



International
Labour
Organization



IFC

International
Finance Corporation
WORLD BANK GROUP



BetterWork



The Heat is On:

**How heat stress impacts
the apparel industry, jobs,
and worker health**



ILR Global Labor Institute

Fias

THE FACILITY
FOR INVESTMENT
CLIMATE ADVISORY
SERVICES

© International Labour Organization 2025

First published 2025



Attribution 4.0 International (CC BY 4.0)

This work is licensed under the Creative Commons Attribution 4.0 International. See: <https://creativecommons.org/licenses/by/4.0/>. The user is allowed to reuse, share (copy and redistribute), adapt (remix, transform and build upon the original work) as detailed in the licence. The user must clearly credit the ILO as the source of the material and indicate if changes were made to the original content. Use of the emblem, name and logo of the ILO is not permitted in connection with translations, adaptations or other derivative works.

Attribution – The user must indicate if changes were made and must cite the work as follows: ILO, *The Heat is On: How heat stress impacts the apparel industry, jobs, and worker health*, Geneva: International Labour Office, 2025. © ILO.

Translations – In case of a translation of this work, the following disclaimer must be added along with the attribution: *This is a translation of a copyrighted work of the International Labour Organization (ILO). This translation has not been prepared, reviewed or endorsed by the ILO and should not be considered an official ILO translation. The ILO disclaims all responsibility for its content and accuracy. Responsibility rests solely with the author(s) of the translation.*

Adaptations – In case of an adaptation of this work, the following disclaimer must be added along with the attribution: *This is an adaptation of a copyrighted work of the International Labour Organization (ILO). This adaptation has not been prepared, reviewed or endorsed by the ILO and should not be considered an official ILO adaptation. The ILO disclaims all responsibility for its content and accuracy. Responsibility rests solely with the author(s) of the adaptation.*

Third-party materials – This Creative Commons licence does not apply to non-ILO copyright materials included in this publication. If the material is attributed to a third party, the user of such material is solely responsible for clearing the rights with the rights holder and for any claims of infringement.

Any dispute arising under this licence that cannot be settled amicably shall be referred to arbitration in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL). The parties shall be bound by any arbitration award rendered as a result of such arbitration as the final adjudication of such a dispute.

For details on rights and licensing, contact: rights@ilo.org. For details on ILO publications and digital products, visit: www.ilo.org/publns.

ISBN: 9789220429211 (web PDF)

DOI: <https://doi.org/10.54394/CGWS6514>

The designations employed in ILO publications and databases, which are in conformity with United Nations practice, and the presentation of material therein do not imply the expression of any opinion whatsoever on the part of the ILO concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers or boundaries. See: www.ilo.org/disclaimer.

The opinions and views expressed in this publication are those of the author(s) and do not necessarily reflect the opinions, views or policies of the ILO.

Reference to names of firms and commercial products and processes does not imply their endorsement by the ILO, and any failure to mention a particular firm, commercial product or process is not a sign of disapproval.



The Heat is On:

How heat stress impacts the apparel industry, jobs, and worker health



ILR Global Labor Institute

Fias | THE FACILITY
FOR INVESTMENT
CLIMATE ADVISORY
SERVICES



About Better Work

Better Work—a collaboration between the United Nations' International Labour Organization (ILO) and the International Finance Corporation (IFC), a member of the World Bank Group—is a comprehensive program bringing together all levels of the garment industry to improve working conditions, respect workers' labour rights, and boost the competitiveness of apparel and footwear businesses.

About Cornell University's Global Labor Institute

Cornell University's Global Labor Institute in the School of Industrial and Labor Relations is a research center focused on quantitative analyses of changes in the world of work with a goal of identifying what works to improve working conditions and advance worker rights along global supply chains.



► Acknowledgments

This note was jointly prepared by Cornell University's Global Labor Institute (GLI) and the International Finance Corporation (IFC) with input from the International Labour Organization's Better Work team. It explores how heat stress is affecting health, productivity, and livelihoods of workers in major apparel-producing countries and how it impacts the apparel industry.

From GLI, the authors Jason Judd, GLI Executive Director, and Brian Wakamo, GLI Research Support Specialist draw on two decades of climate data and on-the-ground insights from recent reports, including [Hot Air: How will fashion adapt to accelerating climate change?](#) and the two-part series [Higher Ground?](#) and gratefully acknowledge Schrodgers for their research contributions to these reports.

