

A comparative analysis of farmers' attitudes toward animal welfare in Ukraine and Azerbaijan

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ABSTRACT

The aim of this study was to understand farmers' views on animal welfare in Ukraine and Azerbaijan, and to identify key issues in general and in each country. A questionnaire with 14 questions was used to survey 58 farmers from Ukraine and 71 farmers from Azerbaijan. Data were collected regarding farm production characteristics, farmers' perception of animal welfare, and what farmers identified as the most important animal welfare issues. A mixed-effects model with restricted maximum likelihood estimation (REML) was used to assess the perceived importance of animal welfare. Least squares means with Tukey's correction were calculated to compare groups. Chi-squared tests of independence were used to assess (1) the relationship between farmers' country of origin and their level of agreement with a statement, and (2) the association between country and animal species in need of welfare improvements. Farmers in both countries considered it necessary (60.3 %) to improve animal welfare, were largely convinced (90 %) that financial compensation from the state was necessary and had the same main perceived welfare problems (lack of funds to improve animal welfare conditions). Ukrainian farmers (50.9 %) responded that animal welfare was not sufficiently taken into account in government policies while, Azerbaijani farmers (53.5 %) agreed that animal welfare was given the appropriate level of importance in the country's legislation. The study showed that 41.4 % of Ukrainian farmers considered the level of animal welfare in the country to be worse than in other countries, compared to 12.7 % in Azerbaijan. Ukrainian farmers were more interested in receiving more information on animal welfare (72.4 %) than Azerbaijani farmers (54.3 %). The study shows that the level of awareness among farmers in the two countries is quite different and in some cases contradictory.

1. Introduction

In the past decade, animal welfare has been increasingly recognized as an important aspect of livestock operations, with consumers

demanding higher standards for both animal welfare and food safety. Farm animal welfare has become a growing concern in recent years, prompting discussions about its role in agricultural and food policies. Despite advances in animal science and productivity, significant

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improvements in animal health and welfare have been challenging to achieve (Sundrum, 2024). This discrepancy has led to increased consumer concern from around the world and pressure on farmers and animal scientists to find solutions that balance market demands with the economic viability of farm systems (Balzani and Hanlon, 2020).

The Common Agricultural Policy in Europe has significantly shaped agricultural practices, indirectly affecting farm animal welfare (Winter et al., 1998). Many countries incorporated animal welfare standards into their agricultural frameworks to align with ethical considerations, consumer demands, and international trade regulations. It is well recognized that high welfare standards not only improve the living conditions of animals but also enhance the overall quality of agricultural products, which can have economic benefits for producers (Belanche et al., 2021). Additionally, there is growing recognition that integrating animal welfare into food policies is crucial for maintaining biodiversity and fostering long-term sustainability in farming practices (Gaudino et al., 2018; Zanon et al., 2024; Del Campo et al., 2025). There is a growing recognition of animals as sentient beings, capable of experiencing pain, stress, and emotions, which has become increasingly reflected in legislative frameworks worldwide (Broom, 2014; Mellor, 2019). The European Union formally acknowledged animal sentience in Article 13 of the Treaty on the Functioning of the European Union, highlighting the necessity of humane treatment in agriculture and other areas (European Union, 2009). Despite these advancements, challenges remain in fully implementing and enforcing these policies across all agricultural sectors (Fraser, 2018).

At present, there is a common EU Directive on farm animals. In addition, EU legislation on the welfare of farm animals includes specific provisions on the keeping of certain livestock species, as well as the conditions under which farm animals are transported and slaughtered. Individual EU Member States may have their own animal welfare standards that may exceed the minimum standards set by EU legislation and allow for stricter measures. For instance, Sweden and Norway (not EU but subject to European Economic Area (EEA) Agreement following EU animal welfare regulations) enforce stricter regulations regarding floor space for pigs, tail docking and teeth clipping. In Norway, surgical castration of piglets must be performed with anesthesia by a veterinarian, and in Sweden it must be done under local anesthesia, whereas in other countries, piglets younger than 7 days are typically castrated by the farmer without anesthesia (Veissier et al., 2008).

In many countries, particularly within the EU, animal welfare has become an increasingly important concern, leading to robust regulatory frameworks and implementation practices. Several initiatives have been undertaken to offer comprehensive overviews of animal welfare policy instruments (Ingenbleek et al., 2012; Lundmark et al., 2016; Staaf Larsson et al., 2024). However, in many non-EU countries, animal welfare remains a secondary consideration, as reflected by weaker regulatory frameworks and less stringent implementation of rules and regulations in practice.

This disparity is particularly evident in countries like Ukraine and Azerbaijan, which are the focus of this study. These countries exhibit limited concern for animal welfare, with minimal regulations in place (Alimardanov et al., 2006; Tomasevic et al., 2020; Lykhova et al., 2023). In Ukraine, despite some progress in animal welfare legislation, implementation remains a challenge (Yatsenko et al., 2020). The country has only recently begun to address animal cruelty issues through legislation. Yet preliminary evidence suggests varying levels of awareness and acceptance of animal welfare standards among farmers in these countries, further influenced by the fact that Ukraine's animal welfare laws are not as comprehensive as EU legislation, motivating this first survey of their perspectives (Petkun and Nedosekov, 2022; Lykhova et al., 2023). Specific requirements for farm animal welfare during rearing, transport, and slaughter are generally limited. Generally, legislative contexts differ markedly between countries. Ukraine regulates farm animal welfare through specific laws, including "On Veterinary Medicine" (Law №1206-IX, 2023), "On State Control over Compliance with

Legislation on Food Products, Feed, By-products of Animal Origin, Animal Health and Welfare" (Law №2042-VIII, 2017), and "On Feed Safety and Hygiene" (Law №2264-VIII, 2018), as well as Ministry Orders regulating keeping, transport, and slaughter in line with EU Directives. Azerbaijan does not have specific farm animal welfare laws, relying instead on general legislation, including the "Law of the Republic of Azerbaijan on the Animal Kingdom" (No. 675-IQ, 1999) and the "Law on Veterinary Medicine" (No. 922-IIQ, 2005), along with related Cabinet decisions. In Ukraine, despite this legislative progress, implementation remains challenging due to limited enforcement capacity, insufficient veterinary inspections, and resource constraints in rural areas (Yatsenko et al., 2020; Petkun and Nedosekov, 2022; Lykhova et al., 2023). In Azerbaijan, the absence of specific farm animal welfare legislation eliminates enforcement issues but leaves systemic gaps unaddressed (Alimardanov et al., 2006). The lack of attention to animal welfare regulation in these countries is further highlighted by the limited research available on the subject in Ukraine and Azerbaijan. While farmers' perspectives on animal welfare have been studied in several countries (Kjelland et al., 2010; Adler et al., 2019; Hansen et al., 2023; Hötzel et al., 2024), no such research has previously been conducted in Ukraine or Azerbaijan.

Understanding the attitudes of farmers in Ukraine and Azerbaijan toward animal welfare is crucial for identifying potential gaps between policy and practice. This knowledge can provide valuable insights into the challenges and opportunities for improving animal welfare standards in these countries. Moreover, it can help inform future policy decisions and educational initiatives aimed at enhancing animal welfare practices.

Therefore, the aim of this study is to investigate farmers' perspectives on animal welfare in Azerbaijan and Ukraine, shedding light on the broader implications for future improvements in this field. The results will contribute to the growing body of knowledge on animal welfare in non-EU countries and provide a foundation for developing more effective strategies to promote animal welfare in these regions.

2. Methods

2.1. Study design and questionnaire

The study was conducted between January and February 2022 in Ukraine, and between January and April 2022 in Azerbaijan. A total of 58 farmers from Ukraine and 71 farmers from Azerbaijan participated in the study. Farmers were selected using random sampling from available farm lists and networks in each country, aiming to include a range of farm sizes (small, medium, large) and production types across regions. The survey was conducted either online (Ukraine) or in-person (Azerbaijan), depending on the accessibility and preferences of the farmers. This study was designed as an exploratory survey; the sample is not intended to be statistically representative of all farmers in either country, but to cover a range of farm sizes and production types. The questionnaire (14 questions in three sections; [Supplementary Material 1](#)) was primarily adapted and modified from the Eurobarometer survey "Attitudes of Europeans towards animal welfare" (March 2016; <https://europa.eu/eurobarometer/surveys/detail/2096>), originally developed in English and translated into Ukrainian and Azerbaijani for this study. Modifications included adding country-specific questions on farm characteristics and the open-ended question on key welfare concerns. The first part contained questions on farm description (the types and number of animals on the farm). Farms were categorized as small (fewer than 50 animals), medium (50–100 animals), and large (more than 100 animals). The questionnaire contained one open-ended question "What are the three most important welfare issues of farmed animals in your country?" The answers to this question were grouped into the following categories: welfare problems related to or caused by 1) lack of knowledge; 2) poor feed quality; 3) poor human food quality (as a result from poor animal welfare); 4) poor housing conditions and 5) economic

constraints. The most common answers in each category are presented in Table 1.

