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Realizing Priorities for Occupational Safety at Agriculture

M. Lutovska^a, V. Mijakovski^b, S. Kjosevski^a

^aFaculty of Technical Sciences, “Mother Teresa” University, Skopje, MK, str. Mirche Acev 4, Skopje

^bFaculty of Technical Sciences, University „St. Kliment Ohridski”, Bitola, MK, str. Makedonska falanga 37, Bitola

Abstract

Given the significant under-reporting of accidents in agriculture across Europe, national reporting still places the sector among the leading sectors in terms of risk. According to Eurostat data, over 500 deaths and more than 150000 injuries per year have been registered on average in the last decade.

The main goal of this paper is to examine the causes of accidents and working conditions among this population, as well as to perceive the priorities for safe work in this still labor-intensive branch, where self-employed farmers are exposed to numerous risks that make their work unsafe. The analyzes were done through a survey that included 120 respondents: owners, family members and workers. The largest number of workers, 63.3%, are men, 35.1% belong to the age group of 46-60 years, and 33.8% of the surveyed farmers have only primary education.

Of particular concern is the fact that 43.5% belonged to the category of family members, which gives the answer to why accidents where children are victims occur very often.

Keywords agriculture, occupational safety, farmers

1. INTRODUCTION

The total equivalent agricultural labour force in the EU estimated by Eurostat is 20.5 million EU workers contributing to production in the sector. However, only 9.7 million are full-time workers, while the rest perform part-time activities [1]. So, in 2020, the number of people employed was 874 million people, or 27% of the global workforce, compared to about 1050 million (40%) in 2000 [2]. As a consequence, the EU's agricultural workforce has decreased by 35% over the last decade, and is projected to decrease to 7.9 million in 2030. In addition to the increasing growth of machinery and technology, this downward trend is also

influenced by the decrease in number of smaller family farms, as well as the interconnected drive for economies of scale through larger, more efficient agricultural holdings [1].

On the other hand, agriculture is known as a hazardous industry worldwide, with major challenges in enumerating the size of the workforce and numbers of accidents at work [3]. The wide variation in agricultural accident statistics as well as numerous inconsistencies in recording are mostly due to under-reporting, differences in interpretation criteria, inadequate social insurance schemes for farmers, family labour and undocumented workers. Given the significant under-reporting of the accidents, national reporting still places the sector among the leading sectors in terms of risk across Europe. According to Eurostat data, over 500 deaths and more than 150000 injuries per year have been registered on average in the last decade. Also, there have been 595 deaths caused by tractor overturns, roughly one every

Corresponding author

Prof. Dr Sc Monika Lutovska
monika.lutovska@unt.edu.mk

Faculty of Technical Sciences, “Mother Teresa” University,
str. Mirche Acev 4, Skopje, North Macedonia

week. Moreover, as many as 54% of these deaths involved farmers over 60 years of age [4]. So, most self-employed farmers are not covered by OSH legislation and are rarely inspected, their occupational accidents and diseases are very rarely reported, so they have limited access to OSH resources and training, or often no resources to invest in new, safer machinery and agricultural infrastructure. One of the main problems because accident data for many categories of workers is excluded from official data is that data reporting to Eurostat is not mandatory for the self-employed and family members in agriculture, as they are not considered 'employees' [5].

However, in 2020, Agriculture, forestry and fishing with 11.4% were the only other Statistical classification of economic activities in the European Community (NACE) sections for which double-digit shares of the total number of fatal accidents in EU were recorded [6].

2. TRADITIONAL HAZARDS IN THE SECTOR

Life on a farm as the unique link between home and workplace allows the coexistence of multiple generations, but at the same time it can also pose a risk to the health, well-being and safety of workers. Children and elderly farmers in particular are at high risk of death and injury on the farm. An aging farm workforce and poor access to medical and OSH services further complicates the situation for workers who are already more likely to work alone [2]. On the other hand, every year, a huge number of young people, under the age of 20, are exposed to the safety hazards associated with working in agriculture. As a result, significant numbers of young people are killed, injured or permanently disabled on farms around the world [7].

By Eurostat (2010), work-related health problems most often occur in the "agriculture, hunting and forestry" sector and are the result of physical work and atypical working hours. Therefore, in an EU survey (2012), these workers were ranked higher than all other sectors in reporting that their work affects their health [5].

In Macedonia, the gradual opening in 2021 increased activities in the real sector, but also the number of accidents at work and accidents with fatal outcome. The rate of deaths at work were 3.77, and the activities of the Household sector as employers, which have a total of 11

accidents of which 4 are fatal, largely include things that would be attributed to the activity of agriculture in 2021. The largest number of accidents in this activity occurred with an agricultural machine - a tractor, during agricultural work, transport or when participating in traffic [8].

That is why agriculture continues to be the riskiest occupation with a death rate about eight times higher than the general employed population [9]. The table 1 below describes common agricultural hazards that give a clear picture and can be used to prevent accidents and avoid workplace injuries [7].