From IFC, the authors are Sabine Hertveldt, IFC Senior Operations Officer, and Nabeera Rahman, IFC Associate Operations Officer under the overall guidance from Amy Luinstra, IFC Manager, Cross-Cutting Solutions. Thanks go to Rusmir Music, IFC Senior Operations Officer, Nishat Shahid Chowdhury, IFC Operations Officer, Conor Boyle, IFC Senior Operations Officer (seconded from ILO), Raquel Scarpari, IFC Extended-term Consultant, and Nam Thanh Tran, IFC Investment Analyst, for their valuable input.

The authors express sincere gratitude to ILO's Better Work colleagues, particularly Nikita Grabher-Meyer, Better Work Technical Officer for Research and Impact, and the Better Work country teams in Bangladesh, Cambodia, Egypt, Nicaragua, and Viet Nam, whose knowledge and on-the-ground expertise from regular factory visits enriched this work.

This work is supported by the Facility for Investment Climate Advisory Services (FIAS), one of the oldest and largest multi-donor trust funds in the World Bank Group.

The note was edited by Gina Wilkinson and designed by Luis Liceaga.

CONTENTS

Executive Summary.....	1
1. Extreme Heat and Intense Flooding	3
▶ Heat impacts in major apparel production centers	3
▶ Measuring heat stress	5
▶ Extreme heat projections for 2030 and beyond	7
▶ Intense flooding.....	7
2. Impacts of Extreme Heat and Intense Flooding	11
▶ Measuring economic risks for the apparel industry in 2030 and beyond	11
▶ Implications for workers	14
3. International, National, and Voluntary Standards on Heat Stress	17
▶ International standards	17
▶ National standards	18
▶ Voluntary industry standards.....	21
4. Investing in Cooling	23
▶ Investing in active and passive cooling	23
▶ IFC initiatives on cooling	25
5. Recommendations	27
References	29
Annex 1	32



► Executive Summary

The global apparel industry, a \$1.77 trillion industry with a workforce of more than 90 million direct employees, faces growing risks from the impacts of climate change. Heat waves and flooding are becoming more severe and frequent, impacting health, productivity, job creation, and earnings for apparel workers around the world. This note aims to understand current and projected risks, and point to actions which governments, regulators, global brands and retailers, manufacturers and investors, can consider to address the impact of heat stress and flooding on apparel workers. The note includes findings from Better Work staff on the ground in countries that are experiencing adverse impacts of climate change.

The information is drawn from recent reports from the Global Labor Institute (GLI) at Cornell University including analysis of 20 years of climate data in 23 apparel production centers across the world. The research found that over the past two decades, 17 of the 23 production centers recorded increases of more than 10 percent in the average number of days with dangerously high temperatures of 35°C or more. It documents an upward trend in the frequency of ‘heat stress waves’—defined as three or more consecutive days with outdoor temperatures above 30.5°C on the wet bulb globe temperature (WBGT) index.

High heat stress levels occur at 32°C or more, when workers can suffer heat exhaustion, life-threatening heat stroke, and other serious health impacts. In addition to threatening health and wellbeing, it is estimated that for every increase of 1°C above 25°C WBGT, productivity for moderate effort in manufacturing falls by an average of 1.5 percent.

Along with high temperatures, climate change is also fueling more intense flooding which often results in apparel workers jeopardizing their health and safety to reach factories and maintain incomes, while factories can lose machinery, materials, and customer orders.



The GLI analysis estimates the future impacts of climate change in key apparel production centers—Dhaka in Bangladesh, Phnom Penh in Cambodia, Karachi in Pakistan, and Hanoi and Ho Chi Minh City in Viet Nam, under two scenarios: one in which the industry works proactively to manage heat stress and intensified flooding, and another scenario of no-adaptation.

Under the no-adaptation scenario, these four countries are projected to forego a total of \$65.8 billion in potential export earnings by 2030. This translates to a 22 percent reduction in export earnings versus a climate-adaptive scenario. The industry would also generate nearly one million fewer new jobs across the four countries. The estimates for 2050 are even worse. With the compounding effect of slower growth under the no-adaptation scenario, estimates for export earnings are 68.8 percent lower than in the adaptation scenario. The analysis also predicts that in these four countries, the employment levels in a no-adaptation scenario would be 8.64 million lower in 2050 than in the adaptative scenario.

