

# STATISTICAL INDICATORS FOR ACCIDENTS AT WORK IN AGRICULTURE ACTIVITY STATISTIČKI POKAZATELJI ZA NEZGODE NA RADU U POLJOPRIVREDOM SEKTORU

Cvetanka MITREVSKA<sup>1</sup>, Vangelce MITREVSKI<sup>2</sup>, Florida KULEVSKA<sup>3</sup>

<sup>1</sup>Faculty for Safety Engineering, Sveti Nikole, R.N. Macedonia

<sup>2</sup>Faculty of Technical Sciences, Bitola, R.N. Macedonia

<sup>3</sup>Secondary School Taki Daskalo, Bitola, R.N. Macedonia

e-mail: vangelce.mitrevski@uklo.edu.mk

## ABSTRACT

Agricultural activity employs an estimated 1.3 billion workers worldwide, which is half of the world's labour force. In terms of fatalities, injuries and work-related ill-health, it is one of the four most hazardous sectors of activity (along with construction, transportation and storage and manufacturing). According to International Labour Organization (ILO) estimates, at least 170000 agricultural workers are dying each year. In this paper, the statistical indicators concerning non-fatal and fatal accidents at work in agriculture, forestry and fishing activity and an incidence rate in the Member State of the European Union (EU-27) and in the R.N. Macedonia during 2017-2021 were presented. The performed statistical analysis shows that the number of non-fatal and fatal accidents at work in agriculture, forestry and fishing activity in EU-27, in 2020 was decreased in comparison with 2017. In the R.N. Macedonia in 2021, there was a decrease in the number of non-fatal accidents at work in comparison with 2017. During 2021 in the R.N. Macedonia, there were no recorded fatal accidents at work. This fact categorizes the R.N. Macedonia in the category of EU-27 Member States with zero fatal accidents at work.

**Keywords:** agriculture, non-fatal and fatal accidents at work, incidence rates.

## REZIME

Poljoprivreda kao delatnost zapošljava oko 1,3 milijarde radnika širom sveta, što je polovina svetske radne snage. U pogledu nesreća na radu sa fatalnim ishodom tzv. smrtnih slučajeva kao i profesionalnih obolenja, poljoprivreda je jedan o četiri najopasnijih sektora delatnosti (uz građevinarstvo, transport i skladištenje i proizvodnju). Prema procenama Međunarodne organizacije rada (MOR), svake godine umre oko 170000 radnika koji rade u poljoprivrednom sektoru. U ovom radu prikazni su statistički pokazatelji koji se odnose na nesreće na radu bez smrtnih ishoda i nesreće sa smrtnim ishodom u poljoprivredi, šumarstvu i ribolovu, kao i stopa incidencije u zemljama članicama Evropske Unije (EU-27) i u RS Makedoniji u periodu 2017 do 2021. Za vrednosti broja nezgoda na radu (nefatalnih i fatalnih) u EU-27 korišćena je baza podataka Eurostat-a, dok su za R.S. Makedoniju korišćeni podaci relevantnih institucija koji sabiraju podatke o nesrećama na radu. Za izračunavanje vrednosti stope incidencije korišćena je metodologija Evropske statistike o nezgodama na radu (ESAW). Izvršena statistička analiza pokazuje da je broj nesreća sa fatalnim - smrtnim ishodom na radu u sektoru poljoprivrede u EU-27 u 2020. godini smanjen u odnosu na 2017. U R.S. Makedoniji u 2021. godine došlo je do smanjenje broja nefatalnih nesreća na radu u odnosu na 2017. Tokom 2021. nije bilo fatalnih nesreća na radu, što kategorizuje R.S. Makedoniju u kategoriju zemalja članica EU-27 u kojima nisu registrovane fatalne nesreća na radu.

**Ključne reči:** poljoprivreda, nefatalne i fatalne povrede na radu, stopa incidencije.

## INTRODUCTION

Agricultural activity employs an estimated 1.3 billion workers worldwide, which is half of the world's labour force. People working in agriculture (crop and animal production, hunting and related service activities) accounted for about 4.2 % of total employment in the EU in 2020, corresponding to an estimated 8.7 million persons (<https://ec.europa.eu/eurostat/statistics>). The structure of employees in agriculture activity is: (i) employed in agriculture activity, (ii) regular agricultural labour force, (iii) volume of agricultural work carried out and (iv) the farm managers. In terms of fatalities, injuries and work-related ill-health, it is one of the four most hazardous sectors of activity (along with construction, transportation and storage and manufacturing). According to International Labour Organization (ILO) estimates, at least 170000 agricultural workers are dying each year. Agriculture is one of the riskiest activities in terms of accidents at work. The workers in agriculture are exposed to a number of accidents at work, especially serious and fatal injuries, which is a sufficient cause for concern for the tripartite stakeholders of the International Labor Organization (ILO). Despite the existence of

the law of safety at work, accidents at work in this activity are increasing every year.

