Chapter 13

Occupational Health and Safety Practices in Animal Production

Mehmet Akif Boz[1]

Hacer Tüfekci[2]

İbrahim Can Temur[3]

Abstract

Occupational accidents and diseases are among the most significant issues in the workplace worldwide and in our country. The concept of occupational health and safety encompasses all systematic scientific studies aimed at protecting workers from potential hazards and factors that may harm their health while performing their jobs in the workplace, as well as reducing risks and improving the workplace environment. Workers in the agricultural sector mostly perform their jobs alone and work without protection for long periods of time in terms of occupational health and safety. Almost all activities carried out within agricultural production, whether plant or animal production, are classified as hazardous. Occupational health and safety in animal production is very important, as it is in many other areas. Animal husbandry is a hazardous activity that involves many factors that can potentially contribute to injury and even death among workers.

Occupational health and safety in animal husbandry must be clearly defined. It must be consistent with animal development policies covering both commercial and smallholder farming. Specific programs and strategic action plans emphasizing the prevention of occupational risks for workers in animal production must be developed. Furthermore, occupational health practices must be integrated into the basic health service structure.

1 Associate Prof. Dr., Yozgat Bozok University, Faculty of Agriculture, Department of Animal Science, 66100, Yozgat, Türkiye, m.akif.boz@bozok.edu.tr, https://orcid.org/0000-0002-7452-6895

2 Assistant Prof. Dr., Yozgat Bozok University, Faculty of Agriculture, Department of Animal Science, 66100, Yozgat, Türkiye, hacer.tufekci@bozok.edu.tr, https://orcid.org/0000-0003-2272-4088

3 Master's Student, Erciyes University, Graduate School of Natural and Applied Sciences, Animal Science, 38030, Kayseri, Türkiye, ibrahimcantemur66@gmail.com, https://orcid.org/0009-0007-8214-8090

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1. Introduction

Occupational accidents and diseases are among the most significant problems in the working life worldwide and in our country. Occupational disease is defined as "diseases resulting from exposure to risk factors in the workplace" within the framework of the International Labor Organization's Occupational Health and Safety Convention No. 155 and the ILO protocol prepared in 2002 (Şener et al., 2024). Occupational health and safety is one of the most important components of efforts to protect individuals' fundamental rights in working life and to create a safe environment in the workplace. Organizations such as the International Labor Organization (ILO) and the World Health Organization (WHO) define occupational health and safety as a discipline that supports the mental, physical, and social well-being of individuals. Approaches developed since the industrial revolution to prevent occupational diseases and accidents have become more comprehensive and systematic today. Technological advances and workplace dynamics have necessitated the continuous development of occupational health and safety practices. Legal regulations such as the Occupational Health and Safety Law (No. 6331) in Türkiye clearly define the responsibilities of employers and employees in this area. In this context, the obligation of employers to reduce occupational risks, protect employees, and provide safe working environments at workplaces emerges as both an individual and a social responsibility (İnci et al., 2024). The purpose of occupational health and safety is to eliminate risks and hazards that threaten individuals' right to life and to provide a safe working environment by taking the necessary measures for previously identified hazards (Dizdar and Önder, 2023). In this context, occupational health and safety aims to protect the life, physical, and mental health of employees. By preventing occupational accidents and diseases, workforce losses are reduced and production safety is ensured (Karabal, 2021).

Agriculture continues to be important worldwide in terms of meeting food needs, providing inputs to the industrial sector, exports, and the employment opportunities it creates. If the characteristics of agriculture are analyzed properly, it can be seen that it differs from other economic sectors. Agriculture, which differs significantly from the other two main economic sectors, industry and services, in terms of production methods and factors, has a structure in which production takes place in both open and closed areas, unlike other industries. In addition to plant and animal production in open areas, livestock activities in closed areas and production activities in greenhouses demonstrate the diversity and scope of agricultural production. These characteristics also deepen the differences in its economic and social

structure. The variability of supply and demand in agricultural production significantly distinguishes the economic aspect of this sector from other sectors. In addition to these characteristics, factors such as dependence on the season, year, and natural conditions, the limited production period, the abundance of product varieties, the diversity of working conditions, and the lack of division of labor and specialization make regulations and studies in this field difficult in every respect. These differences also affect working conditions and the conditions, rights, and responsibilities of workers in agriculture (Yurtlu, 2015).

