farming sustainability in Romania

In Romania, the current status of livestock welfare and sustainability is strongly influenced by the structural characteristics of the agricultural sector. The coexistence of large, modern, market-oriented farms and numerous small or semi-subsistence holdings creates an uneven capacity to implement animal welfare standards. While commercial farms are more likely to have documented procedures, veterinary supervision, and access to financial

support, small-scale farms often face limited investment capacity, outdated housing infrastructure, reduced access to advisory services, and insufficient knowledge regarding welfare indicators (Figure 1) (INS, 2024; ANSVSA, 2023; MADR, 2024).



DIMENSION	STRENGTHS	WEAKNESSES / MAIN CHALLENGES
 Legislative framework	- ANSVSA Order No. 10/2023 - Transposition of EU directives - Five Freedoms principle	- Uneven implementation in small farms - Lack of effective enforcement mechanisms
 Funding	- DR-06, PD-07, PD-08, PD-27 interventions - Approx. €984 million under NSP 2023–2027	- Difficult access for small farmers - High administrative burden and bureaucracy
 Veterinary workforce	- County-level DSVSA network - National strategic program	- Staff shortages in rural areas - Infrequent inspections and limited on-farm support
 Stress management	- ANSVSA guidelines on thermal stress - Measures for stocking density reduction	- Practices such as tail docking without anesthesia - Overcrowding and lack of environmental enrichment
 Digitalization	- Digitalized APIA platforms - Electronic applications	- Lack of PLF system implementation in small farms - Mostly manual monitoring of welfare indicators

Figure 1. **Animal welfare practices in Romanian farms**

(based on data from APIA, 2024; European Commission, 2023; ANSVSA, 2023)

A major challenge is represented by the fragmented structure of Romanian agriculture. Many small livestock farms have limited market orientation and reduced capacity for investment, which affects the modernization of housing systems, the implementation of biosecurity measures, and the regular monitoring of animal welfare indicators. Low and unstable incomes, together with restricted access to credit, insurance, and capital, reduce farmers' ability to improve feeding systems, ventilation, watering facilities, manure management, and housing conditions. As a result, welfare problems may persist not necessarily because farmers reject welfare principles, but because they lack the financial and technical means to implement accordingly (MADR, 2024).

The ageing farmer population and the low attractiveness of livestock farming for younger generations further slowdown innovation. At the same time, the low level of farm digitalization limits the possibility of introducing automated monitoring systems for welfare indicators such as temperature, humidity, animal movement, feeding behaviour, or health status. Digital technologies could support earlier detection of welfare problems, but their adoption requires financial support, farmer training, and advisory services adapted to small and medium-sized farms. (Vlaicu et al., 2024)

Knowledge transfer remains essential for improving animal welfare in Romania. Limited formal agricultural education and insufficient advisory services can lead to poor understanding of the relationship between animal welfare, productivity, biosecurity, and sustainability. Therefore, professional training programs should present welfare not only as a legal obligation, but also as a practical management tool that can reduce losses, improve productivity, and increase consumer trust.

Environmental pressures also influence livestock welfare. Climate change, drought, seasonal variability, and reduced pasture quality can affect feed availability, water access, thermal comfort, and animal health. These issues are particularly relevant for grazing systems and small farms that depend strongly on local natural resources. Improving welfare in these systems requires better pasture management, access to water, shade, and climate adaptation measures. (MADR, 2024)

Market and supply chain limitations reduce the motivation and capacity of farmers to invest in higher welfare standards. Small producers often have limited access to high-value retail chains, certification schemes, or export markets and remain highly exposed to price volatility. Without clear economic incentives, animal welfare may continue to be perceived as an additional cost rather than as a source of added value.

Another important weakness is the insufficient availability of farm-level data on animal welfare indicators. Without systematic monitoring of indicators such as mortality, disease incidence, lameness, injuries, stocking density, behavioural signs of stress, or access to enrichment materials, evidence-based decision-making remains limited. This monitoring gap makes it difficult to evaluate progress and to design targeted public policies.

