

RESEARCH ARTICLE

POLICY OF HEALTH, ANIMAL WELFARE AND ECOSYSTEM BALANCE: CHALLENGES FOR UKRAINE DURING WAR

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ABSTRACT

Ukraine is on the path to integration into the European Union. The state and national community face many challenges. It is necessary to understand, develop, adapt and implement the European bases of sustainable development at the economic, social and environmental levels at the national level. The ambitious sustainable development goals that the EU wants to achieve are now focused on rural areas and everything that surrounds them, including the health and welfare of domestic and livestock animals and not just agricultural production. Animal welfare legislation is aligned with the most recent scientific evidence outlined in documents such as the European Green Deal, the From Farm to Fork strategy, Biodiversity Conservation Strategy. Since the beginning of the full-scale Russian aggression, due to military actions taking place mostly in the Steppe Zone of Ukraine, where four out of five biosphere reserves are located, this has negatively affected the balance in local ecosystems due to the reduction in the number of large and small ruminants raised on pastures and the disappearance of wild fauna, the existence of which depends on the presence of farm animals.

KEYWORDS

EU integration, war, animal health, welfare policy, sustainability

1. INTRODUCTION

The sustainable rural development policy was developed to address the challenges of the 21st century faced by the rural areas of European Union (EU) member states and EU candidate states. It is part of the Common Agricultural Policy (CAP), which is constantly refined and supplemented with new opportunities based on the economic, social, and environmental needs of European society (OIE, 2019; Moyano-Estrada et al., 2020).

One of the priorities of the EU's common agricultural policy for 2023-2027 is the creation of an effective model for supporting and promoting knowledge and innovation in agriculture and related areas: rural areas, value chains, environmental protection, climate change, conservation of biodiversity, protection of animals, sustainable development of society, etc (Eurostat, 2023; European Commission, 2023; Kendall et al., 2006; Maji et al., 2024; Narayan et al., 2021; Morgado et al., 2022; Joseph et al., 2023; European Commission, 2022).

In Ukraine, a relatively small number of national studies are devoted to the legal regulation of ensuring animal welfare and their protection from cruelty, which are mostly covered in scientific works of a legal nature, which mainly highlight the issues of forming a conceptual attitude towards the organization, development, compliance and official consolidation of regulatory regulation of animal protection in a comparative aspect with the legislation of the European Union (Pashkovska, 2018; Zubchenko, 2016; Synoverska, 2019; Kobzeva et al., 2021).

The transformation processes that took place over the past decade in the planned economic, social, environmental and institutional dimensions, although they had positive results in some socio-economic indicators, became impossible to implement in the regions of the temporarily occupied Autonomous Republic of Crimea, the city of Sevastopol and part of the regions of Donetsk and Luhansk regions (Goals sustainable development of Ukraine, 2020).

2. MATERIAL AND METHODS

The research methodology was based on the method of comparative analysis of statistical data, synthesis of scientific bibliographic sources, state documents and their reflection. Our study analyzed statistical data of the State Statistics Service of Ukraine, in particular, summarized tables of statistical information on livestock, in particular, data on the dynamics of livestock numbers by region presented by the Ministry of Agriculture of Ukraine, regional and Kyiv city state administrations, for the period from 2022 to 2024 were taken into account.

3. LITERATURE REVIEW

3.1 European policy on animal health and welfare

European Union policy on animal health and welfare consists of harmonized rules covering a range of animal species and issues affecting their welfare. European legislation establishes minimum standards for all farmed animals with regard to the production, maintenance and transport system, as well as the conditions at the time of stunning and slaughter (European Commission, 2023; Kovtun and Stiurko, 2025; European Commission, s/d(a); Papakonstantinou et al., 2024).

The Brambell Committee in 1965 was the first to attempt to give a scientific definition to animal welfare, they drew attention to the importance of behavior in animal welfare, emphasized the usefulness of experimental scientific studies and accepted that animals had feelings (UK Parliament, 1965).

In 1976, the Council of Europe created the European Convention for the Protection of Animals Kept for Agricultural Purposes, with the aim of establishing common minimum standards for the protection of animals kept for agricultural purposes in signatory countries. The content of this convention concerns animals kept in intensive farming systems and

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applies to animals, raised or kept for the production of food, wool, skin or fur or for other agricultural purposes (Council of Europe, 1976).

The convention aims to protect farmed animals against any unnecessary suffering or injury caused by their housing, the food they receive or the care they receive. In the following years, with the technical and technological development of agricultural animal production and due to the increase in disparities in national legislation in the field of animal protection in places of creation, the convention was changed in 1992 (EU, 92/583/EEC, 1992).

On May 20, 2020, the European Commission adopted the Farm to Fork Strategy. The Strategy aimed to carry out ambitious actions in terms of animal welfare in the context of more sustainable agriculture. One of these actions concerns the launch of an assessment, also called «Fitness Check», of EU legislation on the welfare of farmed animals (European Commission, s/d(a)).

