

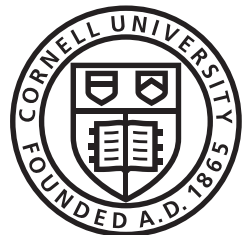


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# Warming to the Idea? Labor Governance and Extreme Heat in Apparel Production

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## Introduction

This brief presents new findings on the impacts of extreme heat and the adaptation responses—or lack of them—from employers, workers, their governments and buyers in the USD [1.77 trillion](#) global apparel and footwear industry. We use new heat data plus interviews with ILO-IFC Better Work Enterprise Advisors to track the need for climate adaptation in Central America, North Africa and South and Southeast Asia. We also present recommendations and new data from the November 2025 report “[The Heat is On: How global warming impacts the apparel industry, jobs, and worker health](#),” co-authored by Cornell Global Labor Institute (GLI) and Better Work.

Governments, regulators, manufacturers, brands, retailers and investors all have a role to play in managing the impacts of climate change. The recommendations named in the report include:

- Set and consistently enforce mandatory and voluntary standards
- Invest in climate adaptation and cooling
- Consult with workers
- Treat heat stress and floods as health hazards
- Treat extreme climate events as ‘force majeure’<sup>1</sup>

To be integrated with these changes are the *social* adaptation needs as opposed to the *physical* adaptation and decarbonization needs of the industry’s workers and manufacturers. As GLI argues in our *Higher Ground?* (with Schroders) and *Hot Air* reports, efforts to combat the impacts of climate breakdown must also include three social adaptation investments: living wages, effective social protection systems and organizing and collective bargaining rights for workers. This suite of investments—physical and social—are taken up together in GLI’s analysis of climate adaptation costs and returns on investment in Bangladesh, to be published in early 2026.

## The Temperature is Rising

After examining conditions in 23 major apparel production centers across the world, GLI research found that in the past two decades, 17 of the 23 centers recorded increases of over 10 percent in the average number of days with temperatures of 35 °C or more posing a significant risk to workers’ health and productivity (Judd et al. 2024).<sup>2,3</sup> Delhi in India, Karachi in Pakistan, and Phnom Penh in Cambodia recorded the highest number of days over 35 °C, as shown in Table 1.

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1 This policy brief is based on the GLI, IFC and ILO report, “[The Heat is On: How global warming impacts the apparel industry, jobs, and worker health](#),” IFC Senior Operations Officer Sabine Hertveldt, IFC Associate Operations Officer Nabeera Rahman, GLI Executive Director Jason Judd and GLI Research Support Specialist Brian Wakamo are the authors of that report.

2 A temperature of 35 °C is equivalent to 95 °F.

3 Given that short-term fluctuations in heat levels and intensity are natural and expected, climate science relies on averages of five years or longer to provide a clearer sense of long-term trends.

**Table 1. Annual days over 35 °C by production center (five-year averages), 2005 to 2024**

| Center           | Country     | Days of 35 °C or more, 2005-2009 | Days of 35 °C or more, 2010-2014 | Days of 35 °C or more, 2015-2019 | Days of 35 °C or more, 2020-2024* | Change from first to last period (%) |
|------------------|-------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|--------------------------------------|
| Delhi            | India       | 141.0                            | 118.2                            | 140.6                            | 115.6                             | -18.0                                |
| Karachi          | Pakistan    | 95.6                             | 83.4                             | 101.2                            | 113.2                             | 18.4                                 |
| Phnom Penh       | Cambodia    | 34.4                             | 88.2                             | 109.8                            | 112.2                             | 226.2                                |
| Yangon           | Myanmar     | 76.4                             | 91.6                             | 98.0                             | 84.6                              | 10.7                                 |
| Cairo            | Egypt       | 71.8                             | 69.2                             | 88.2                             | 78.6                              | 9.5                                  |
| Bangkok          | Thailand    | 80.8                             | 68.6                             | 62.0                             | 76.6                              | -5.2                                 |
| Ho Chi Minh City | Viet Nam    | 28.8                             | 36.4                             | 51.0                             | 74.4                              | 158.3                                |
| Managua          | Nicaragua   | 57.8                             | 60.4                             | 71.8                             | 72.4                              | 25.3                                 |
| Tiruppur         | India       | 39.0                             | 69.6                             | 73.4                             | 67.2                              | 72.3                                 |
| Hanoi            | Viet Nam    | 38.6                             | 32.2                             | 44.4                             | 56.2                              | 45.6                                 |
| Dhaka            | Bangladesh  | 32.8                             | 66.6                             | 42.2                             | 51.2                              | 56.1                                 |
| Manila           | Philippines | 21.8                             | 31.6                             | 42.2                             | 42.4                              | 94.5                                 |
| San Pedro Sula   | Honduras    | 38.0                             | 32.6                             | 36.2                             | 37.6                              | -1.1                                 |
| Amman            | Jordan      | 18.8                             | 21.6                             | 29.2                             | 36.2                              | 92.6                                 |
| Izmir            | Türkiye     | 36.4                             | 25.6                             | 19.2                             | 30.6                              | -15.9                                |
| Monastir         | Tunisia     | 20.4                             | 20.4                             | 23.4                             | 29.4                              | 44.1                                 |
| Colombo          | Sri Lanka   | 3.6                              | 5.8                              | 26.0                             | 25.2                              | 600.0                                |
| Prato            | Italy       | 8.2                              | 9.8                              | 15.6                             | 22.4                              | 173.2                                |
| Kuala Lumpur     | Malaysia    | 7.8                              | 14.4                             | 11.6                             | 12.2                              | 56.4                                 |
| Jakarta          | Indonesia   | 7.6                              | 8.2                              | 6.6                              | 8.6                               | 13.6                                 |
| Dongguan         | China       | 4.2                              | 5.2                              | 5.6                              | 8.4                               | 100.0                                |
| San Salvador     | El Salvador | 2.8                              | 4.8                              | 9.0                              | 6.8                               | 142.9                                |
| Mexico City      | Mexico      | 2.2                              | 4.6                              | 2.0                              | 1.6                               | -27.3                                |