The underdevelopment of animal welfare product labelling in Romania represents an additional limitation. Although consumers are increasingly interested in ethically produced food, the absence of clear and reliable welfare labels reduces transparency and makes it difficult for farmers with higher welfare standards to obtain a market advantage. Developing welfare-based labelling schemes could strengthen consumer trust and encourage producers to invest in better practices (Novel Research, 2023; Humane World for Animals, 2025).

The scientific literature indicates a strong link between animal welfare and the performance of livestock systems. Animals raised under conditions that meet their biological needs generally exhibit better health and higher productive performance. Optimizing nutrition, housing, and health management reduces mortality, improves feed conversion efficiency, and increases milk or meat yield, enhancing productivity without placing additional pressure on natural resources. Scientific studies thus highlight the direct relationship between animal welfare and sustainable production efficiency (Tuba Iram, 2024).

Studies conducted at the European level show that farms complying with higher animal welfare standards experience, on average, a 15–20% reduction in veterinary costs and an increase in production efficiency of up to 10%. (Boyle, L. & Stevenson, P., 2025.)

Animal welfare-oriented management practices can also have positive environmental impact. Healthy animals use feed resources more efficiently, reducing greenhouse gas emissions per unit of product as well as water and energy consumption. Additionally, proper nutrient management and reduced metabolic stress help preserve agroecosystem biodiversity by lessening the need for agricultural expansion or increased external inputs (Padmakumar V. et. al., 2019).

In Romania, the livestock sector makes a significant contribution to greenhouse gas emissions from agriculture. Improving animal rearing conditions by reducing stocking density and optimizing feeding regimes can represent a cost-effective measure for lowering the sector's carbon footprint, in line with the objectives of the National Climate Change Adaptation Strategy 2030 (MADR, 2024).

In recent decades, animal welfare has become an increasingly important public concern, shaping consumer perceptions and regulatory policies, also including social acceptance. Society demands higher standards for housing conditions and ethical treatment of farm animals. This shift encourages farmers and supply chains to adopt responsible practices, enhancing consumer trust and the acceptance of animal-derived products in modern markets (Vijayalakshmy K. et. al., 2023).

In Romania, around 80% of consumers report being willing to pay a higher price for products originating from systems that meet higher animal welfare standards (Novel

Research, 2023). At the same time, awareness campaigns carried out in 2024–2025 by organizations such as Humane World for Animals have increased public interest in labeling products according to animal welfare standards. This trend has the potential to become an important competitive advantage for Romanian farmers in the European market. (Humane World for Animals, 2025)

A 2023 Eurobarometer survey highlighted that 84% of Europeans believe that the welfare of farm animals should be better protected, and 90% consider that farming and breeding practices should comply with basic ethical requirements (Figure 2) (European Commission Eurobarometer, 2023). At the national level, a 2023 study showed that 80% of Romanians are willing to pay up to 10% more for products originating from farming systems that meet higher animal welfare standards, while 69% believe that farm animals deserve better protection (Novel Research, 2023); such data supports sustainable animal farming and animal welfare practices.

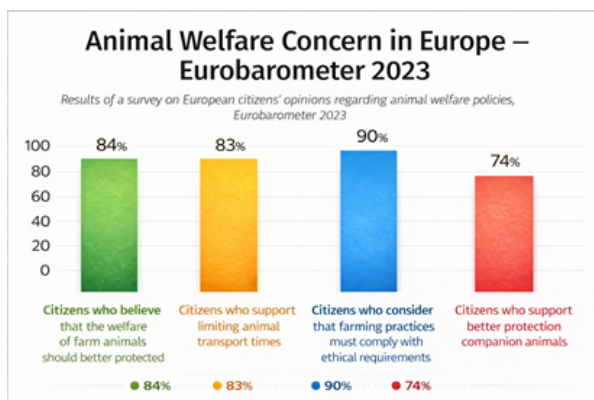


Figure 2. European citizens' attitudes towards animal welfare

(based on data from European Commission Eurobarometer, 2023)

Improving animal welfare and livestock sustainability in Romania requires integrated measures adapted to the specific structure of the national livestock sector, especially to the needs of small and semi-subsistence farms. A first direction is strengthening advisory and control capacity at farm level, by providing institutional practical guidance related to the housing conditions, feeding and watering systems, biosecurity, stress reduction, stocking density, veterinary care, and simple welfare indicators. This would help reduce the gap between existing legislation and its practical

implementation in farms (ANSVSA, 2023; MADR, 2024).