The Farm to Fork Strategy is considered to aim for a new approach to ensure that agriculture, livestock, fisheries and aquaculture, as well as the food value chain, contribute adequately to the goal of reducing greenhouse gas emissions effect to 50% compared to 1990 levels to achieve a climate-neutral Union by 2050 (European Commission, 2020).

However, food production systems continue to be a major cause of climate change and environmental degradation (European Commission, 2019; Kuczynski, et al., 2011). There is an urgent need to reduce dependence on chemical pesticides and antimicrobial agents, excessive fertilization and increase the number of producers of organic agriculture and livestock with the aim of improving animal welfare and reversing the loss of biodiversity (European Commission, s/d(a); Papakonstantinou et al., 2024).

As part of the European Green Deal, on 22 June 2022, the European Commission proposed a regulation on the sustainable use of plant protection products (SUR - sustainable use regulation) as part of a package of measures aimed at reducing the environmental footprint of food production. However, on 22 November 2023, this proposal was rejected by a majority vote of the European Parliament (European Parliament, 2023). What will happen next? What are the prospects for Ukraine? It is unknown.

The EU animal welfare initiative was promoted and encouraged for implementation in other countries on the European continent and beyond, through international agreements and partnerships, through the Welfare Quality® project, which in 2010 became Welfare Quality Network (Newsletter of the welfare quality network, 2023; Ceballos et al., 2019).

3.2 Animal welfare concept

The concept of animal welfare considers that animals must have three important states: biological functioning, affective state and their own nature (OIE, 2019; FAWS, 2009). The biological functioning of animals — including health, growth, production and reproductive activity. According to this approach, as long as an animal is healthy, grows and reproduces its welfare is safeguarded.

Affective states of animals, both negative states (pain, suffering, fear, hunger or frustration) and positive states (Ex: pleasure associated with playing behavior). A mode of animal production is judged according to the suffering it causes to animals or according to the animals' degree of happiness.

The third state is related to the possibility of animals having a natural life, that is, being allowed to live according to the conditions to which they are adapted and demonstrate behaviors specific to their species (European Commission, s/d(a); FAWS, 2009).

Animal welfare, also called animal comfort, cannot be seen only as the absence of stress and behavioral changes. It is considered that the welfare of animals also includes their physical and emotional states, which change under the influence of different factors. In accordance with the World Organisation for animal health (OIE, 2019, p. 333-335) and the Farm's Animal Welfare Council (FAWS, 2009), animal welfare, whether on farm, in transit, at marker or at a place of slaughter should be considered in terms of «five freedoms»:

- Physiological freedom aimed at the absence of hunger, thirst and the fight against malnutrition. Animals must have permanent access to fresh, clean water and food must be sufficient, appropriate and safe to maintain health and vigor. The feeding area should have enough space for each animal to eat and drink, in order to minimize pushing and competition during meals.
- Environmental freedom that implies the absence of discomfort. The animal must be provided with an environment with clean, dry and

comfortable areas, with sufficient space to move around. There must be a covered area for the animals to protect themselves from adverse weather conditions.

- Sanitary freedom (absence of pain, injuries and illness) means that animals must be protected from injuries and elements that could cause them pain, suffering or illness, that is, there must be a prevention and/or rapid treatment plan in order to promote good health.
- Freedom to express your natural behavior. Animals must have sufficient and adequate space, clean facilities and the company of animals of their own species, and must be able to express their natural behavior, also specific to the species.
- Psychological freedom (absence of fear, anxiety and stress). To achieve this, it is necessary for keepers to understand the basic principles of animal behavior, in order to avoid mental suffering and stress, essentially during transportation during loading/unloading of animals.

The concept of «Five Freedoms» originated with the Report of the Technical Committee to Enquire into the Welfare of Animals kept under «Intensive Livestock Husbandry Systems», in London (UK Parliament, 1965; The Brambell Report, December, 1965).

After BREXIT the UK has drawn up new development schemes, including the Animal Health and Welfare Pathway, where certain aspects of farm animal health and welfare (FAHW) will be subsidized through government support, raising a question much debated in the literature regarding the representation of FAHW as a public good (Clark et al., 2024).

For the authors, policy must respond to the demands of society and be responsible to citizens, as it is important to understand public attitudes and preferences in relation to FAHW as a public good, and how the public can prioritize this in relation to a broader set of environmental public goods from agriculture (Clark et al., 2024).

Consumer preferences for products with labels of origin lead producers to implement good agroecological practice in animal production on their farms, and as studies show, this trend is increasing worldwide (Estevez-Moreno et al., 2022).

Scientific sources suggest the implementation of a new work management system in animal breeding sites, which is more friendly to the environment and animal welfare, including in this system the moderate use of antibiotics (Bozzo, 2021). Other researchers suggest careful analysis of animal behavior that allows for early detection of problems and implementation of preventative measures (Fiorilla et al., 2024).