The concept of occupational health and safety encompasses all systematic scientific studies aimed at protecting workers from potential hazards and factors that could harm their health while performing their duties in the workplace, as well as reducing risks and improving the workplace environment (Balkır, 2012). Workers in the agricultural sector mostly perform their jobs alone and work unprotected for long periods of time in terms of occupational health and safety (Akpınar and Özyıldırım, 2015). Long working hours and weekend work prevent workers in the agricultural sector from having opportunities to rest. At the same time, inadequate working and living conditions also cause various health problems among workers (Özel and Güğerçin, 2020).

The importance of the agriculture and food sector has come to the forefront in many countries as a result of the COVID-19 crisis. Measures taken to slow down the pandemic have also highlighted the sector's problems in meeting demand, generating income, and ensuring safety and health conditions for millions of agricultural workers and producers. In our country, the sustainability of agriculture is possible through ensuring the health and safety of agricultural workers and farmers in their workplaces. The agricultural sector is of concern to the entire country in terms of food production and nutrition, its share of the active population and workforce, its contribution to national income, and the raw materials and capital it provides to the industrial sector, as well as the creation and protection of a healthy environment, the establishment of ecological balance, and sustainability. Therefore, it retains its characteristic as an economic and social sector. When viewed from both an economic and employment perspective, occupational health and safety in the agricultural sector is seen to be an issue of paramount importance (Onan Erdal, 2020).

Agricultural activities carried out to meet the needs of the growing world population and the food requirements to satisfy it always retain their importance. These activities are carried out in open, closed, or semi open

areas within plant and animal production. Activities in closed areas also include agriculture and agriculture-based industries. Agricultural activities encompass all hazard classes, including highly hazardous, hazardous, and low-hazard. When agricultural activities are examined separately according to NACE (Nomenclature of Economic Activities) codes within all job categories, it is understood that they harbor many different hidden risks and hazards within themselves, due to factors arising from the materials used and environmental conditions (Alanyurt and Tekin, 2023). Due to the exposure of workers in the agricultural sector to various chemicals, pesticides, particulate matter, zoonotic diseases, and work accidents, occupational diseases and work accidents are more common in the agricultural sector than in other sectors. For this reason, it is considered one of the most dangerous industries worldwide (Molina-Guzmán and Ríos-Osorio, 2020).

The agricultural sector is mechanized in developed countries, while it is labor intensive in developing countries. In developing countries, it is mostly run by small businesses or family businesses, and workers' wages are also quite low (Bilir, 2019). According to 2021 data from the International Labor Organization (ILO), approximately 1.1 billion people are engaged in agricultural work. This report states that a large number of temporary workers are employed by small and large growers. In addition, family members work for free in agriculture to support informal agricultural work or small-scale family farming (ILO, 2023). According to European Union data, approximately 8.7 million people were working in agriculture in European Union member countries in 2020. It is stated that 9 out of every 10 workers (86.1%) are family businesses. In our country, according to TÜİK data, 16.8% of workers were employed in the agricultural sector in 2021 (TÜİK, 2023, Babaoğlu, 2023).

As a result, the rapidly growing world population has made the agriculture and livestock sectors, which provide people with basic foodstuffs, one of the most important sectors. In order to ensure sustainability in these sectors, it is essential that workers benefit from occupational health and safety services and that working conditions are improved. Timing is one of the main factors that complicate agricultural activities. Over a period of approximately one year, it is important to adapt to changing climate and natural conditions at every stage of production and to take the necessary precautions. For this reason, work must be done at the right time to reduce losses and prevent wasted effort. When work is rushed to meet deadlines, the protection and prevention activities that form the basis of occupational safety cannot be carried out properly. Considering factors such as lack of information, carelessness, and negligence, various studies have revealed the

serious extent of accidents and injuries related to occupational health and safety in agriculture. This study aims to highlight occupational health and safety practices in animal production and the importance of this issue.