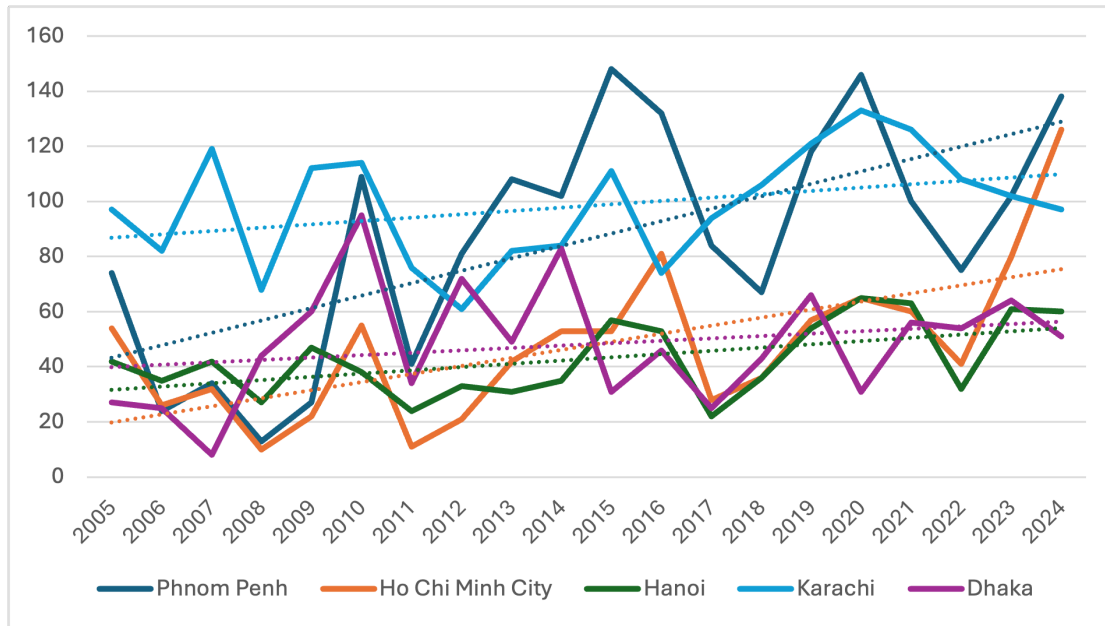
\*Data is up to September 30, 2024.

Source: GLI analysis using direct observations/station data from Visual Crossing.

The largest percentage increases in the number of days over 35 °C occurred in Colombo in Sri Lanka, Phnom Penh in Cambodia, Prato in Italy, Ho Chi Minh City in Viet Nam and San Salvador in El Salvador. Many of the other centers saw significant increases and significant swings in the average number of days over 35 °C, and this is partly attributable to short-term variability in weather patterns. Delhi, for example, recorded fewer average days over 35 °C from 2019-2023 compared to 2014-2018, but it experienced 23 heat waves during that 2019-2023 period.<sup>4</sup>

<sup>4</sup> For this research, a high heat day is one in which outdoor wet-bulb globe temperatures reach more than 30.5 °C and 'heat waves' or 'heat stress waves' are defined as three or more consecutive high heat stress days.