4. RESULT AND DISCUSSION

4.1 Situation and prospects for Ukraine

Legal regulation of the approach to animal health and welfare and their protection from cruelty is considered one of the necessary aspects of the humanization of today's society (Pashkovska, 2018).

Since Ukraine declared its independence, the state has joined the convention on the «Conservation of European wild fauna and flora and of their natural habitats», signed in Bern on September 19, 1979 (see Law of Ukraine No. 436/96-BP dated 29/10/1996); the convention on «International trade in endangered species of wild fauna and flora», signed on March 3, 1973 in Washington (see Law of Ukraine No. 662-XIV (662-14) dated 14/05/99); the convention on the «Conservation of migratory species of wild animals» (see Law of Ukraine No. 535-XIV (535-14) dated 19/03/99); agreements on the «Conservation of Cetaceans of the Black Sea, the Mediterranean Sea and the adjacent Atlantic Ocean water area» (see Law of Ukraine No. 1067-IV (1067-15) dated 09/07/2003); ratified the European Convention for the «Protection of Pet Animals» (see Law of Ukraine No. 578-VII (578-18) of 18/09/2013).

In addition to the regulatory documents listed in the table, you can add regulatory documents of general importance that are related to animal protection. Among them are: the «Red Book of Ukraine», «On environmental protection», «On protection of the population from infectious diseases», «On ensuring sanitary and epidemic well-being of the population», «On state support for agriculture of Ukraine», «On the nature reserve fund of Ukraine», «On the zone of emergency environmental situation», «On state control over compliance with legislation on food products, feed, animal by-products, animal health and welfare», «On the national geospatial data infrastructure» (2024, p. 262).

In Ukraine, the protection of animal rights is regulated by the Law of Ukraine No. 3447-IV «On the Protection of Animals from Cruelty» of February 21, 2006. This Law applies to the following types of activities:

cattle breeding; territories of state nature reserves and other specially protected natural areas; hunting, game farming, fishing; keeping domestic animals and breeding work with them; use of animals in circuses, zoos, at exhibitions and other spectacular events; use of animals in sports, in the field of recreation and entertainment of people; use of animals for scientific research and educational purposes, in testing; use of animals in production, including in testing of biological preparations; other types of activities where animals are affected.

Article 4 of this Law sets out the basic principles of protecting animals from cruelty: cruel treatment of animals is incompatible with the requirements of morality and humanity, causes moral harm to humans; ensuring living conditions for animals that correspond to their biological, species and individual characteristics; ownership and other property rights to animals in the event of cruelty to them may be terminated in accordance with this Law; prohibition of cruel methods of killing animals; liability for cruel treatment of animals; keeping and handling pets without the aim of causing harm to others or to the animal itself.

The Ukrainian academic community views with interest the prospects for transformations in rural areas (European Green Deal, 2020; European Commission, 2019) and develops extension research with the aim of encouraging producers to switch to good animal production practices, encourages the development and deepening of new approaches to the interpretation of new concepts in animal health and welfare (Lyudvenko et al., 2024; Rykovska et al., 2023; Kobzeva et al., 2021; Synoverska, 2019).

Before the war, conditions were created in Ukraine for the transition of agricultural production to a multifunctional basis, which positively affected its productivity and the interest of young people in working in this field. The multifaceted nature of the developing agricultural sector has facilitated Ukraine's access to and participation in the implementation of such important tools as the system of transfer of knowledge and innovations in the agricultural sector (Agricultural Knowledge and Innovation Systems — AKIS; Kovtun et al., 2025) (Agnew et al., 2023).

At the regional level the rural population needs to increase its own level of awareness of potential opportunities and risks in conducting economic activities and understanding the rational use of resources. Dissemination of knowledge and practical skills on modern approaches to agricultural production and informational support for innovations in agriculture is important for small farmers to ensure the competitiveness and sustainable development of their activities (Yeates, 2024; Samoylovych, 2023; Kovtun, 2018).

The manifestation of such changes in people's priorities can be seen in the examples of socially oriented European projects successfully implemented in rural areas before the war, related to the development of local bioenergy production, waste processing and recycling, social projects in the field youth employment, expanding agricultural advisory services, and other companies in the tertiary sector, including the formation of public organizations that care about animal protection, although in animal husbandry this process does not occur as actively as we would like (Rykovska, 2024; Rykovska et al., 2023; Zaitseva, 2019).

The consequences of global climate change are complicated by the deterioration, at the national level, of the socioeconomic conditions of agriculture in general and dairy production in particular (Lyudvenko et al., 2024; Papaconstantinou et al., 2024; Costantino et al., 2021; Garrett et al., 2017). This is due to the prolonged period of martial law due to Russian aggression, constant aerial alerts, the destruction of critical infrastructure, the release of harmful substances into the atmosphere during explosions, the harmful noise of sirens, soil pollution, the loss of livestock and the abandonment of farms on the front line (Kovtun, 2023). The listed factors

negatively affect not only the emotional and physical health of the population, but also the health and welfare of domestic and farm animals, which, in turn, affects the quality of the final products that the national population consumes (Kushnerenko, 2023; Tunikovska, 2023; Pereira et al., 2022).