Table 1. Occupational hazards in agriculture

Hazard identified	Description
Mechanical hazards	Being struck by falling or moving objects (machinery, bales, tree trunks)
Moving parts of machinery	Injuries due to hands or clothing being caught in rotating parts of the machine
Transportation accidents	Being run over or overturning of vehicles
Tractor over-turns	Turning on tractors without a roll-over protection structure, or without a properly engaged system
Terrain vehicle injuries	Lack of a rollover protection device in farm vehicles and machinery
Falling from a height or depth	Falling from trees, through roofs, mobile stairs, or into dug trenches, wells
Drowning or sinking into mud	Drowning in water tanks, slurry tanks, grain silos, drowning in mud
Electricity (electrocutions)	Lightning strike, electrocution, improper grounding of machinery
Heat/solar UV exposure	Dehydration, skin burns due to exposure to sunlight/UV which can lead to the most severe skin diseases
Use of organic fertilizers	Emissions of toxic and flammable gases (NH ₃ , CO ₂ , CH ₄) due to composting, organic acids/sulfides, hydrogen sulfide
Pesticides exposure	Higher temperatures, and especially heat waves, can affect workers' susceptibility to pesticide absorption.
Dust exposure	Dust from genetically modified products, inorganic (mineral) dust.
Biological agents' exposure	Use of wastewater and organic fertilizers. Exposure to pathogenic organisms and bioaerosols (excessive moisture and mold) especially indoors.
Presence of reptiles, rodents, animals,	Working outdoors also includes hazards due to exposure to ticks,

insects	rodents, reptiles, animal bites and insect stings
Manual work	Labor-intensive activity that involves manual and heavy physical work, night work or work in the early morning
Musculoskeletal disorders	Ergonomic risks associated with awkward posture, repetitive motions and handling loads when harvesting crops manually
Psychosocial risks, stress and monotony	Climate change, uncertainty and unpredictability, financial pressures, increasing demands on food production.
Atypical working hours	Periodic seasonal work, night or early morning work, work involving most of the family members
Self-employed	Family members, children, adults over 60 years old
Labour market conditions	Self-employed, temporary seasonal workers, family and older workers, part-time work. Limited access to OSH services.
Food, energy and environmental demands	Food waste, changing consumption patterns (organic food, non-GMO, reduced meat consumption and production).
Impact of new digital technologies	Improving the health and safety of farmers who will be able to virtually operate and monitor machines and systems
New techniques/genetic improvement of crops	Increased crop yields and quality (reduced use of fertilizers, pesticides, water and energy use and GHG emissions.
Climate Change	Changing rainfall patterns will impact by further increasing irrigation needs.
Extreme weather events, fires	Floods, fires, extreme weather conditions - unsafe working. Risk of toxic gases, explosions, extreme heat, fires.
Rural crime	Theft of property, livestock and machinery, possible violence, insecurity, insurance costs and economic losses.

However, accepting risks as part of everyday life can be a serious problem due to habituation to the dangers and ceasing to actively seek ways to eliminate or reduce them [9].

3. MATERIAL AND METHODS

The main goal of this paper is to examine the causes of accidents and working conditions among this population, as well as to perceive the priorities for safe work in this still labor-intensive branch, where self-employed farmers are exposed to numerous risks that make their work unsafe. The analyses were done through a

survey that included 120 respondents from rural areas in the western part of North Macedonia: owners, family members and workers, and based on the data obtained from questionnaires and interviews. The largest number of workers, 63.3%, are men, and only 37.7% belonged to the female gender (Figure 1).

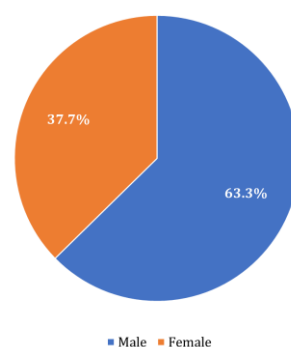


Fig. 1. Gender distribution of surveyed respondents

The age distribution (Figure 2) shows that the labor force in agriculture is relatively middle-aged, and the majority of respondents (35.1%) belong to the age group of 46-60 years.

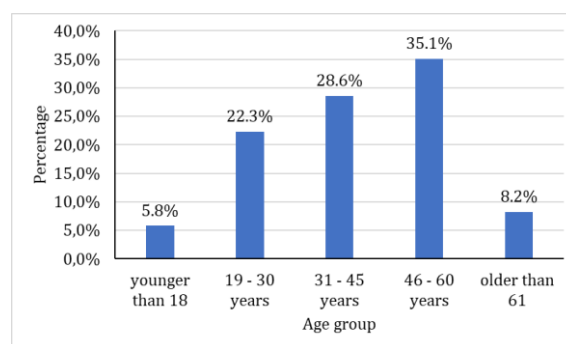


Fig. 2. Age distribution of surveyed respondents

Also, it can be seen that 28.6% belong to the 31-45 years old group, followed by the age group of 19-30 years with 22.3%. The smallest number of agricultural workers, represented by 5.8%, are persons under the age of 18, as well as persons older than 61 with 8.2%.

When it comes to the level of education that agricultural workers have, it is characteristic that more and more farmers with higher education return to the fields and try to realize their ideas by applying modern technologies and digitization of agricultural crop production. According to the survey, their share is 11.4%.