Health risks for farmers and farmworkers include (<https://www.ruralhealthinfo.org/topics/agricultural-health-and-safety>):

- Exposure to farm chemicals, such as pesticides and fertilizers, as well as toxic gases which may be produced from common farm practices like manure decomposition and silo crop storage;
- Exposure to high levels of dust, which can contain mold, bacteria, and animal droppings, among other things;
- Falls from ladders, farm equipment, grain bins, or other heights;
- Exposure to ultraviolet rays from the sun, which can result in skin cancer;
- Joint and ligament injuries, which can result in arthritic conditions affecting mobility;
- Exposure to loud noises and sounds from machinery and equipment which can result in hearing loss;
- Stress from environmental factors, such as droughts, floods, wildfires, pests, and diseases affecting crops and livestock, as

well as from working long hours, financial concerns, and feelings of isolation and frustration;

- Risk of suffocation in a grain bin if a person is engulfed by the grain;
- Risk of heatstroke, frostbite, or hypothermia from working outside in extreme weather conditions;
- Risk of injury from operating farm equipment and motorized vehicles;
- Risk of injury from working with livestock; Risk of electrocution to persons operating large equipment that can contact overhead power lines.

The risk of accidents is increased by fatigue, poorly designed tools, difficult terrain, exposure to extreme weather conditions, and poor general health, associated with working and living in remote and rural communities. In this paper statistical indicators concerning non-fatal and fatal accidents at work in the agriculture sector and incidence rates in the Member State of the European Union (EU-27) and in the Republic of North Macedonia during 2017-2021 were presented.

## MATERIAL AND METHODS

In this paper two main types of statistical indicators on accidents at work in agriculture, forestry and fishing activity are used: the number of non-fatal and fatal accidents at work and incidence rates. For the values of the number of accidents at work (non-fatal or fatal) in the EU-27 the databases of Eurostat were used. In the case of the Republic of North Macedonia, data from relevant national institutions were used. For the calculation of the values of the incidence rates the methodology of the European Statistics on Accidents at Work (ESAW) was used (Mitrevska et al., 2022).

## RESULTS AND DISCUSSIONS

### Situation accidents at work in EU-27 Member States

In Table 1 the number of non-fatal accidents at work in the period 2017-2020 in Member State on EU-27 in agriculture, forestry and fishing activity is presented, ([https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Accidents\\_at\\_work\\_statistics](https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Accidents_at_work_statistics)). In 2020 there were 108508 non-fatal accidents that resulted in at least four calendar days of absence from work and 365 fatal accidents at work.

Table 1. Total number of non-fatal and fatal accidents at work in agriculture, forestry and fishing activity, EU-27

Agriculture, forestry and fishing A	2017	2018	2019	2020
Non-fatal accidents	148326	143959	138573	108508
Fatal accidents	408	441	415	365

Source: Eurostat Last update: 28.02.2023

In the total number of non-fatal accidents at work in the EU-27 between 2017 and 2020, there was a decrease of 39818 accidents i.e. equivalent to a decrease of 26.84 %. During 2020, in the Member State of EU-27, there were 43 fatal accidents at work fewer when compared with 2017 i.e. equivalent to on decrease of 10.53 %. From Table 1 it is evident that the smallest number of non-fatal and fatal accidents at work in agriculture, forestry and fishing activity was recorded in 2020. In Fig. 1 the number of non-fatal accidents at work in the EU-27 Member States is presented. The highest number of non-fatal accidents at work in agriculture, forestry and fishing activity was recorded in Germany (40587), followed by Spain (26350), and Italy (22284).

On the other hand, Malta (21), Cyprus (26) and Bulgaria (38) recorded the lowest number of non-fatal accidents at work.

