

SAFETY CULTURE AND OCCUPATIONAL HEALTH IN AGRICULTURE

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Abstract: Agriculture is the oldest human activity with a high incidence of injuries and hazardous consequences in the work and living environment. However, given the lack of reliable indicators and detailed data, it is difficult to speak with certainty about the nature and extent of all risks and hazards in agricultural activities. Most agricultural holdings and farms do not have a documented occupational safety and health policy or a strategy for effective safety management. Due to the lack of organizational structure, it is difficult to monitor compliance with occupational safety and health standards. Despite being aware of the potential risks and hazards in their work, agricultural workers still do not have an adequate approach to these issues. This paper promotes the need for a more extensive approach to developing a safety culture in agricultural activities. It is a part of the research funded by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia pursuant to the agreement No. 451-03-66/2024-03/ 200148.

Key words: Safety, Safety Culture, Agriculture

1. INTRODUCTION

Globally, agriculture employs half of the workforce, which is exposed daily to a wide range of risks and hazards (Merisalu et al., 2019). In the European Union (EU), agriculture mainly consists of small enterprises or family farms (Eurostat, 2016). A similar situation exists in the USA, where 88% of all farms are small family farms (USDA, 2015). In Norway, with 41,800 registered agricultural holdings in 2015, the labor input was estimated at 45,900 man-years (64% farmers and spouses, 10% family members, 4% independent companies, and 22% employees or temporary hired help) (Statistics Norway, 2016).

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Agriculture is a high-risk activity with a high incidence of injuries (Jadhav et al., 2015; Jadhav et al., 2016) and environmental hazards. Therefore, efforts are needed to reduce injuries and ensure safe and healthy working conditions. Contextual factors make occupational health and safety (OHS) interventions generally difficult to implement within small businesses, because they are difficult to reach and they lack resources and competence (Hasle and Limborg, 2006).

The job of an agricultural producer involves performing labor-intensive physical activities, often in unfavorable and hazardous conditions. Besides the associated risks and dangers, occupational health and safety issues in agriculture are particularly highlighted due to the farmers' lack of knowledge and literacy, the non-use or (un)availability of personal protective equipment, inadequate information about workplace hazards, and/or non-existent or inadequate training. Therefore, it can be argued that farmers do not take safety and health seriously. This is evident from research conducted in the United Kingdom, which showed that farmers generally have unfavorable attitudes toward safety, despite being aware of the potential risks associated with their jobs (Cooper, 2012).

Relevant research shows that the work of farmers is accompanied by both injuries and illnesses that arise due to the nature of the job and the working environment. Eurostat statistics reported 1.5 non-fatal injuries per 100 workers and 4.1 fatal injuries per 100,000 workers in EU agriculture in 2013. However, considering that 75% of the work is performed within the family household⁶, and that reporting work injuries is voluntary, it is not possible to talk about real indicators. Underreporting is manifested in large variations in mortality rates between countries, ranging from 0 to 51 per 100,000 workers (ibid.).

Although the number of fatalities among farmers in the EU has decreased over the years, almost 40% of farmers do not feel safe, considering preventive measures to be insufficient or completely lacking. In modern conditions, numerous preventive strategic activities and initiatives are undertaken to improve and enhance the safety and health of agricultural producers, including the development of safety awareness and culture, education/training, organizational, technical, and other solutions.

2. SEARCH STRATEGY AND USED DATABASES

The research was conducted with the aim of analyzing and identifying the problems and opportunities in occupational safety and health for agricultural producers, as well as the need to develop a safety culture in this sector. It is a desktop research study based on several databases: Google Scholar, KoBSON, Science Direct, PubMed, Embase, Scopus, and PsycINFO. Based on the available journal information in these databases, the most significant journals in the field of agricultural safety were identified. The impact factor (IF) was used as an indicator of the journal's significance.

The search for sources was based on the following keywords: "health and safety education for farmers," "safety culture," "agricultural risk," "farm-induced diseases and injuries," and "agricultural workers." A total of 57 sources were found, 16 of which were selected after initial review (reading abstracts, contents, or introductions). These sources were analyzed in detail to identify problems and directions for developing a safety culture in agricultural activities.

⁶For example, according to Eurostat data from 2010, around 100,000 people were working in Montenegrin agriculture, but only 760 were outside the family; thus, less than 1% of workers are under the inspection system.

3. RISKS AND HAZARDS IN AGRICULTURE

A comparative analysis of risks and hazards in various sectors of human activity shows that agriculture is one of the most dangerous activities worldwide. However, due to the lack of reliable indicators and comprehensive data, it is difficult to speak with certainty about the nature and extent of all risks and hazards in agriculture (Merisalu et al., 2019).