It is believed that animal health and welfare indicators are closely related to the health of the gastrointestinal tract and the housing conditions in which animals are kept (Tunikovska, 2023; Stoybetska et al., 2021). Deviation from norms for a long period of time leads to depletion of the body and disruption of metabolic processes in the gastrointestinal tract, a decrease in immunity and protective functions. As a result, the health and welfare of animals begins to deteriorate. Ultimately, this leads to the deterioration of the public health of society and the environment (Maji et al., 2024; Pereira et al., 2022; Narayan et al., 2021).

The work is carried out with the aim of eliminating difficulties in the implementation and execution of state policies at regional and local levels, related to the lack of full participation of all sectors that should be involved in the development, discussion, implementation and dissemination of state policies on animal welfare in local communities, especially in rural areas (Zaitseva, 2019; Kovtun, 2018).

In addition to the public sector, which creates, develops and transmits national strategies in accordance with European principles, Ukraine still faces low participation and involvement of the private sector and civil society. This contrasts with the countries of the European Union, where such practices are already well developed (Rykovska, 2024).

At the same time, at the international political level, there has been a wide popularization of the concept of animal welfare and protection measures, integrated into the overall EU sustainable development strategy.

Currently, Ukraine actively participates in and supports the formation of national institutions for international cooperation in the field of sustainable development. However, it is necessary to form a national awareness of the entire population about the observance of the principles of socially responsible behavior in relation to farm animals and pets (Clark et al., 2024). This is possible due to the formation of a chain of interaction between the state, the business community, public organizations and the population of rural areas (Gebert and Kuhne, 2024).

4.2 War threatens the preservation of animal welfare and ecosystem balance

War threatens the achievement of sustainable development goals in the areas of biodiversity conservation, animal welfare and the environment (Pereira et al., 2022), not only in Ukraine but also around the world. Ukraine is rich in its natural diversity. Its territory is located entirely on the European continent. Occupying 6% of Europe's territory, 35% of its lands belong to the nature reserve fund. There are 5 biosphere reserves and 19 nature reserves and 50 national natural parks in Ukraine. Nature reserves are located in 12 regions, 6 of which are located in the temporarily occupied Republic of Crimea (Ukraine World, 2019).

The five biosphere reserves approved by Presidential Decrees include: Askania-Nova, Carpathian Biosphere Reserve, Black Sea Biosphere Reserve, Danube Delta Biosphere Reserve, and Chernobyl Radiation and Ecological Biosphere Reserve (Figure. 1) (Ukraine World, 2019). Biosphere reserves are part of the nature reserve fund of Ukraine of international importance, are engaged in nature conservation and scientific research activities and are protected by international norms. At the moment, four of them, except for the Carpathian Biosphere Reserve, are under threat due to military operations.

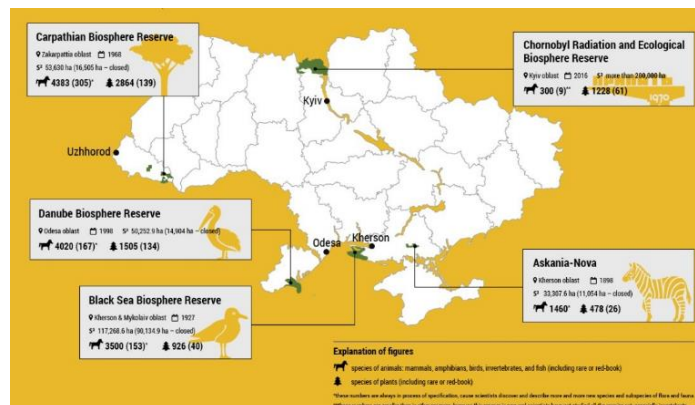


Figure 1: Biosphere reserves of Ukraine

Source: (Ukraine World, 2019)

According to the Ukrainian Nature Conservation Group (Ukrainian nature conservation group, s/d), 1,654,736 hectares of virgin steppes are in the combat zone and under occupation, which is about 59% of the steppes of Ukraine, and 4,514 hectares of shrubs, the area of which occupies more than 10% of the territory of Ukraine. The area of the nature reserve fund of the world, national and regional levels of protection (biosphere and nature reserves, national parks) occupies 1,236,366 hectares. Of these, 44% are in the combat zone, under the temporary control of the Russian occupiers or inaccessible to Ukraine. In this zone is the Askania-Nova biosphere reserve - the largest untouched steppe reserve in Europe, the area of which reaches 110 sq. km.