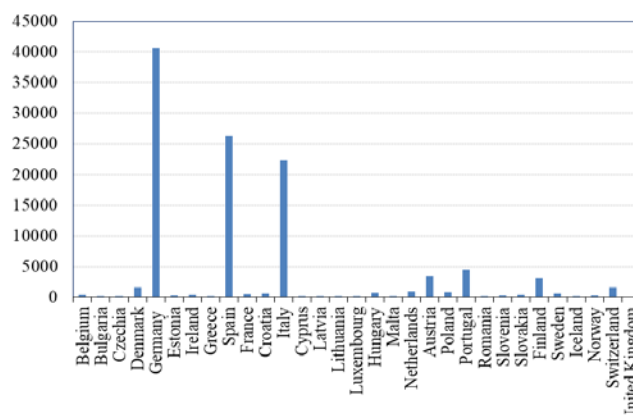


Fig. 1 Non-fatal accidents at work in agriculture, forestry and fishing activity, EU-27, 2020 Source: Eurostat

In Fig. 2 the number of fatal accidents at work in the EU-27 Member States is presented. The highest number of fatal accidents at work in agriculture, forestry and fishing activity was recorded in Italy (67), followed by Germany (66), and Spain (60). On the other hand, Czechia, France, Cyprus, Luxembourg, Malta and Iceland recorded no fatal accidents at work.

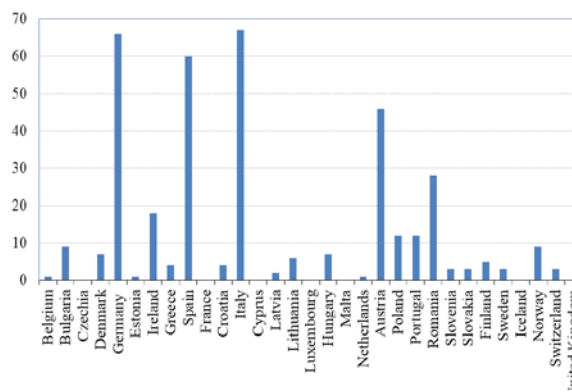


Fig. 2 Fatal accidents at work in agriculture, forestry and fishing activity, EU-27, 2020 Source: Eurostat

In Table 2 the incidence rates for non-fatal and fatal accidents at work in the period from 2017 to 2020 in the agriculture, forestry and fishing activity sector are given ([https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Accidents\\_at\\_work\\_statistics](https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Accidents_at_work_statistics)).

Table 2. Incidence rates for non-fatal and fatal accidents at work in agriculture, forestry and fishing activity, EU-27

Agriculture, forestry and fishing A	2017	2018	2019	2020
Non-fatal accidents	2100.4	1963.8	1447.3	1492.8
Fatal accidents	5.78	6.02	4.44	5.02

Source: Eurostat Last update: 28.02.2023

In the period between 2017 and 2020, there was a decrease in the incidence rates for non-fatal and fatal accidents at work. From Table 2 is evident that the smallest incidence rates for non-fatal and fatal accidents at work in the EU-27 Member States were recorded in 2019 (1447.3 per 100000 persons employed) and (4.44 per 100000 persons employed).

### Situation accidents at work in the Republic of North Macedonia

In the Republic of North Macedonia, there are several organizations and institutions that collect statistical data on

accidents at work. These include the State statistical office, the Labour Inspectorates, the Institute for public health, the Macedonian Occupational Safety and Health Association, the Organization of the Employers of the Republic of Macedonia and the Trade unions. The data for the number of accidents at work in the Republic of North Macedonia is not confidential for the reason that different relevant national institutions published various statistical data (Mitrevski et al., 2015). In this paper, the statistical indicators related to the number of non-fatal and fatal accidents at work and incidence rates in agriculture, forestry and fishing activity in the period 2017÷2021 are based on the data of the Macedonian Occupational Safety and Health Association (Macedonian Occupational Safety and Health Association, 2017÷2021). The reason for that is in the statistical reports of the other relevant institutions that register accidents at work no distinction was made between the number of non-fatal and fatal accidents at the workplace. In agriculture, forestry and fishing activity sector in 2021 there was 1 non-fatal accident that resulted in at least four calendar days of absence from work, while fatal accidents at work were not registered (table 3).

Table 3. Total number of non-fatal and fatal accidents at work in agriculture, forestry and fishing activity, R.N. Macedonia

Agriculture, forestry and fishing A	2017	2018	2019	2020	2021
Non-fatal accidents	3	4	2	1	1
Fatal accidents	0	1	0	1	0

Source: Macedonian Occupational Safety and Health Association

In the total number of non-fatal accidents at work in the Republic of North Macedonia between 2017 and 2021, there was a decrease of 3 accidents i.e. equivalent to an enlargement of 66.6 % (fig. 3).