Given the importance of adapting to a warming world and the high costs of not doing so, this note highlights specific cooling initiatives and explores other actions governments, regulators, manufacturers, brands and investors can consider to lower the impact on workers.

It is part of broader global efforts that recognize the dangers of rising heat. Since 2023, more than 70 countries, together with sub-national participants and non-state actors, have signed the Global Cooling Pledge, which aims to reduce cooling-related emissions by 68 percent by 2050 and to increase access to sustainable cooling.



1. Extreme Heat and Intense Flooding

► Heat impacts in major apparel production centers

The impacts of climate change pose a major challenge for the apparel sector, with much of the \$1.77 trillion industry located in regions where heat waves and flooding are not only becoming more common but intensifying too. These impacts are already threatening productivity and earnings for manufacturers, and investors, as well as the health and incomes of 90 million direct employees and millions more who work indirectly in the industry.

This note combines recent research from the Global Labor Institute (GLI) at Cornell University on climate risks in major apparel production centers with on the ground experiences from the Better Work program—a collaboration between the United Nations' International Labour Organization (ILO) and the International Finance Corporation (IFC), a member of the World Bank Group.¹ It describes the current and projected impact of extreme weather events on the apparel industry, jobs and worker's health and explores what can be done to reduce those impacts.

After examining conditions in 23 major apparel production centers across the world, the 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).^{2,3} 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.

1 [Hot Air: How will fashion adapt to accelerating climate change?](#) and the two-part series [Higher Ground?](#)

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

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. DAYS OVER 35°C BY PRODUCTION CENTER, 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, 2014-2019	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 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 swings in the average number of days over 35°C, and this is partly attributable to short-term variability in weather patterns. For example, of the 23 cities, Delhi 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.⁴ Delhi also experienced record high

4 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.



temperatures of 49°C in 2024 (Dayal and Priyanshu 2024). Finally, two cities, Izmir in Türkiye and Mexico City, saw noticeable decreases in average days over 35°C across all four five-year periods.

► Measuring heat stress

The impacts of high temperatures are exacerbated by humidity, which impedes the body's ability to dissipate heat via sweating. To more accurately measure heat stress for workers, temperatures and relative humidity are combined in what is known as the wet bulb globe temperature (WBGT) index.⁵ Labor and occupational health and safety regulations often use the WBGT index, including in apparel producing countries such as Viet Nam, Malaysia, Thailand, and El Salvador. It is also one of the standard measures of heat stress used in academic literature (Hsiang 2010; Schwingshackl et al 2021).

Heat stress creates discomfort for workers at 28°C on the WBGT index. It causes moderate heat stress at 30.5°C and high heat stress above 32°C (Kjellstrom et al. 2009). At the moderate heat stress threshold, some experts recommend that workers rest as much as they work in an hour—for example, 30 minutes of work requires 30 minutes of rest (Kjellstrom et al. 2009). When the WBGT index reaches high heat stress levels of 32°C or more, workers can suffer heat exhaustion, life-threatening heat stroke, and other serious health impacts (Schwingshackl et al. 2021; Somanathan et al. 2021). Heat stress also impacts worker productivity and output. It is estimated that for every increase of 1°C above 25°C WBGT, productivity for moderate effort in manufacturing decreases by an average of 1.5 percent (Hsiang 2010).⁶

Using data from Cornell University's Earth and Atmospheric Sciences Department, the GLI research team focused on five production centers in four countries—Dhaka in Bangladesh, Phnom Penh in Cambodia, Karachi in Pakistan, and Hanoi and Ho Chi Minh City in Viet Nam. The five locations were chosen because they account for 18 percent of global apparel exports and have a combined apparel workforce of more than 10.6 million people.

According to the analysis, over the past 20 years, these cities experienced an upward trend in the number of days with temperatures above the moderate heat stress threshold of 30.5°C (Judd et al. 2024). From 2005 onwards, Karachi, Hanoi, and Ho Chi Minh City experienced the most notable rises, with Karachi peaking at 115 days above 30.5°C in 2020, as shown in Figure 1. With the exception of Hanoi, all of the cities recorded a sharp increase in heat stress days during 2023 and 2024.

