Climate change: How global warming is stressing people and the economy

December 2024

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Key points:

- High temperatures resulting from climate change continue to impact populations. Annually, 2.4 billion workers - over 70% of the global labour force – are exposed to excessive heat
- Heat stress is an important health and safety risk to consider for states, companies and employees while heat-related social unrest is also a risk for companies and supply chains
- Lost worktime is expected to cost the economy up to $2.5trn in 2030 – more than 1% of GDP - and up to 4% of GDP by 2100
- Investors have an important role to play by integrating this heat-related risk in their stewardship strategies

The Earth experienced its warmest day in recent history on 22 July 2024, with an average daily global surface air temperature of 17.16°C[1].

Worldwide, heatwaves are becoming more frequent, and more intense, creating a range of problems from droughts and wildfires to destroying animals' habitats. Another impact which is often overlooked is the effect on people's health, wellbeing and productivity, particularly from heat stress.

Heat stress is caused by greater heat than the body can tolerate without physiological impairment. Maintaining a core body temperature of around 37°C is essential for the body to continue functioning as it should. Achieving this body temperature equilibrium requires a constant exchange of heat between the body and the environment. [2]

However, as temperatures rise because of global warming and we experience increasingly hot weather, more and more people are being affected by heat stress. In fact, the International Labour Organization (ILO) estimates that more than 2.4 billion workers – some 71% of the global workforce – are likely to be exposed to excessive heat at some point during their work. [3]

Temperature alone is the wrong thermometer

Temperature alone is not enough to understand the impact of heat on people's health. One of the most effective indicators is the Wet-Bulb Globe Temperature. This index considers temperature, humidity, wind speed and solar radiation to provide a comprehensive measure of heat on the human body.[4]

Another commonly used indicator is the Heat Index, which combines air temperature and relative humidity to estimate how hot it feels to the human body. Both indices are valuable for assessing the risk of heat-related illnesses and guiding public health interventions.

For example, a temperature of 40°C with a 100% humidity can be more dangerous than a 52°C temperature with a 40% humidity[5]. This phenomenon comes from different factors affecting evaporation that leads to homeostasis - the process by which the body maintains a stable internal temperature. This balance is crucial for optimal functioning of enzymes and the body as a whole.

Heat stress can cause severe health problems, including heat exhaustion, heatstroke and exacerbation of chronic conditions like cardiovascular and respiratory diseases or kidney diseases. The World Health Organization reports that heat-related mortality for people over 65 years of age increased by approximately 85% between 2000 and 2021. Additionally, mental health issues and increased accident risks are associated with extreme heat [6]. Excessive temperatures also impact productivity.

Certain groups are more susceptible to heat stress, including the elderly, children, outdoor workers, and individuals with chronic illnesses. Socio-economic factors also play a role, with lower-income populations often lacking access to cooling resources and healthcare. [7]

In its highly regarded 2022 Sixth Assessment Report, the Intergovernmental Panel on Climate Change explained: "Even with current, moderate climate change, vulnerable people will experience a further erosion of livelihood security that can interact with humanitarian crises, such as displacement and involuntary migration (high confidence) and violence and armed conflict, and lead to social tipping points (medium confidence)."[8]

It also found that "some regions are already experiencing heat stress conditions at or approaching the upper limits of labour productivity".

Case study: Kidney disease in Nepalese workers returning from the Gulf

Thousands of Nepali migrant workers work in Gulf countries, principally in construction – for example, 364,000 Nepalis live in Qatar.[9]

Researchers have begun to make the link between heat and the high number of migrant workers returning to Nepal with kidney disease.[10] A growing number of men under 40 are coming home in need of dialysis, after working in intense heat with limited access to drinking water.[11]

Nepal is a sadly interesting case to look at. Among the least developed countries in the world[12], emitting only 0.1% of world greenhouse gases, the country is ranked the 10th most affected country by 'weather-related loss events' (such as heatwaves and floods) in the world by the Climate Risk Index[13]. Personal remittances of migrant workers represent 26% of Nepal's GDP[14]. The country may be exposed to a potential 'double penalty' that affects Nepal both within its borders and its citizens working abroad.