Another important direction is the modernization of farm housing infrastructure through additional financial incentives. Investments in better shelters, ventilation, thermal comfort, access to clean water, resting areas, manure management, and environmental enrichment materials can reduce stress, disease incidence, and production losses. Such measures are particularly relevant for small farms, where outdated facilities often limit the implementation of welfare standards. Financial support through the NSP 2023–2027 can play an important role in reducing these structural gaps. (APIA, 2024; MADR, 2024)

Professional training programs for livestock farmers should also be expanded. These programs should emphasize the link between animal welfare, productivity, animal health, and farm profitability. By understanding that improved welfare can reduce veterinary costs, mortality, injuries, and reproductive losses, farmers may be more willing to adopt welfare-oriented practices.

Digital monitoring technologies represent another useful direction, especially for tracking indicators such as temperature, humidity, air quality, animal movement, feeding behaviour, water consumption, and health status. These tools can support early detection of welfare problems and improve farm-level decision-making. However, their adoption in Romania requires financial support, digital training, and advisory services adapted to small and medium-sized farms. (Vlaicu et al., 2024)

Finally, Romania should enhance promoting welfare-based product labelling and further research on the relationship between animal welfare, productivity, environmental impact, and farm profitability. Clear labelling could increase consumer trust and help farmers obtain added market value for products obtained under higher welfare standards. At the same time, better farm-level data and consumer education would support more sustainable and responsible livestock farming (Novel Research, 2023; Humane World for Animals, 2025).

CONCLUSIONS

Animal welfare in the context of sustainable livestock production remains a key concern in many countries, including Romania. A comprehensive assessment of national livestock farming practices is essential for identifying implementation gaps, addressing existing

challenges, and defining future directions for improvement. The findings of this study indicate that animal welfare has considerable potential for further development and adaptation to local conditions, representing an important pillar of sustainable livestock systems in Romania. Strengthening animal welfare indicators and their practical application may also provide a competitive advantage within European markets. However, further progress is required, particularly in relation to the monitoring of welfare indicators and the consistent enforcement of animal welfare standards at farm level.

Higher welfare standards are generally associated with lower veterinary costs, improved productivity, reduced mortality, and enhanced production performance. In Romania, small-scale farms continue to face structural constraints in adopting such practices, including limited financial resources, insufficient access to training and advisory services, outdated infrastructure, and weaknesses in monitoring and implementation systems. Nevertheless, their potential for improvement remains significant, provided that targeted policy measures and effective knowledge transfer mechanisms are implemented.

The Romanian livestock sector is also confronted with long-term structural challenges, particularly the decline in cattle and pig populations. At the same time, available support through the NSP 2023–2027 and growing consumer demand for welfare-certified products create favourable conditions for progress. These developments may encourage the adoption of improved welfare standards, investments in farm modernization, and better alignment with market requirements for sustainable and ethically produced food.

A central challenge for the Romanian livestock sector lies not only in the existence of regulatory frameworks, but also in the economic realities of small-scale farming. While many small farms lack the financial and technical capacity required for modernization, they continue to maintain traditional systems, including pasture-based practices that contribute to biodiversity conservation and rural landscape preservation. Therefore, such farms should be regarded not only as vulnerable units, but also as valuable components of sustainable rural development.

Future progress should focus on strengthening advisory systems, upgrading infrastructure, improving farmer training,

introducing digital tools for welfare monitoring, enhancing consumer awareness, and developing welfare-based labelling schemes. Romania should also advance the implementation of EU animal welfare legislation, with greater emphasis on data collection systems, clear welfare indicators, transparency, and consumer trust.