2. Occupational Health and Safety in Livestock Farming

Livestock farming is a hazardous activity involving many factors that can potentially contribute to worker injuries and even death. However, farm workers generally do not perceive livestock farming as a source of danger (Lindahl et al., 2013; Doğan and Demirci, 2012). Working in the livestock sector continues to be among the most dangerous jobs across all occupations (Mitloehner and Schenker, 2007). Occupational health and safety in this sector is of great importance due to workers' exposure to physical, chemical, biological, and ergonomic risks. Aggressive animal behavior, improper handling techniques, and poor hygiene lead to workplace accidents, while zoonotic diseases and manure gases can cause serious health problems. The indiscriminate use of chemical disinfectants and medications causes respiratory and skin diseases, while heavy lifting and repetitive movements lead to an increase in musculoskeletal disorders. A large proportion of work accidents occur due to direct contact with animals, incorrect use of equipment, and poor hygiene. It is vital to raise awareness among workers about the use of personal protective equipment, provide ergonomic working environments, and establish emergency plans. Furthermore, risks should be minimized by providing regular training on safe working techniques with animals, hygiene rules, and emergency procedures (Serap and İkbal, 2020).

Occupational health and safety in animal production is very important, as it is in many other areas. Most occupational health and safety accidents and incidents occurring in workplaces in Türkiye are not reported. The most common hazards in animal production in Türkiye are zoonotic diseases, ergonomics, noise, climate control, chemicals, animal attacks, bites, injuries, transport accidents, psychological stress, and diseases transmitted through the skin. In particular, animal collisions and zoonotic diseases are very important in animal husbandry (Aygün et al., 2014; Aygün et al., 2019).

Agricultural workers are exposed to attacks by wild animals such as snakes, scorpions, and spiders in the areas where they carry out agricultural activities, resulting in poisoning, injuries, and even deaths. Injuries caused by animals result from agricultural workers who raise animals working in close proximity to them, and are caused by factors such as hitting a hard surface, being kicked, the farmer's incorrect behavior, being bitten, standing in a blind spot, and exposure due to triggering behaviors.

2. 1. Zoonotic (zoonosis) diseases

Diseases that can be transmitted from humans to animals and from animals to humans, and that are observed in both humans and animals, are referred to as zoonosis (Weissenböck et al., 2010). Due to their potential for pandemic and endemic spread, zoonotic diseases pose significant risks as they directly impact human health. Diseases transmitted from animals to humans (zoonosis) are caused by various agents, including viruses, bacteria, and parasites. These agents can be transmitted to humans through animal feces, urine, saliva, blood, milk, animal-derived foods, contact with animals, the mouth, skin, and respiratory tract. (Anonymous 2015; Anonymous, 2016; Anonymous, 2017). While there are approximately 250 diseases transmitted from animals to humans worldwide, this number is around 50 in Türkiye. The main diseases found in Türkiye that are transmitted from animals to humans are anthrax, brucellosis, salmonella, influenza, and rabies (Anonymous, 2004). Common zoonosis, their transmission routes, and effects are presented in Table 1 below.

Table 1. Zoonosis, transmission routes and effects (Taş, 2018)

Zoonosis	Transmission Route	Effects
Brucellosis	Transmitted by touching tissues such as the placenta of infected farm animals.	Causes fever in humans.
Anthrax	Transmitted by contact with tissues of infected animals.	Causes skin lesions.
Leptospirosis	Transmitted when the skin comes into contact with dirty water contaminated by rodents or farm animals.	Causes fever in humans.
Campylobacter, Cryptosporidium	Transmitted from farm animals through contaminated water and food.	Causes gastrointestinal diseases such as diarrhea.
Rabies	Transmitted by bites from wild animals and virus-carrying dogs.	Causes severe nervous system disorders that can lead to death.
Psittacosis	Transmitted by inhaling dust contaminated with droppings from birds and poultry.	Causes pneumonia.
Tuberculosis	Transmitted by inhaling airborne droplets or by drinking unpasteurized milk.	Causes fever, cough, weight loss, fatigue, and night sweats.