These territories are home to many representatives of the national fauna, which are under threat of extinction and are listed in the Red Book of Ukraine. The most common and dominant mammals in the steppes of Ukraine are rodents. Even before the war, their populations had been significantly reduced, and because of the war they were threatened with extinction. The latest updated list of species in the Red Book of Ukraine lists 25 rodent species as being at risk of extinction. Among other mammals protected by law and whose lives are threatened by military operations at sea or on land, 18 out of 25 rodent species are species closely associated with the Eurasian steppes, that is, they are protected by international norms (Table 1).

Table 1: Mammal species of the Red Book of Ukraine that are threatened due to war

Nº.	Species	Distribution in Ukraine (Red Book of Ukraine)	The IUCN Red List of Threatened Species in 2023
1	<i>Hemiechinus auritus</i> (Gmelin, 1770)	Luhansk and Donetsk regions	VU(Gazzard, 2024)
2	<i>Ursus arctos</i> (Linnaeus, 1758)	Carpathians, Kyiv and Sumy regions	LC (Huber, 2018)
3	<i>Delphinus delphis</i> (Linnaeus, 1758)	Black Sea area	LC (Braulik <i>et al.</i> , 2021)
4	<i>Tursiops truncatus</i> (Montagu, 1821)	Black Sea area	LC (Wells <i>et al.</i> , 2019)
5	<i>Phocoena phocoena</i> (Linnaeus, 1758)	Marmara, Black and Azov Seas	EN (Braulik <i>et al.</i> , 2020)
6	<i>Lutra lutra</i> (Linnaeus, 1758)	The entire territory	NT (Conroy <i>et al.</i> , 2007)
7	<i>Vulpes corsac</i> (Linnaeus, 1758)	Only in Luhansk region	LC (Poyarkov <i>et al.</i> , 2007)
8	<i>Lepus timidus</i> (Linnaeus, 1758)	Sumy, Chernihiv, Zhytomyr regions	LC (Henttonen <i>et al.</i> , 2007)
9	<i>Allactaga jaculus</i> (Pallas, 1788)	Sumy, Cherkasy, Chernihiv, Kharkiv and all steppe regions	NT (Rusin, 2024a)
10	<i>Spermophilus suslicus</i> (Gueldenstaedt, 1770)	Kharkiv and Luhansk regions	CR (Rusin, 2024b)
11	<i>Marmota bobak</i>	Kharkiv and Luhansk regions	LC (Gazzard, 2024)
12	<i>Nannospalax leucodon</i> (Nordman,1840)	Black Sea region (Odesa region), northern Bukovyna	LC (Rusin, 2024c)
13	<i>Spalax arenarius</i> (Reshetnik, 1939)	Seaside steppe	EN (Rusin, 2024d)
14	<i>Spalax zemni</i> (Erxleben, 1777)	A species endemic to the Right-Bank Steppe and Forest-Steppe	EN (Rusin, 2024e)
15	<i>Stylodipus telum</i> (Lichtenstein, 1823)	Kherson and Mykolaiv regions, Kinburn Peninsula	EN (Rusin, 2024f)
16	<i>Sicista subtilis</i> (Pallas, 1773)	Steppe and forest-steppe zones, including Crimea	LC (Cserkész andKennerley, 2017)
17	<i>Sicista severtzovi</i> (Ognev, 1935)	Steppe	CR (Rusin, 2024g)
18	<i>Sicista strandi</i> (Formosov, 1931)	Luhansk regions	LC (Rusin, 2024h)
19	<i>Ellobius talpinus</i> (Pallas, 1770)	Steppe Crimea and Pridentsivye.	VU (Rusin, 2024i)
20	<i>Lagurus lagurus</i> (Pallas, 1773)	Steppe and forest-steppe zones	EN (AmoriandRusin, 2024)
21	<i>Cricetulus migratorius</i> (Pallas, 1773)	Steppe zone, Northern Forest-Steppe, Crimea	NT (Rusin, 2024j)

The disappearance of these small steppe mammals poses a threat not only to the socio-humanitarian sphere, but also has a negative impact on steppe ecosystems as a whole, especially on protected species. It believes that potential threats to marmots in this region include the construction of fortifications in the territories of marmot colonies, intensive artillery shelling, and mining (Rusin, 2023). Research also indicates that the military has severely threatened the destruction of several species of ground squirrels, in particular the spotted ground squirrel, which were located near areas that experienced heavy artillery and airstrikes between February and September 2022 (Rusin, 2023).

Another threat, according to the study, is the potential degradation of the habitat of the front-line areas, due to the destruction or cessation of the livestock industry and the forced evacuation of farm animals (Rusin, 2023).The disruption of the ecosystem balance and the reduction of small mammal colonies are caused by the cessation of livestock grazing in the fields. Livestock grazing on pastures is crucial for ground squirrels and

jerboas, as they need pastures with short grass, and the reduction of grazing leads to overgrowth of pastures with tall grass and an unfavorable environment for rodents.