Case study: Heat and social unrest at UPS

Heat reduces workers' ability to work in an optimal and safe environment. From 2015 to 2022, at least 143 UPS employees were hospitalised for heat injuries[15]. Heat can have an impact on workers' health and their ability to drive safely.

Shipping and logistics company UPS has been something of a pioneer in terms of innovation in its field, from the integration of artificial intelligence and its vehicle navigation system to its policy of no left turns when driving – to reduce delays and improve safety[16].

However, some ways of working could need further adaption to a new climate paradigm. In 2023, UPS's 340,000 Teamsters union members went on strike asking for improved working conditions. Heat protection was a key demand. The company committed to buying air-conditioned trucks by 2024 and retrofitting existing ones[17] – no small task, as UPS has almost 100,000 vans in operation, but as of August 2024 they had reportedly made little progress on this front.[18]

Impact on global GDP

Climate change is likely to alter the way people around the world will work. Heat can slow down work, lead to adaptation costs and increase health-related or insurance costs. All these issues are having an increasing impact on global growth.

One analysis of studies on heat stress and the economy found that lost worktime was estimated to have cost US$280bn in 1995 and $311bn in 2010 (around 0.5% of global GDP) and is predicted to cost $2.4trn–$2.5trn in 2030 (more than 1% of GDP) and up to 4% of GDP by 2100. [19]

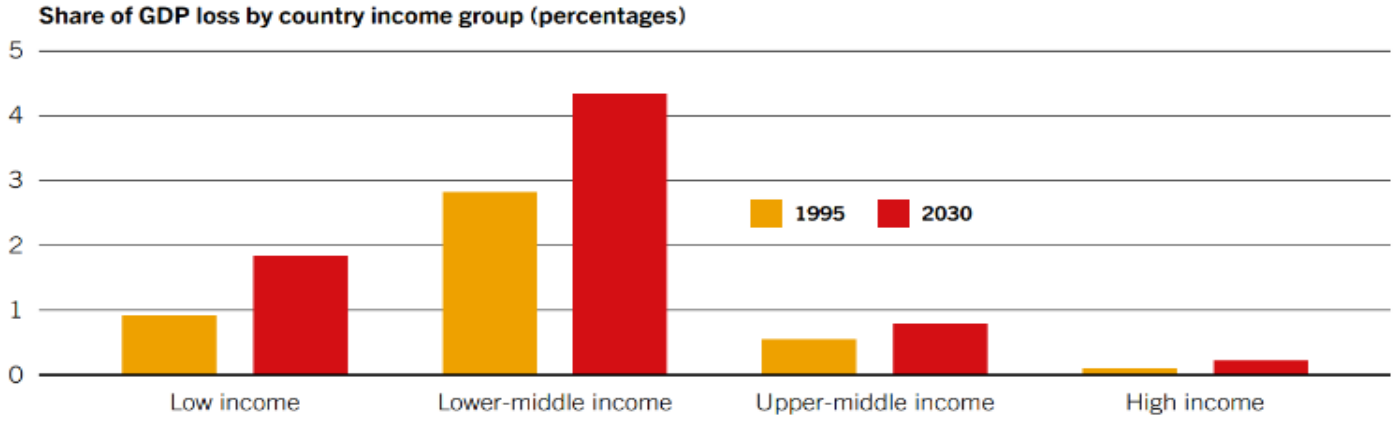
It also highlighted three studies that estimated annual heat-related healthcare expenses from occupational injuries averaged more than $1m in Spain, $1m in Guangzhou, China and $250,000 in Adelaide, Australia. Low-and-middle-income countries alongside nations exposed to warmer climates had greater losses as a proportion of GDP.

