

Global warming and labour conditions

- Society
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High summer air temperatures are associated with reduced labor productivity, an increase in occupational injuries and greater losses to society

Worldwide the number of vulnerable people exposed to heatwaves, which are becoming more frequent as a result of global warming, has risen with around 125 million in the period 2000 – 2015. During the same period, the productivity of outdoor workers decreased by 5.3% globally. A hot work environment is considered an occupational health problem that can affect vital organs such as the heart, brain and kidneys. However, even before clinical symptoms appear, heat exhaustion has a negative impact on workers' ability to perform physical and mental work. Therefore, apart from the harmful effects of heat waves on human health, reduced labor

productivity and economic losses to society are also among the serious negative consequences of global warming.

I was born in middle of August, and the arrival of this month has always brought me a quiet joy, a sense of foretaste of the holiday and the feeling of the long carefree summer days. I lost this happiness shortly before I turned 20, when on August 1st, on such a hot summer day, my grandmother passed away. She was an agricultural worker, but with her retirement she did not smell at home, but was constantly in our yard in one of the largest villages near Plovdiv, where she fed 3 families from one acre and even sold agricultural production. I have never seen a more industrious person than she, who did not complain at all, not only about work, but also did not think about her health, considering her age and accompanying diseases. The Plovdiv heat is known to everyone, but only those who have worked in the field can truly understand it. You definitely have to be young and healthy to bear them, but now I also remember the case of a 40-year-old man who died after harvesting for 2 consecutive days.

In fact, **agricultural workers are one of the most vulnerable occupational groups that will be affected by climate change. They are 25 times more likely to die from the heat than people who do not work outdoors.** This is also the largest group of people working outside - their number worldwide reaches 1 billion people. In the US, agriculture has the third highest number of heat-related deaths. Agricultural workers are four times more likely to develop heat-related illnesses. A study of hot weather deaths for the period 1977–2001 in Northeastern Carolina, USA, showed a 45% proportion of farmers. About 94% of them reported working in extreme temperatures and 40% experienced symptoms related to heat stress. Occupational health and safety programs are often lacking for this category of workers. With low levels of mechanization in agriculture and motivation through output-based pay, agricultural workers in low- and middle-income countries may be at relatively higher risk of heat exposure. Many of the farm workers who died in hot weather were found to be foreign-born, had limited language skills and were often not acclimated to hot-weather workloads when they started seasonal work.

In the future, agricultural workers, along with those employed in the construction sector, are expected to be the most affected by rising summer temperatures – 83% of working hours lost due to heat stress in 1995 were in the agricultural sector, and it is expected to account for 60% of these losses in 2030. While construction accounted for only 6% of work hours lost due to heat stress in 1995, this share is expected to rise to 19% by 2030. Most of the work hours lost to heat stress in North America, Western Europe, Northern and Southern Europe and in Arab countries, are in the construction sector. Construction workers also account for the largest share (36%) of fatal heat-related occupational accidents.

The other affected sectors are textile industry (many of those employed in it work in factories without air conditioning), forest industry, garbage collection, repair works, transport, tourism, service sector, sports, etc. Certain occupations that involve more physical effort and/or tighter clothing (eg firefighters) are at higher risk. The same applies to occupations related to work next to an additional heat source, e.g. ovens, stoves, etc. According to physiology professor Lars Niebo of the University of Copenhagen, Denmark, who is working on a project called HEAT-SHIELD designed to study the effects of heat exposure on the productivity of workers in industrial sectors, even in Europe those working in manufacturing, construction, transport, tourism and agriculture account for half of the workforce.

Temperatures above 39°C can kill.

But even if there are no deaths, such degrees can make many people unable to work or reduce their working abilities. **Already at 24-26°C, labor productivity begins to decrease.** In Europe, for example, agricultural and construction workers lose about 15% of their effective working time when the temperature exceeds 30°C, which is an equivalent to almost one working day per week, Prof Niebo notes, citing HEAT-SHIELD analyses. At 33 – 34°C, a person working with moderate work intensity loses 50% of his working capacity. With high air temperatures, performing even basic tasks in an office environment becomes difficult as mental fatigue sets in.

Some groups of workers are more vulnerable than others because they experience heat stress at lower temperature thresholds. Older workers have a lower physiological resistance to high temperatures, and they represent a growing share of employees – a natural consequence of the aging population.