Various measures must be taken to protect against zoonotic diseases. Regular vaccination of animals and humans, ensuring hygiene in the workplace, and using food in safe and healthy conditions will significantly reduce the risk of transmission of zoonotic diseases. Furthermore, it is crucial to educate employees about the transmission routes of these diseases and prevention methods through occupational health and safety training (Ağar, 2025).

2. 2. Respiratory Diseases and Skin Diseases

According to research, 25% of workers in the livestock sector suffer from some form of respiratory disease. This rate places respiratory diseases among the most common illnesses affecting workers in the livestock sector. The most significant causes of these illnesses are dust, gases, agricultural chemicals, and infectious agents. Dusts can be divided into two groups. The first group consists of dusts composed of organic components, while the second group consists of dusts composed of inorganic components. The most important source of inorganic dusts is pastures and green areas. The most important source of diseases, however, is agricultural organic dusts that harbor microbes. Bronchitis and asthma are the most common disorders. Gases are also a major cause of respiratory diseases encountered in the livestock sector. High ammonia levels in large enclosed areas and poultry houses where ruminant animals are fed pose certain dangers (Anonymous, 2004; Demirhan et al., 2016).

Workers in the animal production sector are exposed to various agents, including the influenza virus, Escherichia coli, and drug-resistant Staphylococcus species, which are zoonotic diseases. Some of these agents cause acute or chronic respiratory symptoms and pose a significant public health problem (Klous et al., 2016; Nordgren and Charavaryamath, 2018). These diseases caused by biological agents can lead to serious labor force losses among workers. This reduction in the workforce causes disruptions in animal care and production processes, leading to significant economic losses in the livestock sector (Ağar, 2025).

Living in areas with a high concentration of livestock farms has been associated with adverse effects on respiratory health in some studies. In their study, van Dijk et al. (2016) reported that individuals with chronic obstructive pulmonary disease (COPD) and asthma are at higher risk from these environmental effects due to their already compromised respiratory function and chronic airway inflammation. The use of personal protective equipment is critical for protecting against disease, particularly for the

health and well-being of workers in the livestock sector. Considering that transmission in this sector is mostly through respiratory and skin contact, appropriate masks and work clothing must be provided and used correctly. Furthermore, installing local and general ventilation systems for workers in enclosed spaces will significantly reduce dust exposure and contribute to protecting respiratory health (Demirhan et al., 2016; Ağar, 2025).

Workers in plant and animal production within agricultural production and other rural residents are frequently in contact with agents that can cause skin diseases. The main causes of skin disease in the agricultural environment are plants, insects, insecticides, sunlight, heat, and infectious agents. Farm and rural-related skin diseases can be divided into five main categories: contact dermatitis; infectious dermatitis; dermatitis caused by arthropods; skin conditions caused by the sun and skin disorders related to heat, cold, and humidity. This section describes the type, diagnosis, treatment, and prevention of skin diseases in each of these five categories. Contact dermatitis can be divided into the following categories: irritant contact dermatitis; allergic contact dermatitis; photoirritant contact dermatitis; and photoallergic contact dermatitis. The three most important and most common infectious dermatoses among agricultural workers are zoonotic dermatophyte fungi and two zoonotic viral diseases, contagious ecthyma of sheep and goats and pseudocowpox of cattle (Donham and Thelin, 2016). Skin diseases can be classified as contact dermatitis; sun-induced, infection-induced, or insect induced. It is estimated that nearly 70% of diseases encountered in the agricultural sector are skin-related. Contact dermatitis is common. Manure, plants, feed, pesticides, and antibiotics added to feed also cause skin diseases. Prolonged exposure to the sun also causes quite serious skin diseases. Actinic keratosis and skin cancers are the most important of these skin diseases (Ağar, 2025).