In addition to workplace injuries, agriculture often sees occupational diseases, specifically chronic illnesses related to work. Agricultural work is physically demanding and strenuous, especially for female agricultural producers. In Finland, musculoskeletal disorders (MSDs) are the most common cause of disability pensions among agricultural workers (Karttunen, Leppälä, Rautiainen, 2014). Around 80% of agricultural workers have reported musculoskeletal disorders at some point (Walker, 2024), with a lifetime prevalence of any form of musculoskeletal disorder among farmers at 90.6% (Osborne A, Blake C, Fullen BM, et al, 2012).

Skin cancer is the most common malignancy in the white population, with ultraviolet radiation considered a major carcinogenic source and health risk factor. Ultraviolet radiation has led to recognition of non-melanoma skin cancer as an occupational disease for farmers and outdoor workers in Denmark, France, Germany, Italy, and Romania (Ulrich et al., 2016).

Respiratory diseases are twice as common among agricultural workers compared to other sectors (Walker, 2001). Other occupational health risks include exposure to noise and ergonomic strain (<https://ec.europa.eu/eurostat/>). Additionally, zoonoses (diseases transmitted from animals to humans), hearing loss, microbiological contamination in the dairy industry, eye injuries, and pesticide poisoning due to improper use are frequently mentioned.

On the other hand, the "hunger" for food, raw materials, and agricultural land has led to increased environmental destruction and disruption of ecological systems. Agricultural activities pose numerous hazards and risks to biodiversity, ecosystem efficiency and productivity, organic matter recycling, physical structure and fertility of soils, elements of geochemical and hydrological cycles, surface and groundwater pollution, desertification, soil salinization, and so on.

4. PREVENTIVE STRATEGIES IN AGRICULTURE

According to statistics, agriculture is a significant sector for all European countries, regardless of their size, structure, development, and economic contribution to the gross national product. This is partially explained by the need to achieve a certain degree of self-sufficiency in food production, as well as the role in preserving and protecting land (Kolodziejczak, 2018). However, approximately 20% of all food produced is wasted (EU, 2019), meaning that one-fifth of all expenses and accidents occurring in agricultural activities are unnecessary. Agriculture is also a sector characterized by large heterogeneity in farm size, types of agricultural activities, and significant seasonal fluctuations in workforce (especially during harvest seasons).

In recent years, various initiatives and preventive strategic activities have been undertaken to reduce the risks of injuries and illnesses in agriculture. In this regard, regulations and their enforcement, educational opportunities and training, as well as technical and technological solutions are being considered (Donham et al., 2016; Lundqvist, Gustafsson, 1992).

The occupational safety and health in agriculture is based on several directives, among which the Framework Directive 89/391/EEC is certainly the most important (as well as for other sectors). This directive provides a legal framework for all EU member states and candidates, obliging employers to conduct risk assessments, document risks, and inform workers about

accident and illness prevention at work. However, since the directive applies to employed workers, there are challenges regarding its application in agriculture, where 89.5% of all agricultural holdings are family farms without hired workers. Coverage of self-employed farmers and family workers mostly relies on national legislation. For example, in Denmark and Sweden, legislation defines the obligation for self-employed farmers to comply with regulations on working with machinery and hazardous materials. Developed European countries with large agricultural sectors, such as Germany, Poland, France, Italy, and Spain, have developed systems of national and regional regulations and organizations that address occupational safety and health for agricultural producers (Kolodziejczak, 2018).

It is also important to mention the International Labour Organization (ILO) Convention C184 concerning Safety and Health in Agriculture (2001), aimed at minimizing risks in agricultural activities and creating necessary conditions for decent and dignified work for agricultural workers.

Many countries have national pension systems for self-employed farmers and farm workers, with retirement age typically ranging from 65 to 67 years. Additionally, in developed Western European countries, there is a system in place to assist self-employed farmers in overcoming temporary disability due to injury, illness, or during rest periods (through insurance companies). In Nordic countries, specialized preventive health services are established for people working in the agricultural industry (Denmark, Finland, and Norway). Finland, for example, has the Farmers' Social Insurance Institution (Maatalousyrittäjien eläkelaitos, abbreviated as MELA), which is mandatory for all farms with at least 5 hectares of agricultural land. Premiums and benefits are based on the size of the farm, type of activities, and contributions of each family member working on the farm (Karttunen, Rautiainen, 2013).