According to the ILO, the most impacted people are and will continue to be those with the lowest income. [20]

A tighter regulatory framework

In the US, the Occupational Safety and Health Administration (OSHA) – part of the Department of Labor - proposed a new standard to help protect workers from heat hazards.[21] It specifically targets the prevention of heat-related illnesses and injuries, which are not comprehensively covered under the existing general health and safety regulations. It includes:

- Specific focus on heat stress: The rule mandates employers to implement measures specifically designed to prevent heat stress, such as providing cool drinking water, ensuring rest breaks and creating shaded or air-conditioned rest areas
- Monitoring and assessment: Employers are required to regularly monitor workplace temperatures and humidity levels, and conduct heat risk assessments
- Training and acclimatisation: The rules include requirements for training employees and supervisors on heat stress prevention and implementing acclimatization plans for new and returning workers
- Record-keeping: Employers must maintain records of heat-related incidents and the measures taken to prevent heat stress
- Integration with general health and safety measures: While general health and safety regulations cover a broad range of potential workplace hazards, the proposed heat stress rule provides detailed and specific guidelines to address the unique risks posed by high temperatures. This ensures a more comprehensive approach to worker safety, particularly in environments where heat is a significant hazard
- Enforcement and sanctions: Non-compliance with the proposed heat stress rule can result in penalties, including fines, operational restrictions, and



Source: ILO estimates based on data from the ILOSTAT database and from the HadGEM2 and GFDL-ESM2M climate models (using as input the RCP2.6 climate change pathway, which envisages a global average temperature rise of 1.5°C by the end of the century).

potential legal action. These sanctions are designed to enforce compliance and ensure that employers take the necessary steps to protect their workers from heat-related risks[22]

Considering heat stress in investment portfolios

Although heat is not the only consequence of climate change, we believe it's a material one. The highly probable increase in heatwaves will generate risks not only for individuals, but also for businesses and countries.

For example, a severe heatwave in Bangladesh in June 2024 harmed not only workers but also the wider textile industry supply chain.[23]

This, and the examples of Nepalese workers and UPS described above suggest that heat can be a systemic issue for an entire country or an idiosyncratic risk for corporates. Adapting to the heat is a cost that companies and states will have to bear, particularly for outdoor workers where implementing solutions is more complex.

Risks including social unrest, lack of engagement, health issues and productivity loss could continue to increase especially if no appropriate measures are taken.

Investors should consider these risks, as well as any other health and safety risks, when they are building portfolios. While there remains a lack of data and it is difficult to monitor heat-related risks, the European Union's Corporate Sustainability Reporting Directive includes reporting standards on health and safety metrics - both quantitative and qualitative indicators.

Investors can also integrate heat stress in their stewardship and engagements strategies. One possible first step is simply to start asking questions about how companies are planning to adapt their employees and contractors to the heat.

A step further would be to define clear engagement objectives following recommendations from organisations such as OSHA. We think that it is important to consider each business' specificities and area of operations. A key recommendation for companies is to involve employee representatives and trade unions in strategies for adapting to heat.

We believe that it is important to adopt a risk-based approach, looking closely at priority sectors that present the most salient risks of impact from heat stress – such as agriculture. There are some 940 million people active in agriculture around the world, and farmers are set to be some of the worst hit by rising temperatures, according to the ILO. [24] It predicts that the sector will account for 60% of global working hours lost from heat stress by 2030.

Agriculture is also one of the sectors where adaptation solutions are potentially more difficult to implement. Elsewhere, construction is also a high-risk sector regarding heat stress.

More broadly, we believe this is a risk which has not yet been fully anticipated. The ongoing increase in greenhouse gas concentration in the atmosphere makes it very likely that millions of people will experience a deterioration in their living and working conditions due to heat stress. Companies and governments must take steps now to reduce the risks to individuals and economies, whether the impacts are likely to be direct - for production countries - or indirect, through supply chains and inflation.

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