2.2. Statistical analysis

Statistical analyses were performed using the SAS software (SAS version 9.4, SAS Institute Inc., Cary, NC, USA). A mixed-effects model using restricted maximum likelihood estimation (REML) was used to assess the perceived importance of protecting the welfare of farmed animals. The model included fixed effects for country (Ukraine and Azerbaijan), farm size (small, medium and large) and their interaction, and a random intercept for country to account for potential clustering within countries. Least-squares means with Tukey adjustments were calculated to compare groups. To examine whether there was an association between the country of the farmers and their level of agreement with a statement, a Chi-square test for independence was conducted. The variables involved were the country of the farmers (Ukraine and Azerbaijan) and their response to a survey statement, which was recorded on an ordinal scale ranging from “Yes, certainly” to “No, certainly not”, with an additional option of “Not sure”. A Chi-square test for independence was also conducted to investigate the association between the country and the species selected by farmers as needing improvement in animal welfare. The variables involved were the country of the farmers and the species selected (e.g., laying hens, broilers, turkeys, etc.). For all Chi-square tests, a p-value less than 0.05 indicated a significant difference.

3. Results

Clear differences in farm structure were observed between Ukraine and Azerbaijan. Ukrainian farms were predominantly large operations (>100 animals; 60 %), whereas most farms in Azerbaijan fell into the small-scale category (<50 animals; 61 %) (Table 2). Mixed-species farming was the dominant production system in both countries, accounting for 79 % of farms in Ukraine and 93 % in Azerbaijan. The distribution of livestock species also varied regionally.

The perceived importance of farmed animal welfare was significantly higher in Azerbaijan than in Ukraine ($p = 0.041$). The size of the farm also played a significant role in the perceptions of the importance of animal welfare ($p = 0.004$), with larger farms showing more value on

Table 1
Categorization of farmers' responses on key animal welfare issues.

| Category number | Categories | Answer options |
|-----------------|--------------------|--|
| 1 | Knowledge | Lack of understanding of animal welfare Imperfect legislation Staffing crisis Lack of information about proper and modern feeding of animals |
| 2 | Feed quality | Low quality of the feeds Lack of pasture Water scarcity High price for protein concentrates |
| 3 | Food quality | |
| 4 | Housing conditions | Lack of space for keeping animals Lack of animal motion Fixed keeping of animals Improvement of veterinary services Improvement of animal keeping conditions Caring for animals during extreme heat |
| 5 | Economic issues | Low subsidy amount Low cost of products High prices for fuel, electricity, veterinary drugs, feed, etc. Marketing problem of the products Increasing state support for animal husbandry and subsidies High cost of feed |

Table 2

Farm size, farm type, and livestock species composition in Ukraine and Azerbaijan.

| Category | Ukraine (n = 58) | Azerbaijan (n = 71) | Total (n = 129) |
|-------------------------------|------------------|---------------------|-----------------|
| Small farms (<50 animals) | 18 (31 %) | 43 (61 %) | 61 (47 %) |
| Medium farms (50–100 animals) | 5 (9 %) | 19 (27 %) | 24 (19 %) |
| Large farms (>100 animals) | 35 (60 %) | 9 (13 %) | 44 (34 %) |
| Single-species farms | 12 (21 %) | 5 (7 %) | 17 (13 %) |
| Mixed-species farms | 46 (79 %) | 66 (93 %) | 112 (87 %) |
| Laying hens | 37 (64 %) | 45 (63 %) | 82 (64 %) |
| Broilers | 9 (16 %) | 8 (11 %) | 17 (13 %) |
| Turkeys | 13 (22 %) | 19 (27 %) | 32 (25 %) |
| Ducks/geese | 3 (5 %) | 16 (23 %) | 19 (15 %) |
| Dairy cows | 21 (36 %) | 35 (49 %) | 56 (43 %) |
| Beef cattle | 12 (21 %) | 22 (31 %) | 34 (26 %) |
| Pigs | 21 (36 %) | 4 (6 %) | 25 (19 %) |
| Farmed fish | 3 (5 %) | 8 (11 %) | 11 (9 %) |
| Horses | 7 (12 %) | 6 (8 %) | 13 (10 %) |
| Rabbits | 10 (17 %) | 2 (3 %) | 12 (9 %) |
| Sheep and goats | 11 (19 %) | 19 (27 %) | 30 (23 %) |
| Buffalo | 0 (0 %) | 14 (20 %) | 14 (11 %) |

the welfare of farmed animals (LS mean values of 6.47, 6.29 and 6.99 for small, medium and large farms, respectively for all farmers from both countries). The Tukey test revealed that the effect of farm size on perceived importance was stronger in Ukraine than in Azerbaijan (Table 3).

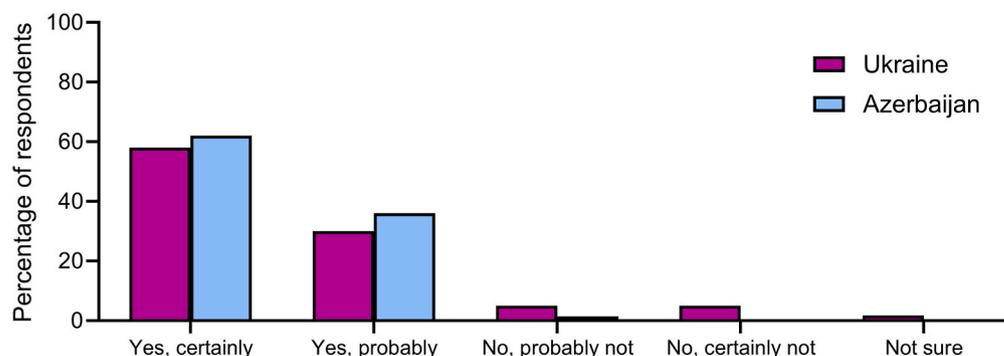
Data are presented as Least Squares Means (LS Means) \pm SE. Within each country, differences between farm sizes are indicated by lowercase letters, while differences between countries within the same farm size are indicated by uppercase letters. Scale: 1 = “not at all important” to 10 = “extremely important”.

A majority of farmers across both countries believed that improvements are needed for improved welfare and protection of farm animals (Fig. 1). Approximately 60.3 % of farmers responded with “Yes, certainly,” indicating a strong belief that changes are necessary. An additional 33.3 % answered “Yes, probably,” suggesting a moderate but still positive attitude towards the need for improvements. In contrast, only a small portion of respondents felt that improvements were not necessary. Approximately 3.2 % answered “No, probably not,” while 2.4 % were more definitive with “No, certainly not.” A very small fraction (0.8 %) of farmers were unsure about the need for improvements. While there appear to be some variations in the response patterns between the two countries, no statistically significant differences ($p = 0.149$) according to a chi-square test were found (Fig. 1). Similarly, the farm size did not significantly influence the responses ($p = 0.569$) (data not shown). A more specific analysis of welfare perceptions among farmers demonstrated significant differences in the prioritization of welfare improvements, revealing which species are viewed as needing the most attention (Fig. 2). There were significant differences in the selection of farm animals for welfare improvement between the two country groups. Laying hens ($p = 0.006$), turkeys ($p = 0.009$), beef cattle ($p = 0.022$), calves ($p = 0.002$), pigs ($p < 0.0001$), horses ($p = 0.020$), sheep and goats ($p = 0.029$), and buffalo ($p = 0.024$) show statistically significant differences in selection between the countries. The most prominent difference was observed for pigs, with a much higher selection rate in Ukraine compared to Azerbaijan. Interestingly, there were

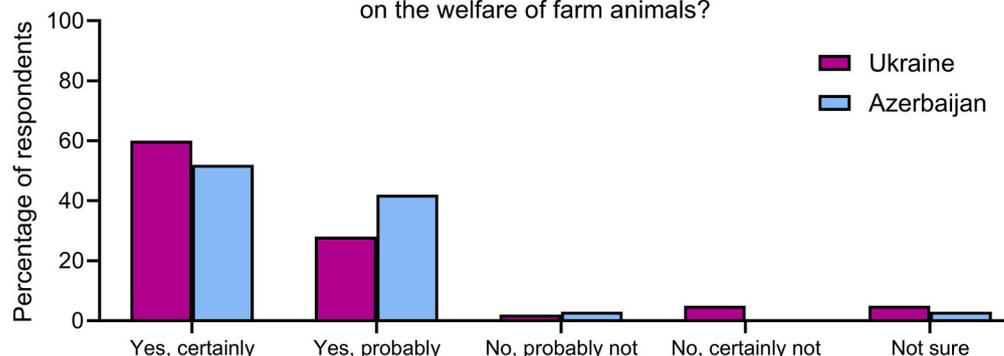
Table 3
Perceived importance of farmed animal welfare by farm size.

| Farm Size | Ukraine | Azerbaijan |
|-----------|----------------------------|---------------------------|
| Small | 6.22a \pm 0.19 (n = 18) | 6.74 \pm 0.12 (n = 43) |
| Medium | 5.40 aA \pm 0.35 (n = 5) | 6.74B \pm 0.18 (n = 19) |
| Large | 6.77b \pm 0.13 (n = 35) | 7.00 \pm 0.26 (n = 9) |

Do you believe that in general the welfare of farm animals in your country needs to be improved?