According to the data of the State Statistics Service of Ukraine, as of January 1, 2024, over the past ten years, a significant decrease in livestock numbers has been observed in cattle (52,4%), including cows (49,7%), small ruminants such as goats and sheep (47,8%), pig population decreased by 35,7%.

The farms located in Donetsk, Zaporizhzhya, Luhansk, Mykolaiv, Kharkiv, Kherson and Sumy regions were the most affected (State Statistics Service of Ukraine; Luk'yanchuk, 2023). It is in these regions that the most intense decline in the number of cattle (Figure 2).The fighting or bombing took place and continues to take place with such intensity that the owners who evacuated were unable to evacuate all the animals, leaving them in the occupied territory, and some did not want to leave the animals and remained in the occupied territories.

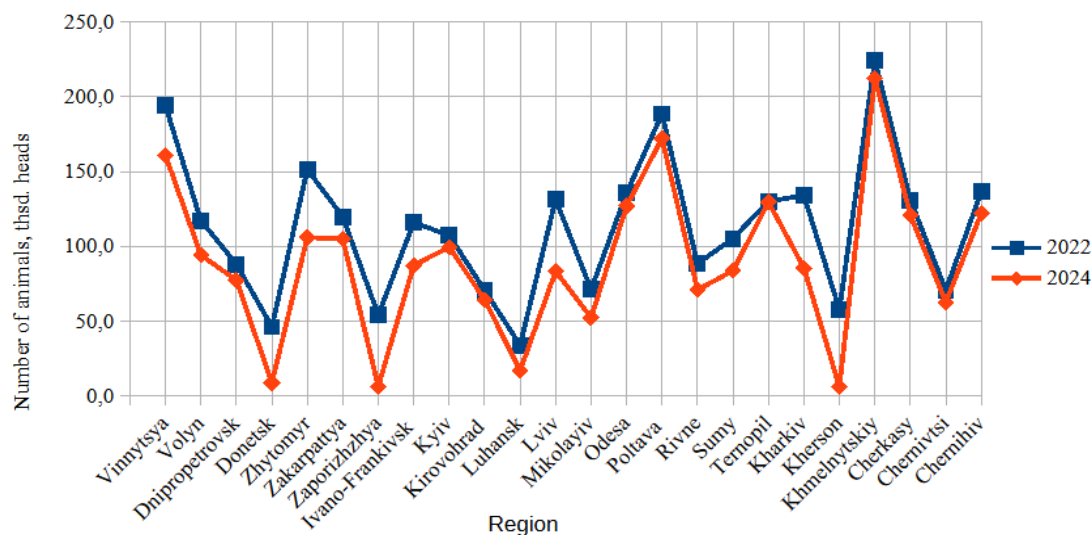


Figure 2: Dynamics of cattle population reduction, thsd. heads

Source: (State Statistics Service of Ukraine, 2024)

The cessation or reduction of agricultural production due to military operations is one of the main risk factors. The reduction in the total number of enterprises engaged in crop production is 7,7 %, of which 1% are livestock farmers who have stopped partial production of crop products; 6,7 % are agricultural enterprises that have completely stopped production. About 90% of enterprises that have stopped production were located in front-line regions (Kovtun, 2023).

This makes it impossible to obtain reliable data on their condition and

health. In addition to the sharp decline in livestock numbers, their health and welfare are also deteriorating. This is influenced by factors such as the mobilization of men for war, who performed functions on farms such as collecting and distributing feed, caring for the hygiene of cows' limbs, removing manure, and cleaning the stalls where the animals were kept.

As a result, from 2022 to 2024, there was a significant decrease in the number of cows in regions where hostilities are taking place, such as Donetsk, Zaporizhzhya, and Kharkiv regions, which affected the decrease in the overall indicator by region (Figure 3).