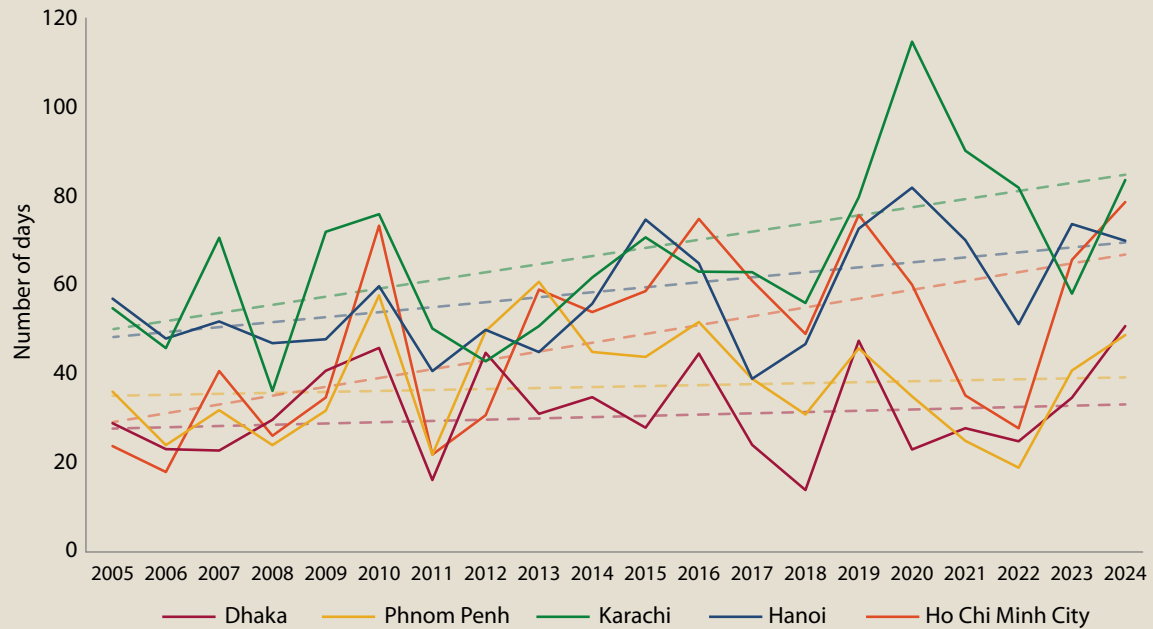
The frequency and intensity or duration of 'heat stress waves' provides a more detailed measure of changes in heat stress. A heat stress wave is defined as three or more consecutive days with outdoor maximums above 30.5°C WBGT. From 2005 onwards, heat stress waves occurred more frequently in the five focus cities, as shown in Figure 2. Ho Chi Minh City showed the most marked increase.

5 Wet bulb globe values are lower than dry-bulb values but represent higher heat stress. For example, a wet-bulb value of 25°C at 65 percent humidity corresponds to a dry-bulb reading of 31°C in low humidity (Somanathan 2021).

6 Several long-term studies measure the effect of heat on labor productivity, including some conducted in apparel production in South Asia. For a comparison, see [Somanathan et al.](#) This study uses Hsiang's relative conservative measure of a 1-2 percent decline in manufacturing productivity per degree above 25°C WBGT.