Would buying animal welfare friendly products could have a positive impact on the welfare of farm animals?



Should farmers be financially compensated for any higher production costs associated with farming animals under more welfare-friendly conditions?

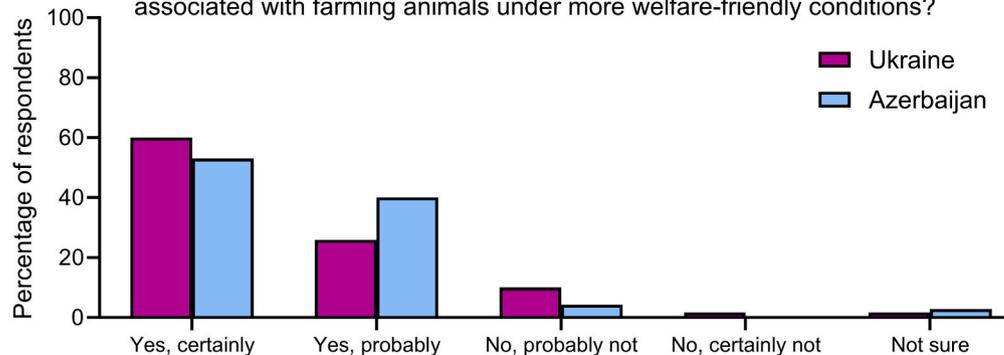


Fig. 1. Farmers' opinions on animal welfare improvements and financial compensation by country.

no significant differences for broilers, ducks/geese, dairy cows, farmed fish, or rabbits.

Based on the results regarding whether buying animal welfare friendly products could have a positive impact on the welfare and protection of farm animals, a majority of farmers believed it could (Fig. 1). Overall, 56 % of participants responded with “Yes, certainly,” and an additional 35.2 % answered “Yes, probably”. Only a small portion of farmers were skeptical or negative about the potential impact, 2.4 % answered “No, probably not,” and another 2.4 % - “No, certainly not.” A slightly larger group of 4 % were unsure about the potential impact. No significant differences were found between the countries ($p = 0.185$) or between farmers from different farm sizes ($p = 0.095$), according to a chi-square test.

A strong consensus among farmers was revealed regarding the necessity of financially compensating farmers for the higher production costs associated with implementing more welfare-friendly farming practices (Fig. 1). Approximately 90 % of farmers believed that such compensation is necessary, with 56.3 % answering “Yes, certainly” and 33.6 % responding “Yes, probably”. Only a small portion of farmers disagreed with the idea of compensation. Approximately 7 % answered “No, probably not,” while 0.8 % answered “No, certainly not.” Additionally, 2.3 % of respondents were unsure about the necessity of financial support for farmers. This opinion in favor of compensation was consistent across both countries. Although farmers from Azerbaijan showed a higher percentage of “Yes, probably” responses (40 %) compared to Ukraine's 25.9 %, no statistically significant differences

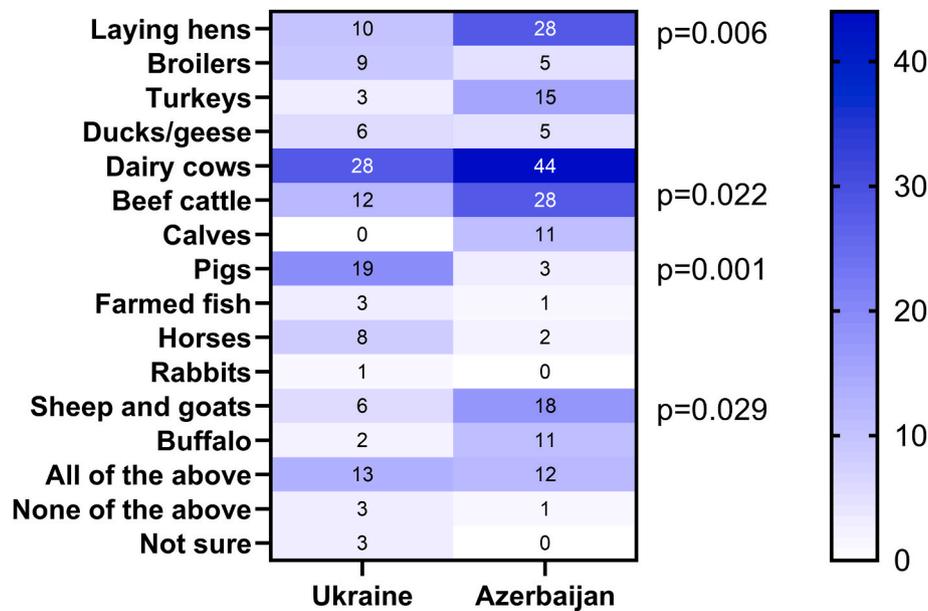


Fig. 2. Heatmap of species selected by farmers in Ukraine and Azerbaijan regarding which farm animals need the most improvement in their welfare/protection. Farmers could select up to three species, such as laying hens, broilers, turkeys, etc. Each cell is color-coded based on the frequency of selections for each species in each country, with darker shades indicating higher frequencies. The numerical values within the cells represent the number of farmers from each country who prioritized each species for welfare improvement. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

were found between the countries according to the chi-square test ($p = 0.264$). Similarly, farm size did not significantly influence the responses ($p = 0.805$) (data not shown).

The results revealed varied perceptions about the importance given to animal welfare and protection in current food and agricultural policies across the farmers from two countries surveyed (Fig. 3). Overall, the largest group of farmers (44.5 %) believed that animal welfare and protection receive “Just about the right level of importance” in their country’s policies. However, a significant portion (31.3 %) felt that these issues are not given enough importance. Only 10.9 % of farmers answered that too much importance is placed on animal welfare, while 13.3 % were unsure about the level of importance it receives. There were significant differences between the two countries ($p < 0.001$). In Ukraine, half of the respondents (50.9 %) believed that animal welfare does not receive enough importance in current policies. In contrast, only 33.3 % thought it receives the right level of importance, and a small minority (5.3 %) believed it receives too much attention. Azerbaijan showed a different pattern. The majority (53.5 %) felt that animal welfare receives the right level of importance in their country’s policies. Equal proportions (15.5 % each) believed that it receives too much

importance, not enough importance, or were unsure. Farm size did not significantly influence the responses ($p = 0.210$) (data not shown).

The results reveal varying levels of awareness among farmers regarding national legislation related to animal welfare and protection (Fig. 4). Regarding the transport of farmed animals, awareness levels were similarly low in both countries, with 17.2 % of farmers in Ukraine and 14.1 % in Azerbaijan being aware of that such legislation exist ($p = 0.622$). However, significant differences were observed in other aspects. For slaughter legislation, Azerbaijani farmers demonstrated a significantly higher awareness in the existence of such legislation with 47.9 % being aware compared to 17.2 % in Ukraine ($p < 0.001$). Conversely, when it comes to legislation concerning farm animal living conditions, Ukrainian farmers showed stronger awareness of the existence of such legislation (39.7 %) compared to farmers in Azerbaijan (19.7 %, $p = 0.013$). A considerable proportion of farmers in both countries expressed uncertainty about existing legislation, with 24.1 % in Ukraine and 36.6 % in Azerbaijan indicating they are unsure ($p = 0.127$).

Overall, farmers in both countries showed a high interest in being more informed about animal farming conditions (Fig. 5). The chi-square test ($p = 0.019$) indicated a statistically significant difference in the

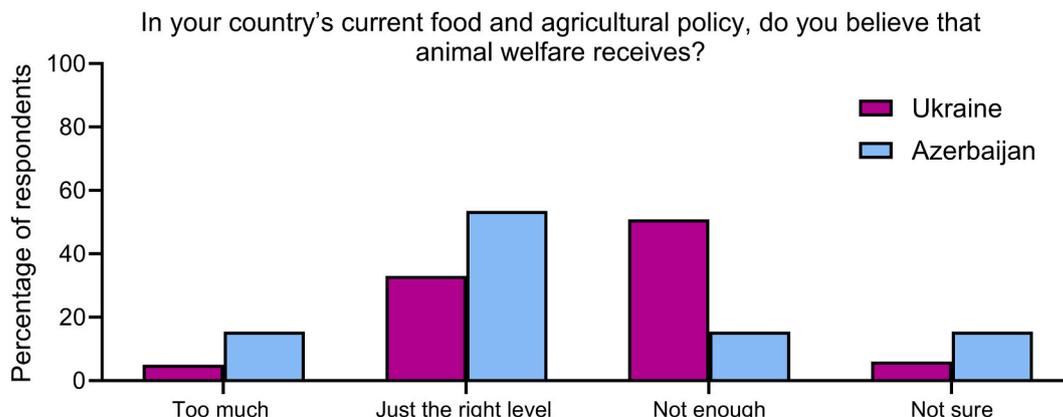


Fig. 3. Farmers' perceptions of animal welfare priority in national agricultural policy.