Overall, animal welfare should be viewed not merely as a regulatory requirement, but as a strategic driver of sustainability and competitiveness within the Romanian livestock sector. The animal welfare in the context of sustainable livestock farming practices is a major concern in many countries, including Romania. The analysis of the national livestock farming practices should be a priority concern for implementation, addressing challenges, and possible directions for improvement. The study shows that animal welfare has significant potential to be improved and adapted to local conditions, serving as a key pillar of sustainable livestock farming in Romania. Enhancing animal welfare indicators and their practical implementation can provide a valuable competitive advantage in the European market. However, further improvements are still needed, particularly regarding the monitoring of welfare indicators and the consistent application of animal welfare standards at farm level. Farms with higher welfare standards may obtain clear benefits, including lower veterinary costs, improved productivity, reduced mortality, and better production performance. In Romania, however, small-scale farms continue to face important structural challenges in adopting such practices, including limited financial capacity, insufficient access to training and advisory services, outdated infrastructure, and gaps in the monitoring and implementation of animal welfare indicators. Nevertheless, their improvement potential remains significant if targeted support measures and knowledge transfer initiatives are properly developed.

Romania's livestock sector faces major challenges, especially the long-term decline in cattle and pig populations. At the same time, the available funding through the NSP 2023–2027 and the increasing consumer interest in welfare-certified products create a favourable context for progress. These conditions may encourage farmers to adopt higher animal welfare standards, invest in improved farming practices, and align their production with market demands for sustainable and ethically produced food.

The core challenge for Romania's sustainable livestock sector is not only the existence of animal welfare rules, but also the economic reality of small-scale livestock farming. Many small farms lack the financial and technical capacity required for modernization, yet they still preserve valuable traditional systems, including pasture-based practices that can support biodiversity and rural landscapes. Therefore, these farms should not be seen only as vulnerable structures, but also as an important resource for sustainable rural development.

Practical steps forward should include stronger advisory services, modernized infrastructure, farmer training, digital monitoring of welfare indicators, consumer education, and the development of welfare-based product labelling. Romania also needs to make further progress in the implementation of EU animal welfare rules, with a stronger focus on data monitoring systems, clear welfare indicators, transparency, and consumer trust.

Overall, animal welfare should be promoted not merely as a regulatory burden, but as a strategic driver of sustainable growth and competitiveness in the Romanian livestock sector.