Figure 1: Workers produce salt in Vietnam. Source: Pixabay.

High temperatures can damage vital organs such as the heart, brain, kidneys and lungs, exacerbate a number of diseases and increase the risk of death. Extreme heat can trigger heart attacks and strokes in susceptible patients due to increased blood viscosity and thus to increase the risk of cardiovascular death. Hot, humid days can trigger asthma symptoms, and warmer climates extend the pollen allergy season. Another side effect of rising temperatures is the link to air pollution. With warming, levels of air pollution, especially surface ozone and fine particles, are increasing in some populated regions, even when emissions of air pollutants have not increased.

Economic losses

According to the International Labor Organization (ILO), even if it's possible to limit global warming to 1.5°C above pre-industrial levels by the end of the century, accumulated financial losses due to heat stress will reach US\$2,400 billion by 2030 (compared to US\$280 billion in 1995 and US\$311 billion in 2010). If nothing is done now to mitigate climate change, those costs will be much higher as global temperatures will rise even further towards the end of the century.

Projections based on a global temperature rise of 1.5°C by the end of the 21st century, as well as labor force trends, **suggest that in 2030, 2.2% of total working hours globally will be lost due to high temperatures, and in South Asia and West Africa the heat-induced productivity**

loss can even reach 5%. That's a productivity loss equal to 80 million full-time jobs. However, this estimate is conservative because, in addition to postulating that the long-term increase in average global temperature will not exceed 1.5°C, it is based on the assumption that agricultural and construction activities take place in the shade. This assumption is based partly on the fact that in tropical countries about 40% of the days are cloudy and partly on the fact that some tasks, especially in agriculture, can often be moved to times of the day when it is not very hot. If we instead assume that agricultural and construction work is done in the sun, the projected global loss of working hours in 2030 would reach 3.8% – the equivalent of 136 million full-time jobs. As global warming continues beyond 2030, greater increases in temperatures are expected to reduce labor productivity even further.

Потенциална загуба на работни часове заради екстремно горещо време

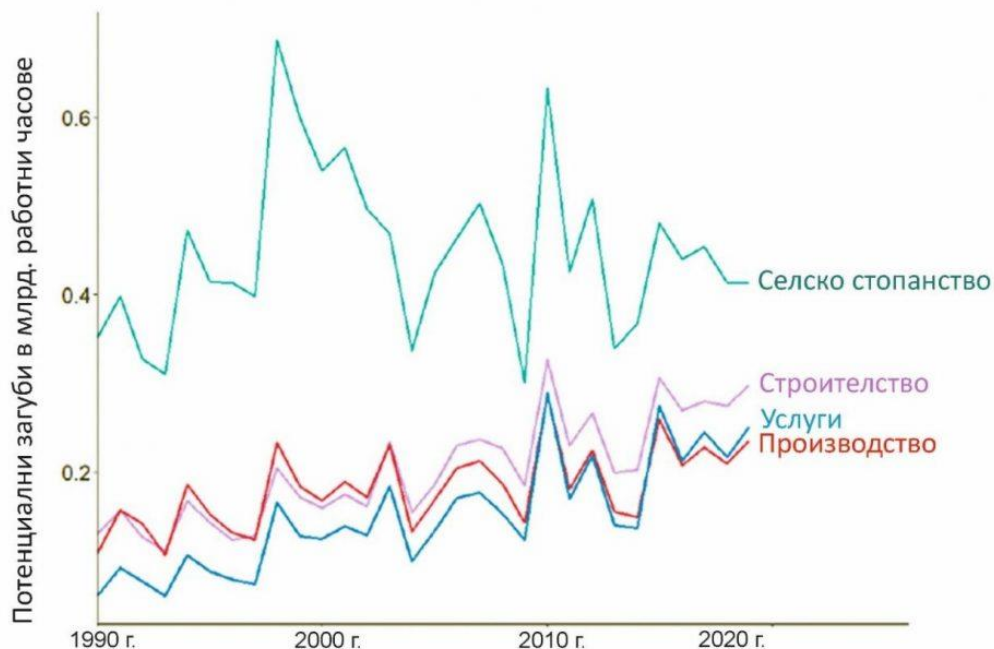


Figure 2: Potential losses of working hours due to hot weather in the WHO European Region.