Fig. 4. Awareness of farmers of national legislation on animal welfare by country.

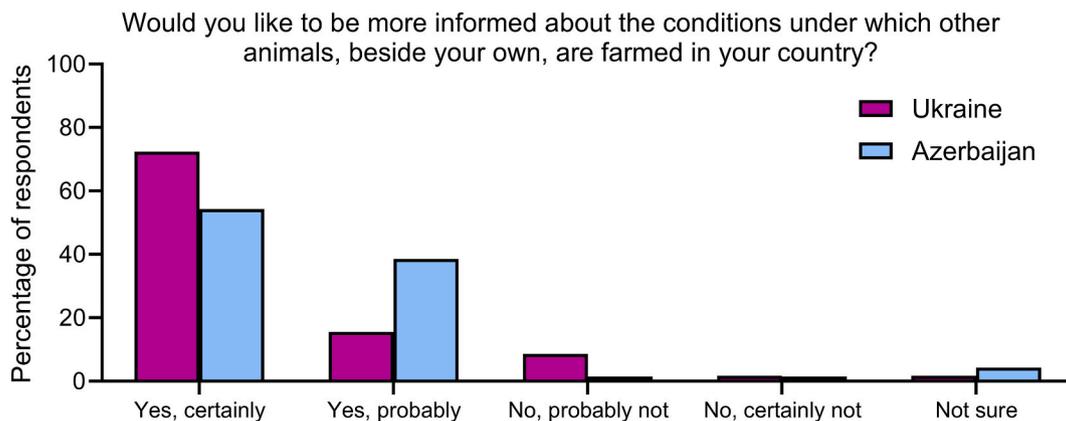


Fig. 5. Farmers' interest in animal farming conditions by country.

distribution of responses between the two countries. The most notable difference was in the distribution of “Yes” responses between “certainly” and “probably.” Ukraine had a higher percentage of farmers who were “certainly” interested (72.4 %) compared to Azerbaijan (54.3 %). While Ukraine had more farmers who were certain about wanting more information, Azerbaijan had a more even split between “certainly” and “probably” responses.

Regarding the three biggest welfare concerns, farmers in Ukraine and Azerbaijan identified similar priorities (Fig. 6). The top two welfare concerns in both countries were economic constraints and housing conditions having a negative impact on animal welfare. However, Azerbaijan ranked poor feed quality as equally important to housing conditions, while Ukraine ranked poor slaughter conditions and lack of knowledge as higher concerns compared to feed quality.

The analysis of farm animal welfare perceptions in Ukraine and Azerbaijan, as compared to the rest of the world, revealed significant differences in the responses ($p < 0.001$) (Fig. 7). Overall, 50.0 % of Ukrainian farmers and 63.4 % of Azerbaijani farmers perceived farm animal welfare in their country as better or the same as in the rest of the world. On the other hand, a larger proportion of Ukrainian farmers (41.4 %) believed that farm animal welfare in their country is worse than in the rest of the world, compared to only 12.7 % in Azerbaijan. Additionally, 8.6 % of farmers in Ukraine and 23.9 % in Azerbaijan were unsure. The analysis of differences in farm sizes also revealed significant variations in farm animal welfare perceptions ($p = 0.007$). Thus, 63.9 % of small farm owners and 70.8 % of medium farm owners perceiving conditions as better or the same as the rest of the world. In contrast, only 40.9 % of large farm owners shared this perception, with the rest more likely to report worse conditions or be unsure (data not shown).

4. Discussion

To the best of our knowledge, this is the first study to compare farmers attitudes towards animal welfare in Ukraine and Azerbaijan. The observed differences in the perceived importance of animal welfare in Ukraine and Azerbaijan are in line with previous studies on consumers, and confirms that cultural and socioeconomic factors influence attitudes towards animal welfare (Carnovale et al., 2021, 2024; Estévez-Moreno et al., 2022; Zamaratskaia et al., 2023; Ammann et al., 2024). The differences in attitudes to animal welfare may be due to variations in agricultural practices, consumer awareness, or regulatory environments between the two countries.

The relationship between farm size and perceived importance of animal welfare is particularly intriguing. Our results indicate that larger farms demonstrate a higher value for animal welfare compared to smaller farms. In line with our results, Robbins et al. (2016) suggested that larger farms may offer certain opportunities to improve animal welfare but may also introduce welfare risks. A survey of Australian dairy farmers found no evidence between herd size and risk factors for adverse welfare of cows (Beggs et al., 2015). Kılıç and Bozkurt (2013) suggested that management practices and farmer attitudes are decisive factors for animal welfare. Our findings highlight the complex interactions between cultural factors and farm characteristics in the perceptions of animal welfare. They also suggest that it is important to consider both country-specific contexts and farm size when developing animal welfare practices in the agricultural sector.

Most farmers (over 90 %) across both countries acknowledged the need for improvements in farm animal welfare. This suggests a growing awareness of animal welfare issues in the agricultural sector and could

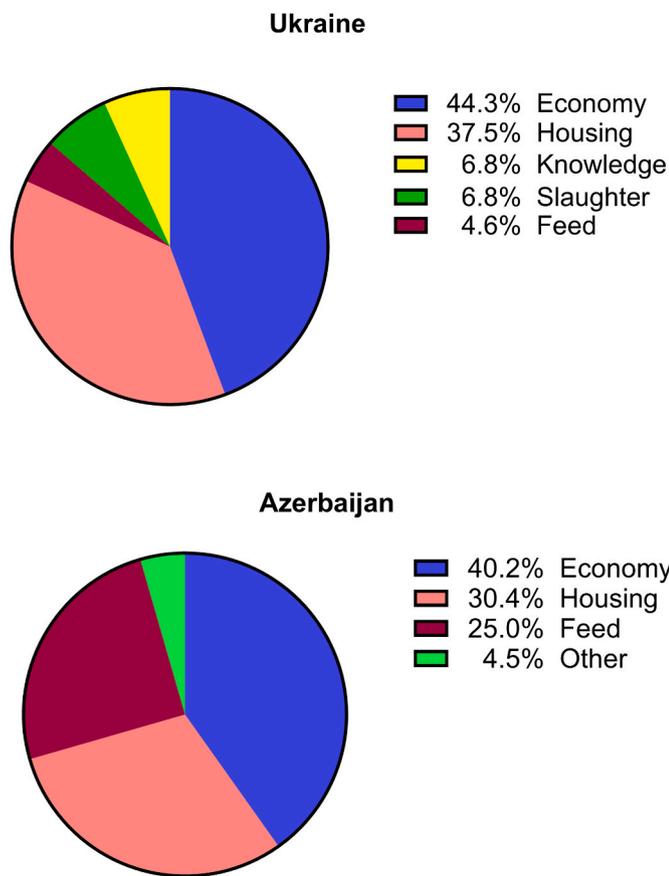


Fig. 6. Biggest welfare concerns, identified by farmers in Ukraine and Azerbaijan.

serve as a foundation for implementing welfare-enhancing policies. The lack of significant differences between countries and farm sizes in recognizing the need for improvements suggests that awareness of animal welfare issues exceeds national borders and farm scale, as indicated in studies from other countries (Ducrot et al., 2024). The significant differences in species prioritization for welfare improvements between Ukraine and Azerbaijan are not surprising, especially the difference observed for pigs, with Ukrainian farmers showing much higher concerns. Many people in Azerbaijan avoid eating pig meat due to religious and cultural reasons, although pork is still available in markets and is consumed by some individuals (van Berkum, 2017). In contrast, pork consumption is significant in Ukraine (Biloukha and Utermohlen, 2000).

A majority of the farmers both in Ukraine and Azerbaijan believe that

buying animal welfare friendly products can have a positive impact on the welfare and protection of farm animals. This is supported by other studies showing that Danish, German and Swedish consumers are willing to pay for improved pig welfare when buying pork (Sandøe and Christensen, 2024). There is a connection between farm animal welfare and human health benefits, and this is one of the main reasons why people prefer to buy products that promote animal welfare (Alonso et al., 2020). However, the willingness to pay for welfare-friendly products varies (Alonso et al., 2020), suggesting that while concern for animal welfare is widespread, economic factors still play a significant role in purchasing decisions. Moreover, positive attitudes concerning animal welfare do not always correspond to purchasing behaviour; in many cases, concern does not translate into purchasing decisions (Hyland et al., 2022).