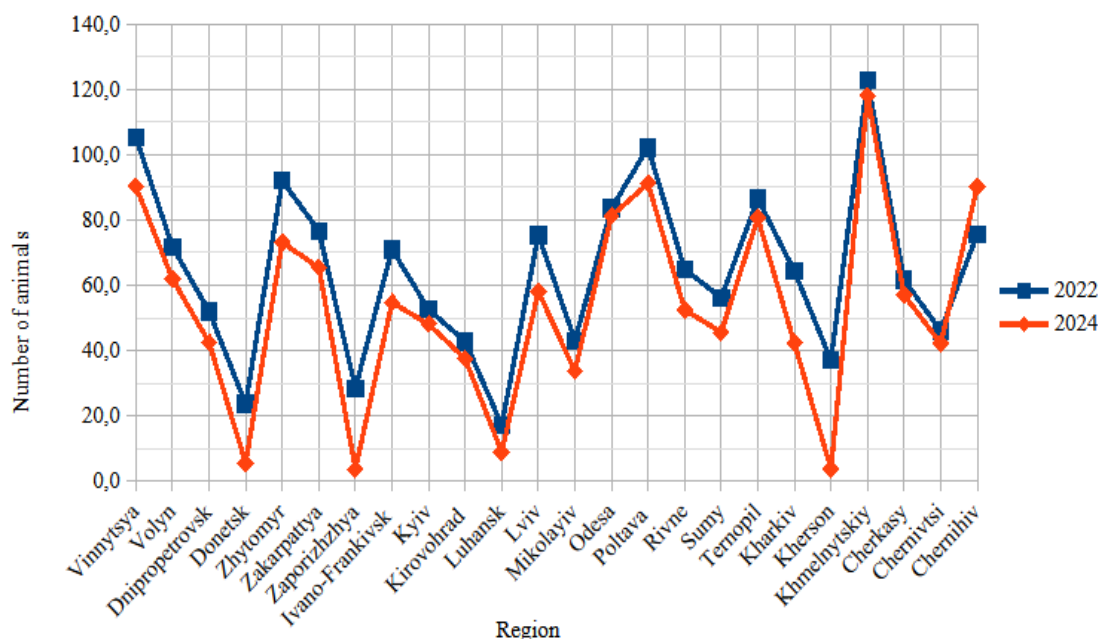


Figure 3: Dynamics of reduction in the number of cows, thsd heads

Source: (State Statistics Service of Ukraine, 2024)

These factors are basic and fundamental in raising animals and ensuring their welfare in the production of consumer products, as they affect the quality and timeliness of feeding, the cleanliness and sanitary condition of the litter, udder hygiene, hoof health, as well as bioclimate criteria for animals (Costantino et al., 2021; Maji et al., 2024).

It has been scientifically proven that animal welfare largely depends on the welfare of their handlers (Gebert et al., 2024). The care that animals receive, with a positive emotional attitude from their breeder or handler, influences their good behavior and good emotional and physiological response. This relationship between animals and their handlers is affected in a state of war, because in regions close to the front lines of Ukraine, where sirens are constantly sounding and bombings are heard at night, it

becomes difficult for workers to sleep and rest. And this affects the health and well-being of workers and their psychological and emotional capacity towards animals.

The pig sector is very important in ensuring the country's food security (Zasukha, 2023; Guiné et al., 2021) during the war, because compared to other animals, such as ruminants, it is characterized by a short reproduction period, high fertility and the achievement of live weight in accordance with commercial standards (Figure 4). However, it was affected by climate change before the war, as these animals are very sensitive to physical and thermal comfort conditions (Verkhovna Rada of Ukraine, 2021). In addition to economic instability and insecurity, the intensification of production technologies negatively affects the health and welfare of animals (Estevez- Moreno et al., 2022; Stoybetska et al., 2021; Costantino et al., 2021; Tuytens, 2005).

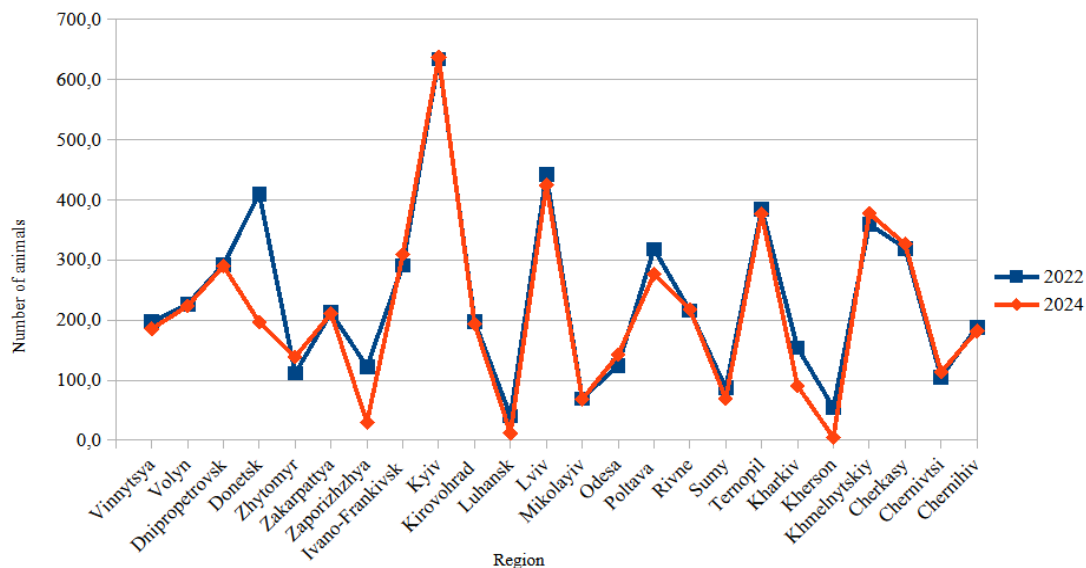


Figure 4: Dynamics of reduction in the number of pigs, thsd heads

Source: (State Statistics Service of Ukraine, 2024)

The most significant decrease in the number of sheep and goats was observed over the last two years (2022-2024) in farms located in Donetsk

(80,7%), Zaporizhzhya (90,8%), Kharkiv (42,4%) and Kherson (92,3%) regions (Figure 5). At the beginning of 2022, the share of sheep and goats in these regions was about 14% of the total livestock in the country. And by the beginning of 2024, this number had decreased to about 5%.