The majority of farmers have high school education (51.5%) participation. Respondents who have not completed any formal education participate with a smaller percentage (3.3%), but the fact that more than 1/3 of this population (33.8%) are farmers with only primary education is particularly worrying (Figure 3).

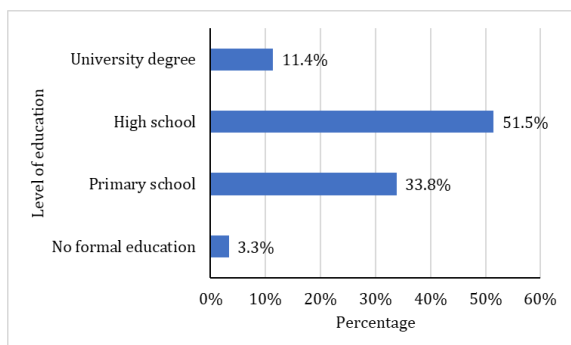


Fig. 3. Level of education of surveyed respondents

Family worker was the most common job position with 50.1%, while the survey results (Figure 4) indicate that 29.6% are farm owners themselves, and 20.3% are seasonal workers.

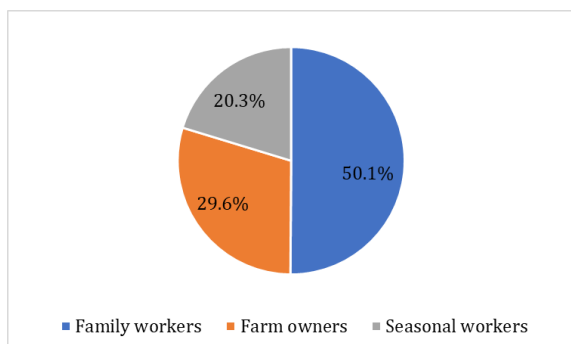


Fig. 4. Job position type of surveyed respondents

Also, of particular concern is the fact that almost half of the workers belonged to the category of family members, which gives the answer to why accidents where children are victims occur very often.

According to the checklist from the survey questionnaire, the most common accidents that happened to the respondents' own farm are listed in the Table 2 below:

Table 2. Types of accidents registered in the survey

Type of accident	Coverage according to the survey questionnaire (%)
Accidents that occurred due to the overturning of a tractor and the crushing of the worker	37.7
Mechanical injuries to the hands or entrapment of fingers during the repair of machines, tractors and other mobile machinery	18.4
Falling from a tree or mobile ladder	17.5
Injuries to the spine while lifting heavy loads or performing manual work	12.2
Leg fractures due to uneven terrain or performing activities at a different height level or falling into a hole	9.1
Traumatized due to stress from accidents that happened on the farm of close family member, where children mostly suffer	2.1
Accidents in which children themselves are the victims	1.9
Lightning strike outdoors	1.1

It is very important to emphasize that among the responses from the survey about injuries experienced or witnessed by the respondents, there is no response that indicates an occupational disease different from a mechanical injury, that requires a longer period of time to be seen the negative effects. Thus, there are no answers about the consequences of exposure to pesticides, organic fertilizers, dust, UV radiation, excessive moisture, mold, atypical working hours (late at night or early in the morning), psychological burdens, stress. This is an indication that people register only the consequences of accidents that are directly visible, but not those that are felt during a longer period of exposure to the hazard.

Herein lie the answers for how low OSH awareness among these workers for the consequences they suffer is, and more worryingly how uneducated this population is, with more than a third of workers having only a primary education. Above all, this is a population marginalized by society, with limited access to rural health services, including OSH health monitoring, as well as OSH advisory support services.

The reasons for such indicators only complement the fact that 60% of agricultural workers are precisely in developing countries,

and only 9% of them are in industrialized countries [10].

4. CONCLUSION

Agriculture is an important sector for the global economy. Between 2000 and 2019, statistics reveal that the global labor value added generated by agriculture, forestry and fisheries combined grew by 73%, reaching \$3.5 trillion in 2019.

Both globally and in Macedonia, increased activities in the real sector in 2021 generate an increase in the number of accidents and deaths, which according to the ILO amounts to 4% of GDP, funds that in poor countries go to compensation for injuries. The losses suffered in this way cost Macedonia more than 400 million euros, which is a staggering number, which in times of health, energy and economic crisis, our fragile economy must not and cannot afford.

In order to reduce the negative impact of agricultural activity on the health of farmers and at the same time to increase social awareness, deeper changes are needed in terms of the way of performing the work, social inclusion, the age structure of the workers, the level of education as well as the application of modern technique and technology in a sustainable and environment friendly way.

Improvements would be aimed at reducing fertilizer use and increasing crop yields and quality, as well as reducing pesticide use by producing crops that are more resistant to pests or diseases. It would also limit the need for water and energy, which would directly affect greenhouse gas emissions. Such measures will ensure a significant improvement in the safety and health of farmers.

On the other hand, the inevitable digitization will have a positive impact on production, but will also result in an increase in the economic gap between small and large farms, a decrease in jobs, a decline in the competitiveness of small family farms, as well as an increase in dependence on large multinational companies.

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