The strong support for financial compensation observed in our study probably reflects the economic reality faced by farmers when implementing higher welfare standards. This agrees with previous research showing that animal production systems with higher welfare standards can increase production costs. For example, a study by Bornett et al. (2003) found that rearing costs under organic standards were 31 % higher than in the free-range systems. The strong belief among farmers regarding the need for compensation highlights a potential gap between the costs of adopting welfare-friendly practices and the market prices for these products. Although research indicates a growing consumer willingness to pay higher prices for animal welfare friendly products (Font-i-Furnols and Guerrero, 2014), the premium is often insufficient to cover the full costs of implementation. This discrepancy was also highlighted by Clark et al. (2017), which found that while consumers express a willingness to pay for improved animal welfare, their actual purchasing behaviour frequently does not align with these stated preferences. Financial resources and higher labor investment were listed as obstacles by the farmers from the Netherlands (van Veen et al., 2023). Te Velde et al. (2002) reported that farmers were concerned that enhanced farm animal welfare would lead to increased workloads, and negative impact on their work-life balance. A similar trend was observed among cattle farmers, who perceived that providing the best care for animals conflicted with labor demands and financial resources (Fischer et al., 2019).

Overall, our results demonstrated that farmers believed that animal welfare receives “just about the right level of importance” in policies, suggesting a moderate level of satisfaction with current policy approaches. The significant differences between Ukraine and Azerbaijan highlight the importance of considering national contexts when discussing animal welfare policies. The majority of the studied farmers in Ukraine believed that animal welfare doesn't receive enough attention which may be attributed to Ukraine's ongoing efforts to align its animal welfare regulations with EU standards. In contrast, most of the studied farmers in Azerbaijan believed that animal welfare receives the right

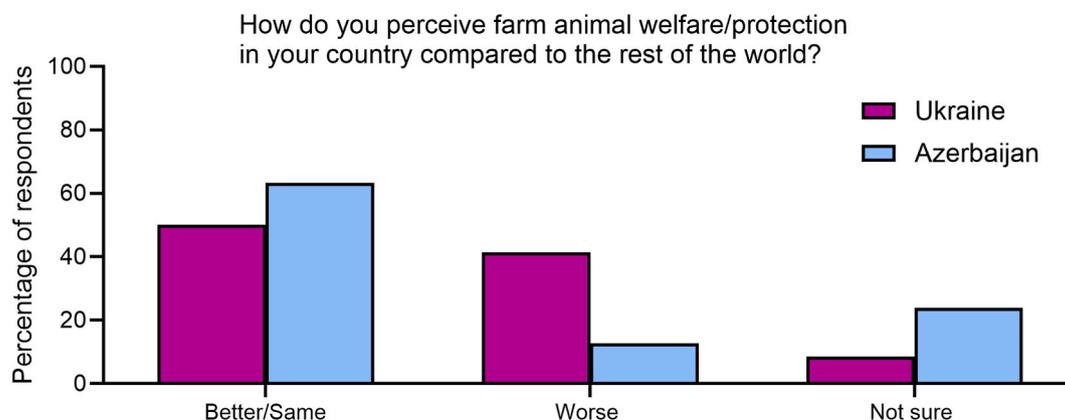


Fig. 7. Farmers' views on farm animal welfare in Ukraine and Azerbaijan vs. the rest of the world.

level of importance, possibly reflecting different cultural, economic, or policy contexts. However, the equal distribution among other opinions suggests a more diverse range of opinions within the country. Specific studies addressing citizens' trust in their country's animal welfare policies are limited. However, multiple studies have highlighted farmers' concerns about the disparity between their national animal welfare legislation and regulations in other countries. This perceived imbalance has often led to feelings of unfairness among farmers (Bock and Van Huik, 2007; Croyle et al., 2019; Balzani and Hanlon, 2020). Clark et al. (2024) examined public perceptions of animal health and welfare as a public good and suggested limited awareness of the evolving agricultural policy context, yet strong support for the use of public funds to support public goods, especially in farm animal welfare. Chaney et al. (2023) stressed the importance of cross-cultural perspectives and the role of political systems in influencing public opinion and policy effectiveness in the domain of animal welfare.

Most farmers in both countries stated that improvements in farm animal welfare are needed, indicating that they perceive substantial room for progress at farm level. These findings are not mutually exclusive: farmers can recognize that animal welfare on farms still needs improvement while simultaneously perceiving that, at the policy level, the topic receives about the right or, for some, still insufficient level of importance in their country's legislation and strategies. This might suggest that farmers see a gap between policy intentions and practical implementation and resources at the farm level.

Our results showed that farmers in Ukraine and Azerbaijan had different levels of awareness of the existence of national legislation. A significant number of them were not sure about its existence. This indicates that issues of animal welfare legislation is quite new in these two countries and is in the early stages of implementation. The lack of awareness also represents a risk to animal welfare, since legislation cannot be implemented by farmers who are unaware of its existence. At the same time, in analyses carried out by Balzani and Hanlon (2020) in countries with a long history of animal welfare, farmers complained of an unfair imbalance between national legislation and that of other countries. For example, Finnish cattle and pig farmers felt that the increase in number of inspections after EU accession was unjustified. At the same time, it is recognized that even where significant efforts have been made at national level to address animal welfare issues, there are often problems with enforcement (Goetschel, 2024).

Our results indicated a strong interest among farmers in both Ukraine and Azerbaijan in gaining more information about animal farming conditions on other farms, with Ukrainian farmers showing a higher level of interest. Similarly, the Eurobarometer surveys revealed a general interest in learning more about animal farming conditions (Eurobarometer, 2007, 2016). The EU citizens were more evenly split between "probably" and "certainly" interested responses, while our results show a stronger "certainly" interest from Ukrainian farmers (72.4%). However, the Eurobarometer survey focused on citizens rather than farmers. In contrast, the present study specifically captured the perspectives of farmers in Ukraine and Azerbaijan, highlighting their professional interest in animal farming conditions. This focus may explain the stronger responses, particularly the higher percentage of Ukrainian farmers who were "certainly" interested in receiving more information compared to EU citizens.

Economic issues were identified as a top concern by farmers in Ukraine and Azerbaijan. Indeed, the agricultural sector in both countries face economic challenges, with low returns on investment and productivity issues in some sectors (FAO, 2022). Moreover, in low-income countries, economic considerations often overshadow animal welfare concerns and do not receive the same recognition as in high-income countries (Parlasca et al., 2023). Additionally, economic factors can impact animal welfare practices, and economic pressures can lead to practices that may compromise animal welfare (Grandin, 2014).

An important economic factor relevant to third countries arises from the competitive tensions between differing animal welfare standards

across global markets. In the European Union, farmers are increasingly expressing concerns about the competitive disadvantages they face when complying with stricter animal welfare regulations, compared to producers in non-EU countries. The higher welfare standards demanded within the EU are often not mirrored in third countries, creating asymmetries in production costs and market competitiveness (Kasper et al., 2019). As a result, there is growing pressure to introduce trade measures or labeling requirements that would limit the import of products from countries with lower animal welfare standards or at least ensure transparency for consumers (de Roest et al., 2020; Blandford and Gaasbeek, 2021).

In both Ukraine and Azerbaijan, one of the main concerns affecting animal welfare is economic constraints (lack of finance). This is in line with research conducted in Finland (Kallioniemi et al., 2024), where the profitability of Finnish dairy farms has deteriorated due to market developments and rising costs. Therefore, financial aspects play an important role in technology investments. According to Richter et al. (2025), implementing improved farm animal welfare practices results in higher costs for farmers. These increased expenses are primarily due to the need for greater investments in buildings and machinery to support better animal living conditions and care. Studies of the impact of changes in farm animal welfare on the economic performance of Swedish beef farms have shown that improvements can reduce farm profitability. It is therefore important to provide farmers with financial incentives through private or public payment schemes to improve farm animal welfare in a sustainable way (Ahmed et al., 2020). Lusk and Norwood (2011) suggested that the costs of improving animal welfare on farms should be addressed through targeted subsidies or compensated through the market by increasing the price of labelled products. Fernandes et al. (2021) also highlighted the increased costs of pig farms that meet higher welfare standards through farmer training, retrofitting of equipment and housing and the introduction of painkillers and the lack of support systems for the decision to implement improved farm animal welfare systems. However, there are also studies showing the benefits from improved farm animal welfare (Fernandes et al. (2021). Improved welfare standards may lead to improved health with reduced need for veterinary service and medicine, reduced mortality, higher growth rates and improved reproduction, which will all contribute to farm productivity. Higher welfare standards also contribute to competitive advantages.