Figure 1. Annual days over 35 °C in five focus cities, 2005-2024



Source: GLI analysis using direct observations/station data from Visual Crossing.

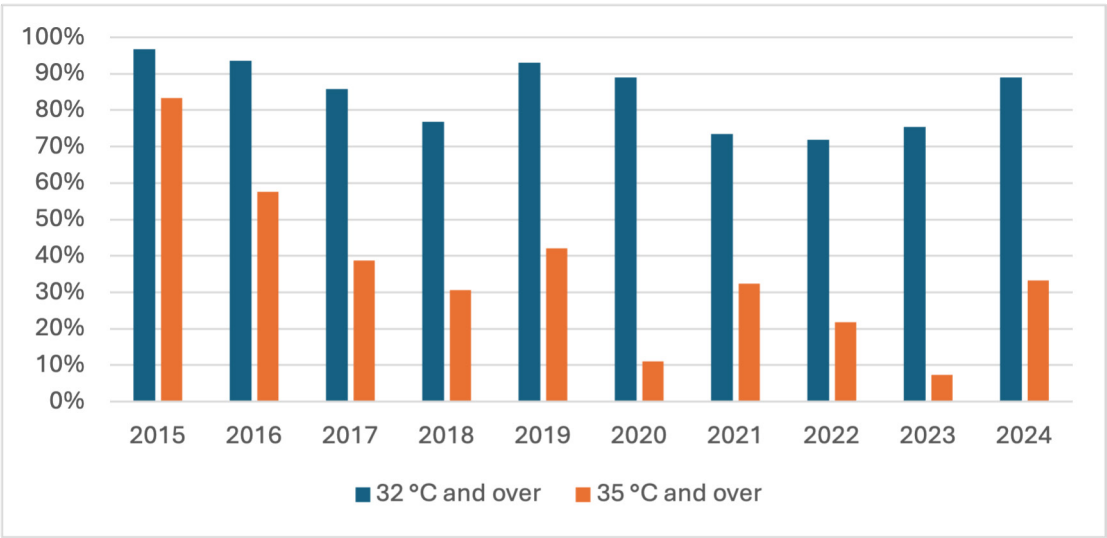
Narrowing our focus to five key production centers, we see that annual variability in temperature at play and a clear trend: increasing numbers of days per year ('exceedance days') between 2005 and 2024 when daily outdoor highs climbed above 35 °C. Ho Chi Minh City and Phnom Penh, in particular, have seen rapid accelerations in annual exceedance days.

## Better Work Assessments

What about temperatures inside factories? The Better Work program in Cambodia (known as Better Factories Cambodia) assesses all exporting apparel and footwear factories and applies its own threshold (32 °C) for acceptable levels of indoor heat. This threshold is not set by local law or regulations. Better Factories Cambodia uses dry-bulb (air-surface) temperature sensors to obtain reliable and comparable factory temperature readings in production areas. GLI analyzed findings from this unique dataset of 800 assessments, conducted during the hottest months of March, April and May from 2015 to 2024:

- Eighty-two percent of factories in Cambodia had indoor temperatures in their hottest production areas above the 32 °C threshold.
- One in three factories experienced days when indoor temperatures exceeded 35 °C.
- Almost 53 percent of factories had indoor temperatures above 32 °C, while also being hotter than concurrent outdoor temperatures.

Figure 2. Share of all assessments of Cambodian apparel factories with indoor temperatures above 32 and 35 °C (dry-bulb), March, April and May, 2015 – 2024



Source: GLI analysis using Better Factories Cambodia data.

### What are other Better Work programs seeing?

GLI and IFC interviewed Enterprise Advisors (EAs) in other nations with Better Work programs in March and April 2025. In **Nicaragua**, EA's noted a relatively high usage of active cooling methods. Over half of factories visited have workstation/cooling fans only, 60 percent of that group have workstation, ceiling, and exhaust fans, and slightly more than one-third of factories had water evaporative cooling systems. They estimated that 23 percent of assessed factories had no cooling methods. Although the Nicaraguan government has set heat stress thresholds, temperatures in factories often exceed those thresholds. One Better Work staff reported a factory with “300 percent of the thermal stress [threshold]” and that he “interviewed the workers, and they said that [these factory heat levels] are normal... [I] was in shock.”

In **Bangladesh**, EAs noted that in some assessments during the hottest months, “we found that the factory workers were suffering because of extreme heat... [To] reduce the heat, to feel cool, they just turned off their production floor lights, though they are causing a low-light issue. We found that to reduce the unacceptable heat they are also suffering negative impacts because of the low-light issue.” Another said, “I’m also scared about how the RMG sector and how the Bangladeshi people survive in this coming days, with a fight against the heat and flood.”