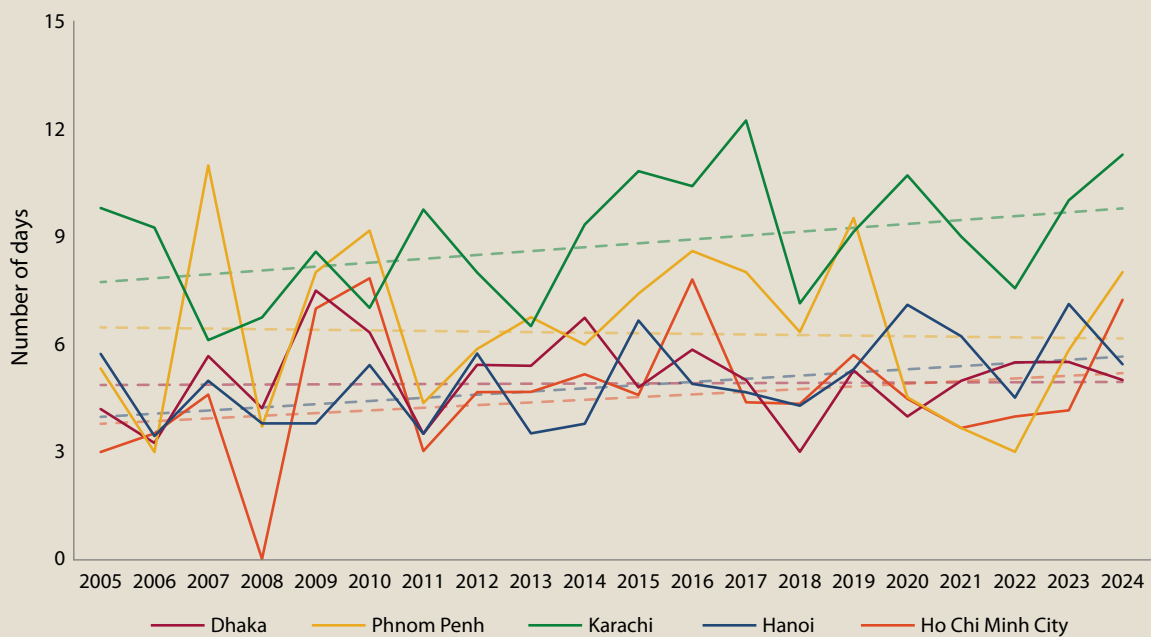


FIGURE 1. DAYS ABOVE 30.5°C WBGT ANNUALLY, BY CENTER, 2005 TO 2024



Source: GLI analysis using reanalysis of ERA5 hourly data on single levels from Copernicus Climate Change Service.

FIGURE 2. AVERAGE DURATION OF HEAT STRESS WAVES IN DAYS, BY CENTER, 2005 TO 2024



Source: Cornell GLI analysis using reanalysis of ERA5 hourly data on single levels from Copernicus Climate Change Service.



Despite annual volatility, the duration of heat stress waves increased significantly in three of the five focus cities. Hanoi and Ho Chi Minh City saw longer heat stress waves, while Karachi recorded a large jump in the duration of heatwaves from an average of 8.1 days in the decade from 2005 to 2014 to 9.8 days in the subsequent decade.

► Extreme heat projections for 2030 and beyond

Increases in high heat are expected to accelerate. Table 2—drawn from the GLI and Schroders' analyses in their *Higher Ground?* reports—illustrates projected changes in the frequency of days above 30.5°C WBGT in key apparel and footwear production centers for the years 2030 and 2050.⁷ Many of these centers are in tropical and subtropical regions already prone to extreme heat.

To assess how these projections compare with recent conditions, WBGT data from 2004–2014 were analyzed using the same climate models and compared to estimates for the number of days above 30.5°C WBGT in 2030. Across the cities of Karachi, Dhaka, Ho Chi Minh City, and Phnom Penh, the average number of days above 30.5°C WBGT is projected to increase by 50.9 percent, rising from 39 days in 2014 to 59 days by 2030. Starting from relatively low baselines, Ho Chi Minh City, Hanoi, and Phnom Penh are expected to experience more than a doubling of number of days above 30.5°C WBGT by 2030. In contrast, cities with already high exposure—such as Dhaka and Karachi—are projected to see increases of 63 percent and 20 percent, respectively.

► Intense flooding

Climate change not only causes more frequent and severe heat waves, it is also driving intense flooding. The impact of flooding varies widely, sometimes factory-to-factory and block-by-block, depending on infrastructure and urban planning. In some cases, apparel workers risk their health and safety to reach factories and maintain incomes. Factories can lose machinery and materials. Delivery delays can result in discounts on completed orders, requiring expensive airfreighting, or cost future orders.

In Table 3, the Cornell GLI analysis uses rainfall as a proxy for flooding risk. Higher daily precipitation indicates greater flooding risk, but the analysis does not account for the impacts of flood barriers or water discharge rates. Between 2005 and 2024, 10 of 23 major apparel producing cities recorded at least a 10 percent increase in average rainfall during their 30 heaviest rainfall days.⁸ Yangon, Jakarta, and Dongguan are among the cities where rainfall intensified significantly across all five-year periods.

“In 2024, the northern part of Viet Nam was hit by the strongest storm ever... causing many factories along the Red River to close for months for cleaning up and repairing infrastructure, machines, and equipment.”