The second major problem that pose a risk to farm animal welfare in Ukraine and Azerbaijan was identified as poor housing conditions. This is in accordance with Chidgey (2023), who stated that the space provided for animals should be appropriate to their physical size, social behaviour, activity and natural habits. Also, air temperature and humidity are very important (Borshch et al., 2024; Lykhach et al., 2022) as well as other environmental conditions (Petkun et al., 2024). Salvin et al. (2020) also suggested that the confinement of cattle in feedlots had a negative impact on their welfare due to limited activity, lack of pasture and inability to express natural behaviours.

Farmers in Azerbaijan ranked poor feed quality as the third most important animal welfare issue, which appears to be linked to the more pronounced climate change in the region and the dependence of farms on natural pastures. This is consistent with the view of Craine et al. (2010), who found that rising climate temperatures reduced the crude protein and digestible organic matter content of pasture plants and affected cattle nutrition. Poorer forage quality means that animals do not get the right amount of energy, including lower average daily weight gain and poorer feed conversion (Gninkplékpó et al., 2024).

Poor slaughter conditions are the third most important animal welfare issue for Ukrainian farmers. A similar concern is expressed by Lambooij (2024), who suggests improving legislation and management tools related to farms, transport facilities and slaughterhouses. At the same time, in the UK and Ireland survey, the majority of respondents (81.4%) were "somewhat satisfied" that their slaughterhouse had an appropriate animal welfare system in place (Gouveia and O'Connor,

2025). **Faucitano (2018)** points out that failure to maintain an adequate level of animal welfare during transport, lairage and slaughter creates stressful conditions and has an irreversible impact on the subsequent quality of carcasses and meat, and undermines farmers' efforts to improve animal welfare and productivity.

This study had some limitations. The exploratory design used a modest sample size ($n = 129$) from random sampling across farm sizes and types, limiting generalizability to all farmers in Ukraine and Azerbaijan. However, data from early 2022 remain relevant, as no major farm animal welfare legislation changes have occurred since. Farmer demographics such as age and experience were not recorded, preventing adjustment for potential confounders, though no prior studies indicate age as the dominant factor differentiating attitudes between these countries. Future research with larger samples should include multivariate regression controlling for age and other variables to confirm these patterns.

5. Conclusion

The analysis of farmers' opinions in Ukraine and Azerbaijan showed that there is heterogeneity in awareness of the importance and level of protection of farm animals of different species. Most farmers in both countries believed that animal welfare needs to be improved and that poor housing conditions and economic constraints were the two most important factors contributing to poor animal welfare. A significant proportion of the farmers expressed uncertainty about existing national legislation. However, in Ukraine half of the respondents felt that animal welfare was not given the appropriate level of importance in national policy, while in Azerbaijan the majority of farmers felt that current policy gave it the appropriate level of importance. These are rather contradictory results, given that a relatively large proportion of farmers in both countries rated farm animal welfare as better or similar to the rest of the world. Respondents in both countries commonly agreed to the need for financial support such as compensation or subsidies from the state and identified the main challenge in keeping farm animals as lack of funds to improve animal welfare conditions.

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CRediT authorship contribution statement

Oksana Kravchenko: Conceptualization, Methodology, Writing – original draft. **Elina Åsbjer:** Conceptualization, Methodology, Writing – review & editing. **Mykhailo Matvieiev:** Data curation, Investigation, Writing – review & editing. **Ayaz Mammadov:** Investigation, Writing – review & editing. **Javid Ojaghi:** Investigation, Writing – review & editing. **Simon Tobias Höxter:** Formal analysis, Writing – original draft. **Birgitta Staaf Larsson:** Conceptualization, Writing – review & editing. **Irada Khalilova:** Conceptualization, Writing – review & editing. **Andriy Getya:** Investigation, Project administration, Writing – review & editing. **Nataliia Hryshchenko:** Investigation, Writing – review & editing. **Anders H. Karlsson:** Conceptualization, Methodology, Writing – review & editing. **Hallvard Wie:** Funding acquisition, Project administration, Writing – review & editing. **David Richard Arney:** Project administration, Writing – review & editing. **Ragnar Leming:** Conceptualization, Methodology, Writing – review & editing. **Francesca Carnovale:** Methodology, Writing – review & editing. **Liene Anson:** Writing – review & editing. **Vytautas Ribikauskas:** Methodology, Writing – review & editing. **Galia Zamaratskaia:** Conceptualization, Formal analysis, Funding acquisition, Investigation, Supervision, Visualization, Writing – original draft.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jrurstud.2026.104045>.

Data availability

Data will be made available on request.

References

- Adler, F., Christley, R., Campe, A., 2019. Invited review: examining farmers' personalities and attitudes as possible risk factors for dairy cattle health, welfare, productivity, and farm management: a systematic scoping review. *J. Dairy Sci.* 102 (5), 3805–3824. <https://doi.org/10.3168/jds.2018-15037>.
- Ahmed, H., Alvåsen, K., Berg, C., Hansson, H., Hultgren, J., Röcklinsberg, H., Emanuelson, U., 2020. Assessing economic consequences of improved animal welfare in Swedish cattle fattening operations using a stochastic partial budgeting approach. *Livest. Sci.* 232, 103920. <https://doi.org/10.1016/j.livsci.2020.103920>.
- Alimardanov, E., Abdullayev, K., Rothenberger, C., Young, A., 2006. Livestock services for small-scale cattle holders in rural Azerbaijan. *Small Enterprise Dev.* 17 (4), 62. <https://doi.org/10.3362/0957-1329.2006.045> [Article].
- Alonso, M.E., González-Montaña, J.R., Lomillos, J.M., 2020. Consumers' concerns and perceptions of farm animal welfare. *Animals (Basel)* 10 (3). <https://doi.org/10.3390/ani10030385>.
- Ammann, J., Mack, G., El Benni, N., Jin, S., Newell-Price, P., Tindale, S., Hunter, E., Vicario-Modroño, V., Gallardo-Cobos, R., Sánchez-Zamora, P., Miškolci, S., Frewer, L.J., 2024. Consumers across five European countries prioritise animal welfare above environmental sustainability when buying meat and dairy products. *Food Qual. Prefer.* 117, 105179. <https://doi.org/10.1016/j.foodqual.2024.105179>.
- Balzani, A., Hanlon, A., 2020. Factors that influence farmers' views on farm animal welfare: a semi-systematic review and thematic analysis. *Animals* 10 (9), 1524. <https://doi.org/10.3390/ani10091524>.
- Beggs, D.S., Fisher, A.D., Jongman, E.C., Hemsworth, P.E., 2015. A survey of Australian dairy farmers to investigate animal welfare risks associated with increasing scale of production. *J. Dairy Sci.* 98 (8), 5330–5338. <https://doi.org/10.3168/jds.2014-9239>.
- Belanche, A., Martín-Collado, D., Rose, G., Yáñez-Ruiz, D.R., 2021. A multi-stakeholder participatory study identifies the priorities for the sustainability of the small ruminants farming sector in Europe. *Animal : Int. J. Anim. Biosci.* 15 (2), 100131. <https://doi.org/10.1016/j.animal.2020.100131>.
- Biloukha, O.O., Utermohlen, V., 2000. Correlates of food consumption and perceptions of foods in an educated urban population in Ukraine. *Food Qual. Prefer.* 11 (6), 475–485. [https://doi.org/10.1016/S0950-3293\(00\)00020-3](https://doi.org/10.1016/S0950-3293(00)00020-3).
- Blandford, D., Gaasbeek, M., 2021. Can animal welfare be protected in international trade? *EuroChoices* 20 (2), 24–30. <https://doi.org/10.1111/1746-692X.12289>.
- Bock, B.B., Van Huik, M., 2007. Animal welfare: the attitudes and behaviour of European pig farmers. *Br. Food J.* 109 (11), 931–944.
- Bornett, H.L.L., Guy, J.H., Cain, P.J., 2003. Impact of animal welfare on costs and viability of pig production in the UK. *J. Agric. Environ. Ethics* 16 (2), 163–186. <https://doi.org/10.1023/A:1022994131594>.
- Borshch, O.O., Ruban, S., Borshch, O.V., Matvieiev, M., Prudnikov, V., Sobolev, O., Bilkevych, V., Fedorchenko, M., 2024. Cow behaviour and milk yield during different categories temperature-humidity indices. *Rev. Invest. Vet. Perú* 35 (1), e25305. <https://doi.org/10.15381/rirep.v35i1.25305>.
- Broom, D.M., 2014. *Sentience and Animal Welfare*. CABI Publishing. <https://doi.org/10.1079/9781780644042.0000>.
- Carnovale, F., Jin, X., Arney, D., Descovich, K., Guo, W., Shi, B., Phillips, C.J.C., 2021. Chinese public attitudes towards, and knowledge of, animal welfare. *Animals* 11 (3), 855.
- Carnovale, F., Xiao, J., Shi, B., Arney, D.R., Phillips, C.J.C., 2024. The effects of occupation, education and dwelling place on attitudes towards animal welfare in China. *Animals* 14 (5), 713. <https://doi.org/10.3390/ani14050713>.
- Chaney, P., Jones, I.R., Narayan, N., 2023. Beyond the unitary State: Multi-Level governance, politics, and cross-cultural perspectives on animal welfare. *Animals (Basel)* 14 (1). <https://doi.org/10.3390/ani14010079>.