2. 3. Occupational Accidents

Occupational accidents and diseases arising from various causes result in numerous losses of life and property, ultimately causing economic and social harm to individuals, employers, and the country. Many factors contribute to the occurrence of occupational accidents and diseases. These can be listed as: 1. Natural conditions (climate), 2. Individual reasons, 3. Unsafe environment, and 4. Unsafe behaviors (Dursun, 2013). According to ILO data, an average of 313 million work accidents occur worldwide each year, and 2.7 million people lose their lives in these accidents. Similarly, two million people contract occupational diseases. The agricultural sector also presents a bleak picture in terms of occupational accidents. For example, according to

the ILO, 250 million people worldwide are affected by agricultural accidents each year, with 170,000 agricultural workers losing their lives in a total of 335,000 fatal accidents. Undoubtedly, these figures are also debatable. This is because a significant portion of workers are unregistered, while another portion are involved in production as members of family businesses. For this reason, not all accidents are reported to the relevant institutions (Güğercin and Baytorun, 2018).

In our country, work accidents and occupational diseases have emerged as an increasingly problematic issue in recent years. Work accidents are particularly common in sectors with intensive industrial activity. Unfortunately, the measures taken and regulations implemented to prevent these accidents are insufficient, and it is not possible to completely prevent deaths and injuries (Özbakır and Akşit, 2023). A study examined the total number of occupational accidents and diseases that occurred on a sectoral basis between 2008 and 2021. The study reported that accidents caused by plant and animal production ranked 35th (42.906), while occupational diseases ranked 51st (26). The study considered 88 different sectors (Özbakır and Akşit, 2023).

A significant portion of work accidents in the livestock sector stem from direct physical contact with the animals being raised. Animals kicking, pushing, becoming aggressive and attacking, and biting cause injuries. According to the National Traumatic Injury Surveillance of Farmers (NIOSH) in the US, in all agricultural sectors, including livestock farming, a significant portion of injuries stem from physical contact with animals, and incidents caused by cattle and sheep alone account for 18% of the total. At the same time, these injuries are the events that cause the most workday loss in terms of temporary inability to work (Demirhan et al., 2016). (Demirhan ve ark., 2016).

3. Conclusions and Recommendations

Nearly all activities carried out within agricultural production, both plant and animal production, are classified as hazardous. The obligations specified by law to eliminate risks cannot be fulfilled. This situation is primarily caused by the informal nature of agriculture and the fact that most businesses are small family businesses operating on their own behalf and account. Furthermore, there is a need for policies to prevent the informal employment of workers and for measures to include them in the social security system. It is clear that any legislative work undertaken without taking these requirements into account will have no practical effect. Furthermore, considering the serious

relationship between agriculture in Türkiye and the country's economy in terms of exports, employment, food safety, and food security, for the "Agricultural Occupational Health and Safety Law No. 6331" to be effective in practice, those living in rural areas must share in and feel the benefits of prosperity and development. If this happens, the Law will gain validity and prevalence.

In our country, there are serious deficiencies in occupational health and safety in the livestock sector, and there is a lack of awareness. Providing training to farmers engaged in livestock farming, developing protective approaches against animal-related risks in large-capacity livestock farms, and conducting risk assessments can help eliminate animal-related risks. In addition, protective measures such as wearing gloves when approaching and handling animals and animal products, getting protective vaccinations, etc., should be taken, paying attention to the transmission routes of zoonotic diseases. Along with these, regular health monitoring, vaccination measures, pest control, protective creams, and good pesticide use practices are extremely important in terms of occupational health and safety practices. Livestock farming can bring various health problems. Occupational health and safety in livestock farming must be clearly defined. It must be in line with animal development policies covering both commercial and smallholder. Specific programs and strategic action plans emphasizing the prevention of occupational risks for workers in animal production must be prepared. In addition, occupational health practices must be integrated into the basic health service structure.

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