5. EDUCATION AND SAFETY AGRICULTURE

Education is considered a fundamental preventive measure within the occupational health and safety system, and this holds true for agricultural activities as well. Strategically, education aims to enhance the health and safety of farmers/agricultural workers by encouraging them to adopt knowledge, skills, and habits of safe behavior and healthy living. It also involves developing health literacy, which enables individuals and communities to access, understand, assess, and apply information relevant to making health-related decisions.

The concept of health literacy is closely related to the concept of safety literacy, which focuses more on workplace safety and protection. Numerous studies confirm the interaction between health or safety culture and the quality of health. Health and safety culture are not just the responsibility of individuals but also of regulatory bodies, agencies, professionals, and policy makers. In fact, health literacy is a key concept for promoting public health because it encompasses both personal and societal as well as environmental benefits.

Numerous studies confirm the connection between health training and literacy, but few focus on the health and safety of farmers specifically. It is important to consider the potential that training has in enhancing the quality of life for farmers and their families. Within the agricultural population, there are specific groups such as elderly migrants, women, children, and other vulnerable groups who are particularly sensitive to hazards in agricultural activities. Low levels of education, language diversity, lack of experience, and youth are characteristics that determine the specific educational needs in agricultural work.

Analysis of relevant literature shows that there is still no adequate strategy to improve the health and safety culture of farmers. The majority of studies focus on educational interventions aimed at preventing injuries and illnesses, improving farmers' health, and promoting good agricultural practices. Educational approaches in various countries include the use of films,

lectures, bulletins, games, fairs, and community involvement in activities, farmer training, and educator training. For example, in Ireland, the Agriculture and Food Development Agency (TEAGASC) offers daily news, information, webinars, and courses on various agricultural topics on its website, and uses social media channels (Twitter, Facebook, YouTube) to disseminate information (<https://www.teagasc.ie/>). In Denmark, the leading agricultural knowledge and innovation center SEGES provides consultancy services to farmers, including training on safety and health in agricultural operations (<https://en.seges.dk>). Numerous studies focus on accidents and the prevention of diseases and injuries in agriculture caused by pesticide use (poisoning, eye injuries, musculoskeletal injuries). These studies mention various educational approaches in developing a safety culture, such as puppet shows, social performances, games, interactive exercises, drawing, seminars on health, training farmers to further educate their neighbors on safe pesticide use, providing protective equipment and clothing, etc. In this context, dialogue and community participation are promoted, particularly involving local authorities and agricultural producer communities.

6. CONCLUSION

There are numerous challenges when it comes to occupational safety and health in agriculture, ranging from defining and implementing legal regulations, comprehensive risk assessment, consistent reporting of work-related injuries, engagement of occupational health services, training for safe work, and developing a safety culture among farmers, among others. Additionally, there are open questions regarding the devastation of the environment, ecological systems, and biological resources due to various agricultural activities.

In EU countries, the assessment of occupational risk for employees in the agricultural sector is conducted in accordance with EU Directive 89/391. However, one of the most serious issues and shortcomings is the exclusion of self-employed farmers from this regulation, who constitute almost 90% of the agricultural population (leading to underreporting of work-related injuries and accidents). In some European countries, these issues are covered by national legislation (including self-employed farmers), and it is generally recommended to follow the examples of these countries (Ireland, Norway, Portugal, Slovakia, Denmark, Sweden).

Comparative analysis of relevant documents and literature also points to issues related to recording, reporting, collecting, and processing data on workplace injuries. Statistics show that fatal accidents are generally recorded, while minor injuries or occupational illnesses are rarely visible. Although fatalities in agriculture have drastically decreased over the past decades, there is a need to focus on prevention and the development of a safety culture. Additionally, national policies require changes in the structure and amount of data included in injury reports, as well as in the recording of workplace injuries, indicating the importance of a unified information system for reporting and recording workplace injuries. There is a general consensus that all countries should improve reporting and monitoring systems for workplace injury responses in every sector, including agriculture.

It is of particular importance to examine the educational needs and create training programs for farmers with the aim of acquiring knowledge, skills, and abilities for safe work in this sector. On an international level, educational initiatives vary widely, ranging from the training of so-called supervisors and fieldwork aimed at preventing injuries and risks in agricultural jobs (Sweden, New Zealand) to organizing public lectures, exhibitions, films, educational programs, and disseminating information through social media, etc. An analysis of relevant literature has not led us to data indicating the existence of defined national systems for OSH education of farmers. However, most countries have some form of safety and health education in agricultural schools and colleges. Some countries have specific curricula for safety and health education in agricultural schools, but in most cases, these issues are integrated into other

subjects, making evaluation difficult. There is a general consensus among scientists and experts that there is a need for a more extensive approach to the education of agricultural producers and the constant promotion of a culture of prevention and safety in agriculture.

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