Better Work Enterprise Advisor,
Viet Nam

⁷ For this analysis, the research team examined data from the 23 key apparel production centers as well as an additional nine cities with large garment manufacturing industries.

⁸ In Viet Nam, the “heaviest rainfall” is quantitatively defined as rainfall exceeding 50 mm. However, this definition has not been applied in this analysis to maintain methodological consistency across all countries included in the study. In this note, “heaviest rainfall days” refer to the 30 days with the highest observed daily rainfall amounts during the study period.

**TABLE 2. PROJECTED NUMBER OF DAYS ABOVE 30.5°C WBGT, 2030 AND 2050**

Center	Country	2030	2050
Karachi	Pakistan	189.95	202.71
Colombo	Sri Lanka	144.52	157.76
Managua	Nicaragua	133.29	151.90
Port Louis	Mauritius	104.29	104.43
Dhaka	Bangladesh	64.81	104.48
Yangon	Myanmar	58.90	91.62
Delhi	India	55.14	75.00
Ho Chi Minh City	Viet Nam	55.14	97.76
Chattogram	Bangladesh	50.10	84.86
San Salvador	El Salvador	42.33	57.29
Bangkok	Thailand	42.19	74.48
Phnom Penh	Cambodia	41.38	75.05
Hanoi	Viet Nam	37.29	55.86
Dongguan	China	33.29	48.81
Shenzhen	China	33.29	48.81
Kuala Lumpur	Malaysia	22.86	57.10
Izmir	Türkiye	17.90	18.71
Tiruppur	India	15.38	29.14
Manila	Philippines	10.43	27.24
Jakarta	Indonesia	9.81	38.29
Ningbo	China	8.52	17.52
Monastir	Tunisia	6.67	11.24
Tangier	Morocco	2.05	2.48
Cairo	Egypt	1.52	4.24
Istanbul	Türkiye	0.86	1.29
Mexico City	Mexico	0.57	2.14
Taipei	Taiwan, China	0.48	1.90
Amman	Jordan	0.33	0.62
Prato	Italy	0.24	0.24
San Pedro Sula	Honduras	0.19	1.48
Blumenau-Florianopolis	Brazil	0.10	0.33

Sources: Schrodgers, WorldPop, World Resources Institute, Copernicus EU. Analysis undertaken in July 2023.

**TABLE 3. AVERAGE DAILY PRECIPITATION FOR 30 HEAVIEST RAINFALL DAYS, 2005 TO 2024**

Center	Country	Average daily precipitation in millimeters			
		2005–2009	2010–2014	2015–2019	2020–2024
Kuala Lumpur	Malaysia	45.1	44.4	44.7	46.2
Dhaka	Bangladesh	41.5	29.4	46.5	42.2
Colombo	Sri Lanka	44.4	44.3	43.4	41.5
Manila	Philippines	37.9	51.2	44.7	39.5
Yangon	Myanmar	20.2	34.2	32.1	39.1
Hanoi	Viet Nam	35.0	36.0	35.9	38.9
Dongguan	China	34.1	34.1	37.6	38.6
Jakarta	Indonesia	32.0	34.3	34.7	36.6
Phnom Penh	Cambodia	22.7	23.3	25.2	29.4
Ho Chi Minh City	Viet Nam	30.5	29.0	21.9	28.3
Bangkok	Thailand	26.8	24.9	25.4	25.8
Managua	Nicaragua	23.7	21.8	23.6	25.3
Delhi	India	21.0	21.4	18.6	23.7
San Pedro Sula	Honduras	15.1	15.0	16.2	18.3
San Salvador	El Salvador	15.1	15.0	16.2	18.3
Tiruppur	India	15.8	13.4	16.2	16.1
Izmir	Türkiye	17.0	20.8	19.0	15.8
Karachi	Pakistan	7.9	4.7	5.9	12.4
Prato	Italy	15.7	15.3	14.8	10.9
Monastir	Tunisia	10.8	9.7	11.9	8.2
Amman	Jordan	6.7	5.6	6.6	6.6
Cairo	Egypt	0.8	0.7	1.8	2.4
Mexico City	Mexico	2.9	1.9	1.8	0.8

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

Of the five focus cities, Dhaka had the most noticeable increase in precipitation on its rainiest days. Over recent years, Karachi—a coastal city with a tropical semi-arid climate—recorded significant swings in rainfall and consequent flooding. Only Ho Chi Minh City saw an overall decline in rainfall intensity.