- Chidgey, K.L., 2023. Space allowance for growing pigs: animal welfare, performance and on-farm practicality. *Animal*, 100890. <https://doi.org/10.1016/j.animal.2023.100890>.
- Clark, B., Proctor, A., Boatey, A., Mahon, N., Hanley, N., Holloway, L., 2024. Animal health and welfare as a public good: what do the public think? *Agric. Hum. Val.* 41 (4), 1841–1856. <https://doi.org/10.1007/s10460-024-10585-0>.
- Clark, B., Stewart, G.B., Panzone, L.A., Kyriazakis, I., Frewer, L.J., 2017. Citizens, consumers and farm animal welfare: a meta-analysis of willingness-to-pay studies. *Food Policy* 68, 112–127. <https://doi.org/10.1016/j.foodpol.2017.01.006>.
- Craine, J.M., Elmore, A.J., Olson, K.C., Tolleson, D., 2010. Climate change and cattle nutritional stress. *Glob. Change Biol.* 16 (10), 2901–2911. <https://doi.org/10.1111/j.1365-2486.2009.02060.x>.
- Croyle, S., Belage, E., Khosa, D., LeBlanc, S., Haley, D., Kelton, D., 2019. Dairy farmers' expectations and receptivity regarding animal welfare advice: a focus group study. *J. Dairy Sci.* 102 (8), 7385–7397.
- de Roest, K., Ferrari, P., Knickel, K., 2020. Specialisation and economies of scale or diversification and economies of scope? Assessing different agricultural development pathways. *J. Rural Stud.* 80, 62–73. <https://doi.org/10.1016/j.jrurstud.2020.08.002>.
- Del Campo, M., Montossi, F., Soares de Lima, J.M., Brito, G., 2025. Future cattle production: animal welfare as a critical component of sustainability and beef quality, a South American perspective. *Meat Sci.* 219, 109672. <https://doi.org/10.1016/j.meatsci.2024.109672>.
- Ducrot, C., Barrio, M.B., Boissy, A., Charrier, F., Even, S., Mormède, P., Petit, S., Pinard-van der laan, M.H., Schelcher, F., Casabianca, F., Ducos, A., Foucras, G., Guatteo, R., Peyraud, J.L., Vayssier-Tausat, M., Veyssat, P., Friggens, N.C., Fernandez, X., 2024. Animal board invited review: improving animal health and welfare in the transition of livestock farming systems: towards social acceptability and sustainability. *Animal* 18 (3), 101100. <https://doi.org/10.1016/j.animal.2024.101100>.
- Estévez-Moreno, L.X., Miranda-de la Lama, G.C., Miguel-Pacheco, G.G., 2022. Consumer attitudes towards farm animal welfare in Argentina, Chile, Colombia, Ecuador, Peru and Bolivia: a segmentation-based study. *Meat Sci.* 187, 108747. <https://doi.org/10.1016/j.meatsci.2022.108747>.
- Eurobarometer, 2007. Attitudes of EU citizens towards animal welfare. https://www.poli-tique-animaux.fr/fichiers/eurobarometer_-_attitudes_of_eu_citizens_towards_animal_welfare-2007.pdf.
- Eurobarometer, 2016. Attitudes of Europeans towards animal welfare. <https://europa.eu/eurobarometer/surveys/detail/2096>.
- European Union (EU), 2009. Treaty on the Functioning of the European Union (TFEU). Official Journal of the European Union. Article 13.
- Faucitano, L., 2018. Preslaughter handling practices and their effects on animal welfare and pork quality. *J. Anim. Sci.* 96 (2), 728–738. <https://doi.org/10.1093/jas/skx064>.
- Fernandes, J.N., Hemsworth, P.H., Coleman, G.J., Tilbrook, A.J., 2021. Costs and benefits of improving farm animal welfare. *Agriculture* 11 (2), 104. <https://doi.org/10.3390/agriculture11020104>.
- Fischer, K., Sjöström, K., Stiernström, A., Emanuelson, U., 2019. Dairy farmers' perspectives on antibiotic use: a qualitative study. *J. Dairy Sci.* 102 (3), 2724–2737. <https://doi.org/10.3168/jds.2018-15015>.
- Font-i-Furnols, M., Guerrero, L., 2014. Consumer preference, behavior and perception about meat and meat products: an overview. *Meat Sci.* 98 (3), 361–371. <https://doi.org/10.1016/j.meatsci.2014.06.025>.
- Food and Agriculture Organization of the United Nations (FAO), 2022. The State of Food and Agriculture 2022: Leveraging Automation in Agriculture for Transforming Agrifood Systems. FAO, Rome. Available at: <https://www.fao.org/newsroom/detail/FAO-state-of-food-and-agriculture-SOFA-2022-automation-agrifood-systems/>. (Accessed 9 February 2025).
- Fraser, D., 2018. Animal welfare: translating science into practice. In: Mench, J.A. (Ed.), *Advances in Agricultural Animal Welfare*. Woodhead Publishing, pp. 129–143. <https://doi.org/10.1016/B978-0-08-101215-4.00007-9>.
- Gaudino, S., Reidsma, P., Kanellopoulos, A., Sacco, D., Van Ittersum, M.K., 2018. Integrated assessment of the EU's greening reform and feed self-sufficiency scenarios on dairy farms in Piemonte, Italy. *Agriculture* 8 (9).
- Gninkpléko, E.L.R., Koura, B.I., Lesse, P., Toko, I., Demblon, D., Houinato, M.R., Cabarau, J.F., 2024. Small ruminant farmers' feeding strategies to cope with climate change across five agroecological zones of Benin, West Africa. *Heliyon* 10 (21). <https://doi.org/10.1016/j.heliyon.2024.e39834>.
- Goetschel, A.F., 2024. Animal welfare as the basis of one health: a UN convention on animal welfare, health, and protection poses a realistic solution to improved animal welfare and human health. *CABI One Health* 3 (1). <https://doi.org/10.1079/cabionehealth.2024.0003>.
- Gouveia, K., O'Connor, I., 2025. Job satisfaction and animal welfare at slaughter: a survey of official veterinarians in the United Kingdom and Republic of Ireland. *Anim. Welf.* 34. <https://doi.org/10.1017/awf.2024.43> article-number e7.
- Grandin, T., 2014. The effect of economic factors on the welfare of livestock and poultry. In: Grandin, T. (Ed.), *Improving Animal Welfare: a Practical Approach*, second ed. CABI, Wallingford, pp. 215–230. 978-1-78064-467-7.
- Hansen, B.G., Langseth, E., Berge, C., 2023. Animal welfare and cow-calf contact-farmers' attitudes, experiences and adoption barriers. *J. Rural Stud.* 97, 34–46. <https://doi.org/10.1016/j.jrurstud.2022.11.013>.
- Hötzel, M.J., Albernaz-Gonçalves, R., Olmos, G., 2024. 26 - farmer attitudes towards pig welfare. In: Camerlink, I., Baxter, E.M. (Eds.), *Advances in Pig Welfare*, second ed. Woodhead Publishing, pp. 577–591. <https://doi.org/10.1016/B978-0-323-85676-8.00013-4>.
- Hyland, J.J., Regan, Á., Sweeney, S., McKernan, C., Benson, T., Dean, M., 2022. Consumers attitudes toward animal welfare friendly produce: an island of Ireland study. *Front. Anim. Sci.* 3, 930930.
- Ingenbleek, P.T.M., Immink, V.M., Spoolder, H.A.M., Bokma, M.H., Keeling, L.J., 2012. EU animal welfare policy: developing a comprehensive policy framework. *Food Policy* 37 (6), 690–699. <https://doi.org/10.1016/j.foodpol.2012.07.001>.
- Kallioniemi, M.K., Kymäläinen, H.R., Niemi, J.K., 2024. Enabling factors and constraints for the adoption of animal welfare-enhancing technologies among Finnish dairy farmers. *Front. Anim. Sci.* 5, 1332525. <https://doi.org/10.3389/fanim.2024.1332525>.
- Kasper, C., Roe, B.E., Nayga, R.M., 2019. Assessing consumer preferences for animal welfare attributes in meat products: a cross-country comparison. *Eur. Rev. Agric. Econ.* 46 (5), 734–768. <https://doi.org/10.1093/erae/jbz025>.
- Kielland, C., Skjerve, E., Østerås, O., Zanella, A.J., 2010. Dairy farmer attitudes and empathy toward animals are associated with animal welfare indicators. *J. Dairy Sci.* 93 (7), 2998–3006. <https://doi.org/10.3168/jds.2009-2899>.
- Kılıç, İ., Bozkurt, Z., 2013. The relationship between farmers' perceptions and animal welfare standards in sheep farms. *Asian-Australas. J. Anim. Sci.* 26 (9), 1329–1338. <https://doi.org/10.5713/ajas.2013.13124>.
- Lambooi, E., 2024. Animal stress and welfare during transport and slaughtering: an outline for future policies. *Animals* 14 (21), 3064. <https://doi.org/10.3390/ani14213064>.
- Law of the Republic of Azerbaijan on the Animal Kingdom, No. 675-IQ, 1999. <https://e-qanun.az/framework/3850>.
- Law of the Republic of Azerbaijan on Veterinary Medicine, No. 922-IIQ, 2005. <https://e-qanun.az/framework/10691>.
- Law of Ukraine, 2017. On state control over compliance with legislation on food products, feed, b-products of animal origin, No. 2042-VIII. <https://zakon.rada.gov.ua/laws/show/2042-19>.
- Law of Ukraine, 2018. On Safety and Hygiene of Feeds, No. 2264-VIII. <https://zakon.rada.gov.ua/laws/main/2264-19>.
- Law of Ukraine, 2023. On Veterinary Medicine, No. 1206-IX. <https://zakon.rada.gov.ua/laws/show/1206-IX#Text>.
- Lundmark, F., Röcklinsberg, H., Wahlberg, B., Berg, C., 2016. Content and structure of Swedish animal welfare legislation and private standards for dairy cattle. *Acta Agric. Scand. Sect. A Anim. Sci.* 66 (1), 35–42. <https://doi.org/10.1080/09064702.2016.1198417>.
- Lusk, J.L., Norwood, F.B., 2011. Animal welfare economics. *Appl. Econ. Perspect. Pol.* 33 (4), 463–483. <https://doi.org/10.1093/aep/p036>.
- Lykhach, A., Lykhach, V., Mylostyvyi, R., Barkar, Y., Shpetny, M., Izhboldina, O., 2022. Influence of housing air temperature on the behavioural acts, physiological parameters, and performance responses of fattening pigs. *Journal of Animal Behaviour and Biometeorology* 10 (3), 1–7. <https://doi.org/10.31893/jabb.22026>.
- Lykhova, S.Y., Maistro, D.M., Tkachenko, V.V., Shestakova, S.O., Mikhaylichenko, M.A., 2023. Animal welfare: european standards as a basis for reforming national legislation in Ukraine. *Nativa* 11 (2), 264–271. <https://doi.org/10.31413/NAT.V11I2.15923>.
- Mellor, D.J., 2019. Moving beyond the “five freedoms” by updating the “five domains” model for animal welfare. *Animals* 10 (1), 101. <https://doi.org/10.3390/ani10010101>.
- Parlasca, M., Knöbelsdorfer, I., Alemayehu, G., Doyle, R., 2023. How and why animal welfare concerns evolve in developing countries. *Anim. Front.* 13 (1), 26–33. <https://doi.org/10.1093/af/vfac082>.
- Petkun, H., Valchuk, O., Nedosekov, V., 2024. Selection of parameters in the development of a welfare assessing system on dairy farms in Ukraine. *Vet. Zootech.* 82 (1), 47–54. <https://vetzoo.lsmuni.lt/data/vols/2024/8201/en/petkun.pdf>.
- Petkun, H., Nedosekov, V., 2022. Analysis of EU and Ukrainian legislation for the cattle welfare. *Scientific messenger of LNU of veterinary medicine and biotechnologies. Series: Vet. Sci.* 24 (106), 108–113.
- Richter, S., Stolz, H., Martínez-Cruz, A.I., Kachi, A., 2025. Animal welfare has priority: swiss consumers' preferences for animal welfare, greenhouse gas reductions and other sustainability improvements in dairy products. *Food Qual. Prefer.* 123, 105350. <https://doi.org/10.1016/j.foodqual.2024.105350>.
- Robbins, J., von Keyserlingk, M.A., Fraser, D., Weary, D.M., 2016. Invited review: farm size and animal welfare. *J. Anim. Sci.* 94 (12), 5439–5455. <https://doi.org/10.2527/jas.2016-0805>.
- Salvin, H.E., Lees, A.M., Cafe, L.M., Colditz, I.G., Lee, C., 2020. Welfare of beef cattle in Australian feedlots: a review of the risks and measures. *Anim. Prod. Sci.* 60 (13), 1569–1590. <https://doi.org/10.1071/AN19621>.
- Sandøe, P., Christensen, T., 2024. 22 - how much do people care about pig welfare, and how much will they pay for it? In: Camerlink, I., Baxter, E.M. (Eds.), *Advances in Pig Welfare*, second ed. Woodhead Publishing, pp. 497–515. <https://doi.org/10.1016/B978-0-323-85676-8.00006-7>.
- Staaf Larsson, B., Jansson, A., Holmberg, M., Winblad von Walter, L., Stéen, M., Dahlborn, K., 2024. A comparison of three animal welfare assessment protocols applied to Swedish dairy cow herds. *Acta Agric. Scand. Sect. A Anim. Sci.* 73 (3–4), 153–164. <https://doi.org/10.1080/09064702.2024.2317708>.
- Sundrum, A., 2024. Why Has Animal Science Not Led to Improved Farm Animal Health and Welfare? *Frontiers in Animal Science* Front. 4:1214889. <https://doi.org/10.3389/fanim.2023.1214889>.
- te Velde, H., Aarts, N., van Woerkum, C., 2002. Dealing with ambivalence : farmers' and Consumers' perceptions of animal welfare in livestock breeding. *J. Agric. Environ. Ethics* 15 (2), 203–219. <https://doi.org/10.1023/A:1015012403331>.
- Tomasevic, I., Bahelka, I., Čitek, J., Candek-Potokar, M., Djekić, I., Getya, A., Guerrero, L., Ivanova, S., Kušec, G., Nakov, D., Sołowiej, B., Stoica, M., Szabó, C.,