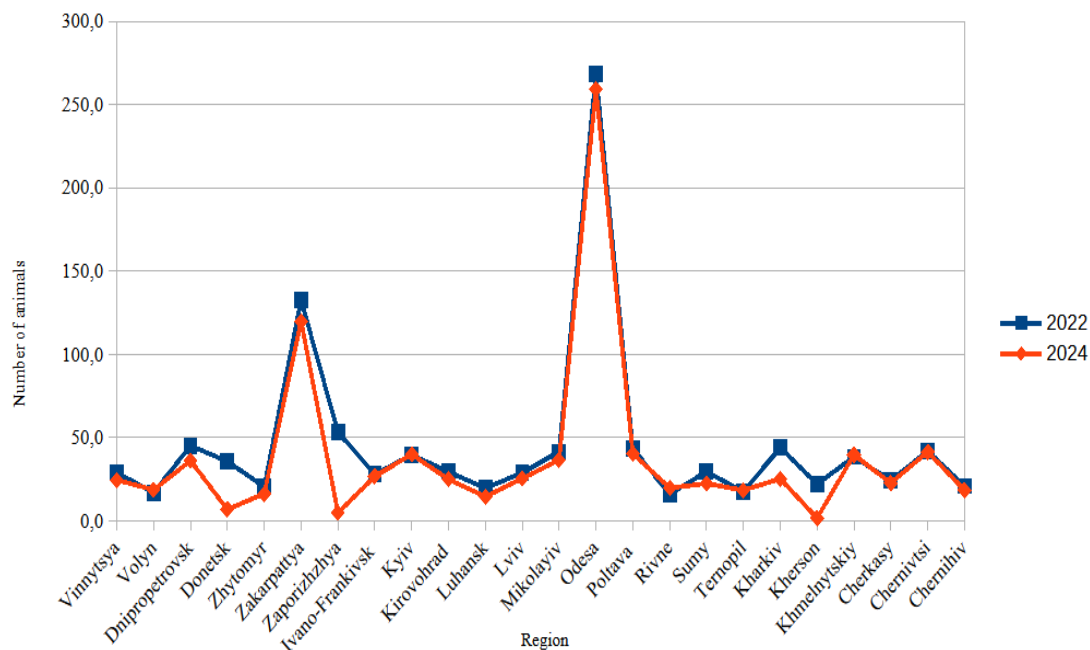


Figure 5: Dynamics of reduction in the number of sheep and goats, thsd. heads

Source: (State Statistics Service of Ukraine, 2024)

5. CONCLUSIONS

Due to Russian aggression, in addition to a sharp reduction in livestock numbers in Steppe Zone farms, animal health and welfare are deteriorating due to human factors. Mobilization of men to war, who performed such functions on farms as preparing and distributing feed, caring for limb hygiene, cleaning manure, and cleaning stalls where animals were kept. These factors are considered basic and fundamental in raising animals and ensuring their welfare in the production of consumer products, since the quality and timeliness of feeding, cleanliness and sanitary condition of bedding, udder hygiene, hoof health, and bioclimatic criteria for animals depend on them.

Cattle and small ruminants such as sheep and goats play an important role in the conservation of the Steppe's wildlife, especially rodents. A decrease in the number of ruminants in this area, as research shows, can clearly lead to an imbalance in the Steppe ecosystem, where biosphere reserves of

international importance are located. Imbalance in national ecosystems will negatively influence the achievement of Sustainable Development Goal 15 - «Protect, restore and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt loss of biodiversity», of which animals of all species form an integral part.

On the other hand, the risks to the livestock sector associated with the war also threaten the implementation of important global sustainable development goals (SDGs), such as SDG 2 - «Eliminate hunger, develop agriculture», which, in turn, may affect the achievement of food security indicators 2.1.1 - «Meat consumption» and 2.1.2 - «Milk and dairy product consumption» per capita (kg/year), which before the war were characterized by a medium or low probability of achievement, and SDG 8 - «Decent work and economic growth» (Kovtun *et al.*, 2025; Goals of sustainable development of Ukraine, 2020).

Sustainable Development Goal 2 covers three main areas that are interrelated: i) access to balanced nutrition, ii) agricultural productivity

and iii) food production. One of the important tasks of SDG 2 is to ensure the creation of sustainable food production systems, contributing to the preservation of ecosystems and the gradual improvement of the quality of land and soil, mainly through the use of innovative technologies.

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