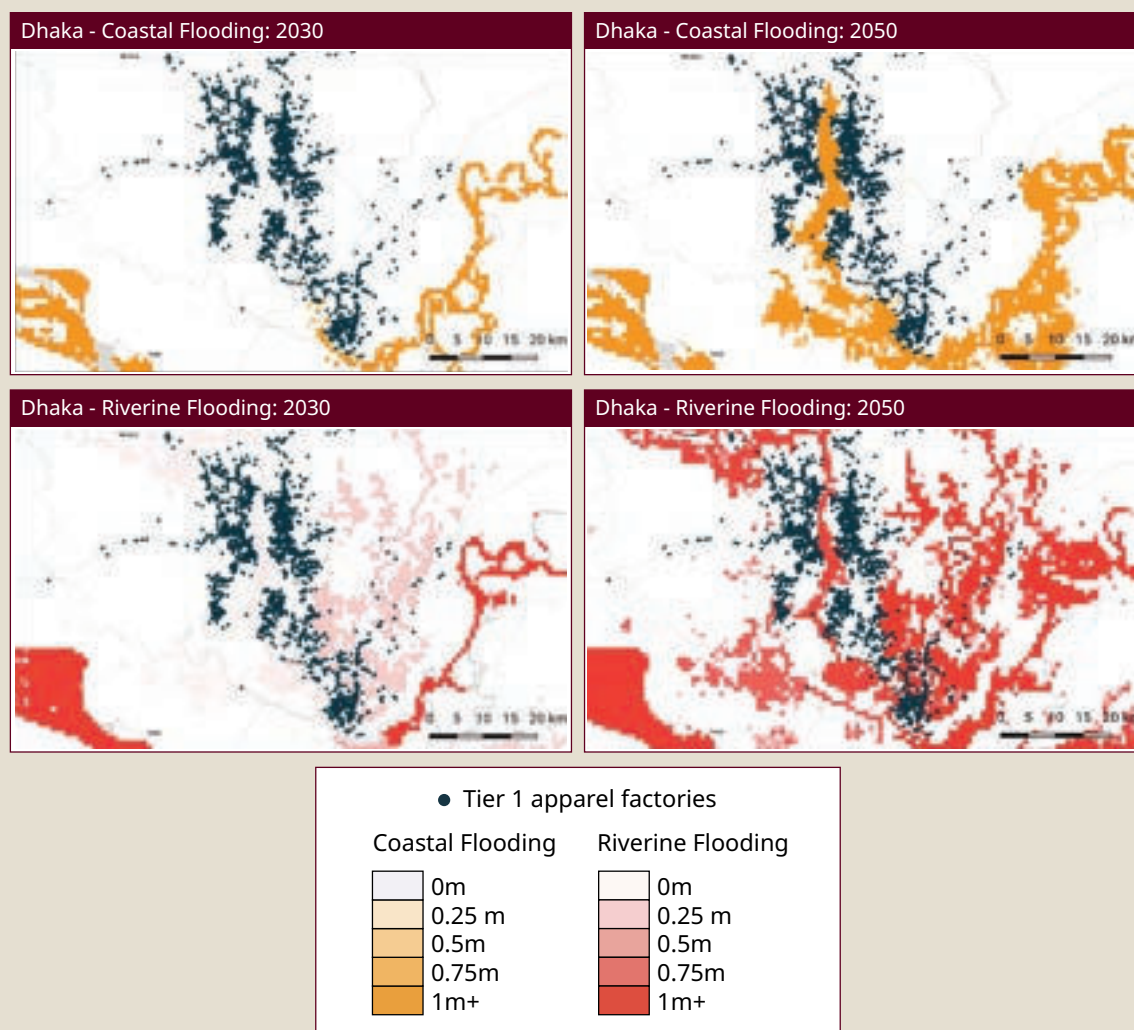
To gauge future risks for apparel production, the GLI research team used flood projection maps. In Figure 3, apparel factories in Dhaka are represented as blue dots, while the intensity and extent of projected rainfall flooding is shown in red and coastal flooding in gold.