- Tudoreanu, L., Weiler, U., Font-i-Furnols, M., 2020. Attitudes and beliefs of Eastern European consumers towards animal welfare. *Animals* 10 (7).
- van Berkum, S., 2017. Market and Competitiveness Analysis of the Azerbaijan Agricultural Sector: an Overview. Wageningen Economic Research. <https://edepot.wur.nl/450210>.
- van Veen, L.A., van den Oever, A.C.M., Kemp, B., van den Brand, H., 2023. Perception of laying hen farmers, poultry veterinarians, and poultry experts regarding sensor-based continuous monitoring of laying hen health and welfare. *Poult. Sci.* 102 (5), 102581. <https://doi.org/10.1016/j.psj.2023.102581>.
- Veissier, I., Butterworth, A., Bock, B., Roe, E., 2008. European approaches to ensure good animal welfare. *Appl. Anim. Behav. Sci.* 113 (4), 279–297. <https://doi.org/10.1016/j.applanim.2008.01.008>.
- Winter, M., Fry, C., Carruthers, S.P., 1998. European agricultural policy and farm animal welfare. *Food Policy* 23 (3), 305–323. [https://doi.org/10.1016/S0306-9192\(98\)00036-0](https://doi.org/10.1016/S0306-9192(98)00036-0).
- Yatsenko, I.V., Zapara, S.I., Zon, G.A., Ivanovska, L.B., Klochko, A.M., 2020. Animal rights and protection against cruelty in Ukraine. *J. Environ. Manag. Tour.* 11 (1), 91–103. [https://doi.org/10.14505//jemt.11.1\(41\).11](https://doi.org/10.14505//jemt.11.1(41).11).
- Zamaratskaia, G., Mammadov, A., Ojaghi, J., Höxter, S.T., Kravchenko, O., Hryshchenko, N., Matvieiev, M., Åsbjer, E., Staaf Larsson, B., Usenko, S., Karlsson, A. H., Wie, H., Kocina, I., Anson, L., Ribikauskas, V., Arney, D.R., Leming, R., Carnovale, F., Getya, A., 2023. Attitudes of consumers towards animal welfare in Ukraine and Azerbaijan. In: *Proceedings 2023: 14Th International Symposium: Modern Trends in Livestock Production*. Institute for Animal Husbandry, pp. 104–113.
- Zanon, T., Alrhoun, M., Gauly, M., 2024. Assessing the impact of biosecurity practices and animal welfare in small-scale mountain dairy farming. *Sci. Rep.* 14 (1), 13294. <https://doi.org/10.1038/s41598-024-63841-y>.