In **Vietnam**. “We have to do something relating to heat and also flooding. Last year, Vietnam was hit by the strongest storm [ever] to hit the north of Vietnam. In many factories along the Red River in the north, the factory had to close for some months to clean up and repair.” Factories are reactive and not proactive in mitigating heat stress, according to one EA: “The first [action] is a complaint from workers saying ‘OK, the workplace is hot. We need some equipment to cool down the workplace.’ So they [management] reactively respond to the complaint by setting up some fans.”

# What is the state of governance?

In 2024, ILO published *Heat at Work: Implications for safety and health*, which includes an analysis of national legislation on workplace heat stress across 21 countries. The major apparel producing countries of Brazil, China, India, Viet Nam, and Thailand are featured in this analysis, as shown in Table 2.

Table 2. Examples of legislation on maximum temperature thresholds in the workplace

| Country  | Heat Stress Indicator         | Safety Threshold (Work Intensity/Risk)                                                                |
|----------|-------------------------------|-------------------------------------------------------------------------------------------------------|
| Brazil   | WBGT                          | 31.7–33.7 °C for 'very low intensity' work<br>20.7–24.7 °C for 'very high intensity' work             |
| China    | Air temperature               | 37–39 °C is considered 'high risk'<br>Above 39 °C is an 'extreme risk'                                |
| India    | WBGT                          | 30 °C is the safe threshold for all work                                                              |
| Viet Nam | Air temperature (indoor only) | 34 °C for 'light' work,<br>32 °C for 'medium' effort,<br>30 °C for 'heavy' work                       |
| Thailand | WBGT                          | 34 °C for 'low intensity' work,<br>32 °C for 'moderate' work,<br>30 °C for 'very high intensity' work |

Sources: Brazil's Regulatory Standard No. 9 (Annex 3), China's Administrative Measures on Heatstroke Prevention (AMPH2012), India's Factories Act No. 63, 1948, Viet Nam Ministry of Health's Permissible values of microclimate parameters in the workplace following QCVN 26:2016/BYT, and Thailand's Occupational Standard.

VF Corporation developed [Facility Compliance Standards](#) for its manufacturing partners/suppliers, across the globe. Along with providing practical advice, the guidelines lay out that dry-bulb temperatures in the workplace must not fall below 10 °C or above 35 °C (See table at right). VF Corporation says facilities must comply with its standards or with local laws, whichever are more stringent.

| Avoid      | <50 °F       | <10 °C       |
|------------|--------------|--------------|
| Borderline | 50 ° - 60 °F | 10 ° - 15 °C |
| Ideal      | 60 ° - 86 °F | 15 ° - 30 °C |
| Borderline | 86 ° - 95 °F | 30 ° - 35 °C |
|            | >95 °F       | >35 °C       |

However, national standards often go unenforced and can be gamed, such as in Viet Nam, where the measuring and enforcing of the indoor temperature guidelines is largely left in the hands of the employers or with outside environmental audit firms.

## Recommendations

Governments, regulators, manufacturers, brands, retailers and investors all have a role to play in managing the impacts of climate change. Potential strategies to reduce the impact on job growth, productivity, and revenues, and to protect the health, safety, and livelihoods of apparel workers include:

- **Set and consistently enforce mandatory and voluntary standards:** Governments and regulators can set and enforce mandatory standards and brands and retailers can introduce voluntary standards for work hours, rest breaks, effort levels, and hydration based on indoor wet- and dry-bulb standards appropriate to the region. Governments can also require manufacturers to collect and disclose heat and humidity levels.
- **Invest in climate adaptation and cooling:** Manufacturers, investors, brands and retailers can invest in effective passive and active cooling systems, as well as financing options. These can range from low-cost passive solutions to more expensive active cooling systems. Investments in green certification can increase competitiveness and attract more business.
- **Consult with workers:** Manufacturers can train workers to identify heat stress symptoms, heat related illnesses and help them access first aid and medical care. They can actively consult with workers and their representatives about the best ways to organize production and lower adverse impacts on workers' health and incomes.
- **Treat heat stress and floods as health hazards:** Regulators can treat high heat and flood events as health hazards, which would entitle workers to paid leave for these events and related illnesses, and give workers the right to stop work, individually and collectively, without penalty or loss of income.
- **Treat extreme climate events as 'force majeure':** When unavoidable events prevent a business from fulfilling a contract, 'force majeure' can free them from their obligations. Labor laws and agreements between global brands and manufacturers could recognize climate events as 'force majeure' and make allowances in production schedules, delivery, workers' emergency leave, and income.



Photo sourced from Better Work Programme