Source: Lancet, 2020.

The economic losses from high temperatures are not only related to lost benefits from not working. In agriculture, for example, the consequences of high temperatures affect the yields and, respectively, the food prices which leads to greater poverty and food insecurity.

The impact of heat stress will be most pronounced in lower-middle and low-income countries.

Unfortunately, heat stress is often accompanied by other challenges, as it is more prevalent in countries with a shortage of decent work, lack of social protection and high rates of informal employment. Excessive levels of heat deepen inequality between rich and poor countries and between different social groups within the same country.

The challenges of heat stress can **exacerbate existing gender gaps in the world of work**, notably by worsening working conditions for many women employed in the agricultural sector (although conditions for men working for the construction business are also becoming more difficult). In addition, exposure to heat at work increases health risks for pregnant women.

Heat stress can be one of factors driving people to migrate.

Heat stress can also act as a push that prompts agricultural workers to leave agrarian areas in search of better prospects in cities or in other countries. Although various factors ultimately weigh in the decision to migrate, heat stress is increasingly becoming a driver of international migration. Stress from higher temperatures has been associated with greater migration in recent years, suggesting that people consider climate conditions when deciding to migrate.

Heat waves and incidences at work

The relationship between hot weather and occupational accidents is poorly studied. An Italian study assessed the association between hot weather conditions and hospital admissions due to occupational accidents in Tuscany (central Italy) for the period 1998–2003. The results indicated that heat waves may represent a risk factor for occupational accidents in Italy during the summer. The most risky are high temperatures in June, which workers tolerate worse than the hot days in the following summer months. The peak of occupational accidents occurred on days characterized by hot, but not extreme hot conditions. Workers can change their behavior when heat stress increases by taking preventive measures.

In a study evaluating the relationship between ambient temperatures and occupational injuries in Spain over a 20-year period from 1994 to 2003, it was estimated that 2.7% of all injuries were due to suboptimal and extreme ambient temperatures. This occupational accident rate is equivalent to an annual loss of 42 working days per 1,000 workers, representing 0.03% of Spain's GDP in 2015.

According to another study in Australia, conducted over a 10-year period (2001 – 2010), there was an association between the maximum outdoor temperature above the threshold of 35.5 °C and the overall risk of occupational disease caused by heat exposure. **A 1°C increase in**

maximum temperature was associated with a 12.7% increase in occupational heat illness claims. During heatwave periods, this risk is about 4–7 times higher than at other times. **The sectors with the highest risk of heat stress are agriculture, construction and business services.**



Figure 3: The construction sector has the largest share of fatal heat-related occupational accidents. Source: Pixabay.

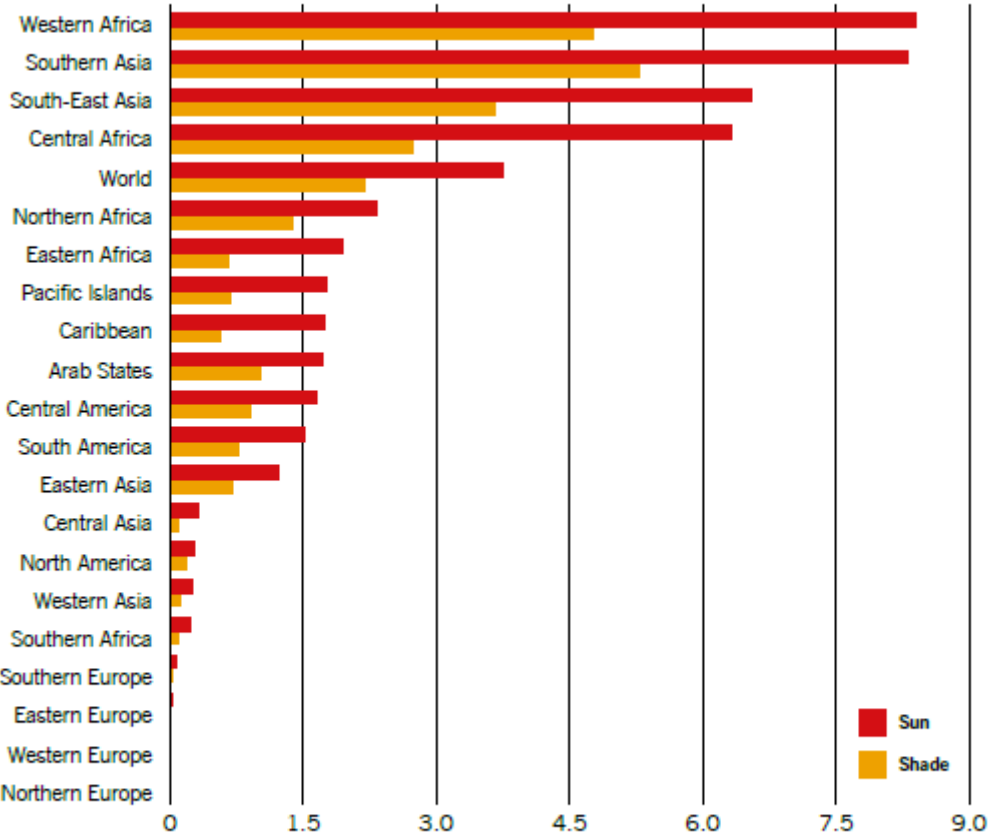
The future for the world, Europe and Bulgaria