REFERENCES

- Boyle L., Stevenson P., Sustainability of livestock production: raising the profile of animal welfare and the risks with "techno-fixes", *Animal Frontiers*, 15 (5), 2025, 47–57, <https://doi.org/10.1093/af/vfaf034>
- Sardar, M. A., Khan, M. I. A., Salman, M., & Ullah, I. 2023. Farm animal welfare as a key element of sustainable food production: Animal welfare and sustainable food production. *Letters In Animal Biology*, 3 (2), 01–08. <https://doi.org/10.62310/liab.v3i2.116>
- Wawrzyniak, D. Review: Animal husbandry and sustainable agriculture: is animal welfare (only) an issue of sustainability of agricultural production or a separate issue on its own?, *animal*, 2023, 17, Supplement 4, 100880, ISSN 17517311, <https://doi.org/10.1016/j.animal.2023.100880>.
- Tuba Iram. Sustainable Livestock Management Practices: Reducing Environmental Impact, Improving Animal Welfare, and Increasing Productivity. *Research & Reviews: Journal of Veterinary Science and Technology*. 2024; 13 (02): 23-27. Available from: <https://journals.stmjournals.com/rjovst/article=2024/view=174818>
- Padmakumar Varijakshapanicker, Sarah Mckune, Laurie Miller, Saskia Hendrickx, Mulubrhan Balehegn, Geoffrey E Dahl, Adegbola T Adesogan, Sustainable livestock systems to improve human health, nutrition, and economic status, *Animal Frontiers*, 2019, 9 (4), 39–50, <https://doi.org/10.1093/af/vfz041>
- Vijayalakshmy, K., Chakraborty, S., Biswal, J. and Rahman, H. 2023. Sustainable livestock production: A systematic review of different constraints associated with sustainable livestock production. *European Journal of Agriculture and Food Sciences* 5 (2):1-11
- Vlaicu, P.A.; Gras, M.A.; Untea, A.E.; Lefter, N.A.; Rotar, M.C. Advancing Livestock Technology: Intelligent Systemization for Enhanced Productivity, Welfare, and Sustainability. *AgriEngineering*, 2024, 6, 1479–1496, <https://doi.org/10.3390/agriengineering6020084>
- Ritchie, H., Rosado, P. & Roser, M. 2023. Animal Welfare. *Our World in Data*. <https://ourworldindata.org/animal-welfare>
- European Commission –Eurobarometer, 2023. Europeans' attitudes towards animal welfare, <https://europa.eu/eurobarometer/surveys/detail/2996>
- European Commission. 2023. Overview of EU policy on animal welfare. https://food.ec.europa.eu/animals/animal-welfare/overview_en
- European Commission, 2025. Vision for Agriculture and Food- commitment to the revision of animal welfare legislation. https://agriculture.ec.europa.eu/overview-vision-agriculture-food/vision-agriculture-and-food_en
- APIA, 2024. Intervention DR-06 – Animal Welfare, NSP 2023–2027. <https://apia.org.ro/planul-national-strategic-2023-2027-pns-al-romaniei/interventii-implementate-din-pns/bunastarea-animalelor-dr-06/>
- INS, (2024). Livestock and poultry numbers as of 1 December 2023. <https://insse.ro/cms/ro/tags/comunicat-efective-animale>
- INS, 2025, Cattle populations as of June 1, 2025. <https://insse.ro/cms/ro/tags/comunicat-efectivele-de-bovine>
- ANSVSA, 2023, Order no.10/2023 on minimum standards for the protection of cattle. <https://www.ansvsa.ro/sanatate-bunastare-si-nutritie-animale/bunastarea-animalelor/>
- Humane World for Animals, 2025. "The Hidden Lives of Farm Animals" – Public awareness campaign on farm animal welfare in Romania, <https://www.humaneworld.org/ro/animale-de-ferma>
- Novel Research, 2023. Study on Romanian consumers' attitudes toward farm animal welfare. Cited in Humane World for Animals (2025)
- Agroinfo, 2024. Support measures for farm animal welfare – National Strategic Plan 2023–2027. <https://www.agroinfo.ro/politic/ajutoare-anul-acesta-pentru-bunastarea-animalelor-din-ferme> (Accessed on September 20, 2025)
- Linstädt, J., Thöne-Reineke, Ferma, 2025. <https://revista-ferma.ro/avem-mai-putine-bovine-si-porcine-si-mai-multe-ovine-cate-animale-a-pierdut-romania-in-ultimii-12-ani/> (Accessed on September 20, 2025)
- Linstädt, J., Thöne-Reineke, C., Merle, R. Animal-based welfare indicators for dairy cows and their validity and practicality: a systematic review. *Frontiers in Veterinary Science*, 2024, 11, 1429097. <https://doi.org/10.3389/fvets.2024.1429097>
- Jurkovich, V. et al. A Review of the Effects of Stress on Dairy Cattle Behaviour. *Animals(Basel)*, 2024, 14 (14), 2038. <https://doi.org/10.3390/ani14142038>
- European Court of Auditors. 2018. Special Report No. 31/2018: Animal welfare in the European Union.

-
- <https://op.europa.eu/webpub/eca/special-reports/animal-welfare-31-2018/ro/>
- Agrobiznes. 2025. Studiu USAMB București: cum modul de creștere al găinilor în România influențează calitatea ouălor, <https://agrobiznes.ro/58868-cum-modul-de-crestere-al-gainilor-in-romania-influenteaza-calitatea-oualor/> (Accessed on October 15,2025)
- Krishnamoorthy, P., Goudar, A. L., Suresh, K. P., & Roy, P. *Global and countrywide prevalence of subclinical and clinical mastitis in dairy cattle and buffaloes by systematic review and meta-analysis*. Research in Veterinary Science, 2021, 136, 561–586. <https://doi.org/10.1016/j.rvsc.2021.04.021>
- Berean, D. I., Bogdan, L. M., Ciupe, S., Coman, S., & Cimpean, R. *Diagnosis and prevalence of mastitis in a dairy farm from Cluj County, Romania*. Cluj Veterinary Journal, 2025, 30 (2)
- Stanek P, Żółkiewski P, Januś E. A Review on Mastitis in Dairy Cows Research: Current Status and Future Perspectives. *Agriculture*. 2024, 14 (8):1292. <https://doi.org/10.3390/agriculture14081292>