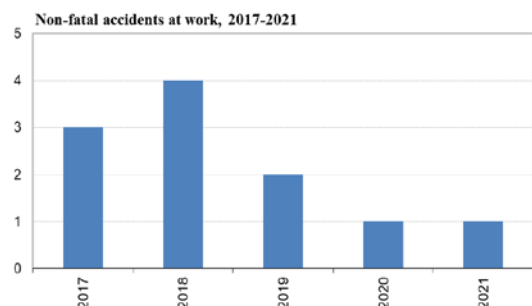


Fig. 3 Non-fatal accidents at work in agriculture, forestry and fishing activity

During 2021, there were no recorded fatal accidents (fig.4). This fact categorizes R.N. Macedonia in the category of EU-27 Member States with zero fatal accidents at work.

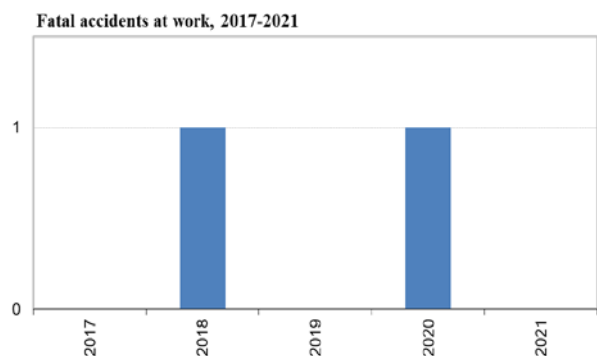


Fig. 4 Fatal accidents at work in agriculture, forestry and fishing activity

In Table 4 the incidence rates for non-fatal and fatal accidents at work in the period from 2017 to 2021 in the agriculture, forestry and fishing activity sector are given.

Table 4. Incidence rates for non-fatal and fatal accidents at work in agriculture, forestry and fishing activity, R.N.Macedonia

Agriculture, forestry and fishing A	2017	2018	2019	2020	2021
Non-fatal accidents	0.403	0.527	0.251	0.126	0.126
Fatal accidents	-	0.132	-	0.126	-

Source: Macedonian Occupational Safety and Health Association

In comparison with the values of incidence rates of fatal accidents at work for 2020 in the EU-27 Member States, the Republic of North Macedonia can be classified as a country with incidence rates for fatal accidents at work less than 1 (Czechia, France, Cyprus, Malta and Iceland).

## CONCLUSIONS

In this paper, some statistical indicators for a number of non-fatal and fatal accidents at work and incidence rates in the Member States of EU-27 and the Republic of North Macedonia in the agriculture, forestry and fishing activity were presented. From the values of statistical indicators may be concluded that educational and preventive research projects should be carried out that improve the health and safety of agricultural workers.

## REFERENCES

Mitrevska, C. Mitrevska, E. Mitrevski, V. (2022). Statistical indicators for accidents at work in construction sector. ANNALS of Faculty Engineering Hunedoara – International Journal of Engineering, 20(1), 87-90.

Mitrevski, V. Geramitcioski, T. Mijakovski, V. Mitrevska, C. (2015). Situation regarding accidents at work in the European Union and in the Republic Macedonia. ANNALS of Faculty Engineering Hunedoara – International Journal of Engineering, 13(2), 223-228.

Annual Report for fatalities, injuries and accidents at work (2017). Macedonian Occupational Safety and Health Association. 2017. Macedonian Occupational Safety and Health Association.

Annual Report for fatalities, injuries and accidents at work (2018). Macedonian Occupational Safety and Health Association. 2018. Macedonian Occupational Safety and Health Association.

Annual Report for fatalities, injuries and accidents at work (2019). Macedonian Occupational Safety and Health Association. 2019. Macedonian Occupational Safety and Health Association.

Annual Report for fatalities, injuries and accidents at work (2020). Macedonian Occupational Safety and Health Association. 2020. Macedonian Occupational Safety and Health Association.

Annual Report for fatalities, injuries and accidents at work (2021). Macedonian Occupational Safety and Health Association. 2021. Macedonian Occupational Safety and Health Association.

Eurostat, Accidents at work statistics, Published on [https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Accidents\\_at\\_work\\_statistics](https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Accidents_at_work_statistics). Last update 28.02.2023. <https://ec.europa.eu/eurostat/statistics>. <https://www.ruralhealthinfo.org/topics/agricultural-health-and-safety>.

Received: 07.03.2023.

Accepted: 20.03.2023.