Globally, losses of working hours by 2030 are projected to be greatest in West and Central Africa, as well as in South and Southeast Asia (Fig. 4). Although affected to a lesser extent than populations in tropical and subtropical countries, people living in Europe's temperate climate zone may face increasing risks at work and in their homes as a result of more frequent heat waves. Furthermore, at the subregional level, considerable heterogeneity is observed. Northern, Central and Eastern Europe are less vulnerable and Southern Europe is expected to be only slightly affected by heat stress.

However, the increased frequency and intensity of heat waves in Europe could have a serious impact on public health and productivity. Especially in southern European countries, elderly people, outdoor workers and those who work in non-air-conditioned rooms are vulnerable to heat-related illnesses and injuries. ClimateCost in 2021 reported that total productivity losses due to

climate change could cost to Europe between 300 and 700 million USD by 2080. **According to the ILO, Bulgaria is among the more affected Eastern European countries in terms of lost jobs hours due to heat stress.**

Figure AII.2 Percentages of working hours lost to heat stress calculated using in-sun and in-shade estimates of heat stress, all subregions, 2030 (projections)



Source: ILO estimates based on data from the ILOSTAT database and the HadGEM2 and GFDL-ESM2M climate models.

Figure 4

What can be done?

According to the ILO, solutions exist. The structural transformation of agrarian economies should be accelerated, so that fewer agricultural workers are exposed to high temperatures, as well as to reduce the physical effort involved in this type of work. Other important policy measures are skills development, the promotion of an enabling environment for sustainable enterprises, public investment in infrastructure and improved integration of developing countries into world trade. At the workplace level, accurate forecasting of weather conditions in the relevant geographic region, adaptation of work clothing and equipment, and technological improvements can make it easier for workers and their employers to cope with increasing temperatures. Employers and workers

should discuss together how to adjust working hours, in addition to adopting other occupational safety and health measures. An international study published in 2021 (6) found that starting work 1 hour earlier reduced losses from high temperatures by 18%, and starting work 2 hours earlier by as much as 33%.



Figure 5: Early start of the working day has long been practiced in agriculture. Source. [Источник](#).

International labor standards, such as The Convention on Safety and Health at Work can help guide governments in developing national policies to address health risks at work in heat stress conditions.

This year's August 1 is approaching, and before it are the so called "hot days" - on July 28, 29 and 30. These are the hottest days of the year according to folk meteorology - the heart of the summer. They also roughly coincide in terms of climate, although from year to year the warmest days can vary in date. It is important to follow the weather forecast. Global warming is not a sentence and there are measures to help us protect ourselves from extreme heat, even if we have to work outside, although the most pessimistic forecasts claim that it will become so hot that it will be impossible to work on open air. At this stage, changes in labor law, increased control

over employers and the adoption of individual measures could still help protect us. Because behind the statistics human destinies stays and they can really be changed in only one moment.

Header photo source: Pixabay

See also other articles by Dr. Zornitsa Spasova on the subject:

1. Why are heat waves called the "silent killer"? - Part 1

2. Why heat waves are called the silent killer - Part 2

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