The estimates in Figure 3 are based on the maximum ‘inundation depths’ from coastal and riverine flooding for two-year and ten-year events, or ‘return periods’ (RP2 and RP10). Worst-case flooding



(RP100 events) could impact approximately 27 percent of facilities in Bangladesh with flooding levels of 0.5 meter or more.⁹

FIGURE 3. PROJECTED COASTAL AND RAINFALL FLOODING LEVELS IN DHAKA, 2030 AND 2050



Sources: Schrodgers, WorldPop, World Resources Institute.

Note: Flooding based on RP-2 event (2030) and RP10 event (2050).

Looking at the larger set of production centers, a combination of flooding and high heat will make Colombo, Dhaka, Chattogram, Yangon, Delhi, Bangkok, Phnom Penh, and the Dongguan-Guangzhou-Shenzhen region highly vulnerable by 2030 (Judd et al. 2023). Most other production centers will experience high heat, flooding, or both, but at relatively lower levels.

⁹ In *Higher Ground?* The authors analyzed RP2, RP10, and RP100 events (also known as a once-in-a-century flood events). See: Boumis, G., Moftakhari, H. R., & Moradkhani, H. 2023. "Co-evolution of extreme sea levels and sea-level rise under global warming." *Earth's Future*, 11. and Slater, L., Villarini, G., Archfield, S., Faulkner, D., Lamb, R., Khouakhi, A., & Yin, J. 2021. "Global changes in 20-year, 50-year, and 100-year river floods." *Geophysical Research Letters*, 48.



2. Impacts of Extreme Heat and Intense Flooding

► Measuring economic risks for the apparel industry in 2030 and beyond

To estimate future impacts of climate change in the focus countries of Bangladesh, Cambodia, Pakistan, and Viet Nam, GLI researchers used detailed projections of flood inundation levels and translated these into days of factory-level disruption. The number of days over 30.5° Celsius WBGT in 2021 and projections for 2030 and 2050 were used to assess impacts on worker productivity and resulting changes in apparel export earnings and jobs. This information was then combined to calculate apparel export earnings and jobs under two different scenarios—one in which the industry invests in climate adaptation, and another with no adaptation measures.¹⁰

Under the no-adaptation scenario, the apparel industry in these four countries is projected to forego a combined total of \$65.8 billion in potential export earnings by 2030.¹¹ That translates to nearly 22 percent less in export earnings compared to the adaptation scenario, as shown in Table 4. Across the four countries, the apparel industry in the no-adaptation scenario would employ nearly 1 million fewer workers in 2030 than in the adaptation scenario.¹²

¹⁰ The jobs forgone calculation uses compound annual job growth rates and projected export earnings under adaptive and non-adaptive. The projections of employment growth in 2030 and 2050 are based on changes in annual earnings under the climate-adaptive scenario and annual growth rates in employment between 2015 and 2019. These job figures are then adjusted downward in the high heat-stress scenario using the ratio of export earnings between the climate-adaptive and heat-stress scenarios. It should be noted that employment data reporting for apparel and footwear is less robust than export earnings data. Where data is intermittent in ILOstat, industry association reports and annual statistical yearbooks, the authors interpolated employment levels for 2015 and 2019.

¹¹ In 2030 dollars.

¹² Instead of 13.9 million new jobs that could be created across the four countries in a climate adaptive scenario, only 12.96 million jobs would be created in a scenario where no action is undertaken (see Table 5).


TABLE 4. PROJECTED IMPACTS OF CLIMATE-RELATED HEAT AND FLOODING ON APPAREL EXPORT EARNINGS IN 2030 AND 2050

Country	Year	Export earnings with climate adaptation (USD)	Export earnings without climate adaptation (USD)	Projected forgone earnings with no adaptation (percent)
Bangladesh	2021 (Baseline)	\$46.55 B		
	2030	\$122.01 B	\$95.35 B	-21.85
	2050	\$1,038.22 B	\$328.11 B	-68.40
Cambodia	2021 (Baseline)	\$15.24 B		
	2030	\$35.64 B	\$28.92 B	-18.85
	2050	\$235.41 B	\$79.31 B	-66.30
Pakistan	2021 (Baseline)	\$9.07 B		
	2030	\$24.54 B	\$16.95 B	-30.92
	2050	\$224.35 B	\$43.76 B	-80.50
Viet Nam	2021 (Baseline)	\$56.99 B		
	2030	\$116.80 B	\$92.17 B	-21.09
	2050	\$575.46 B	\$197.85 B	-65.62
Totals	2021 (Baseline)	\$127.85 B		
	2030	\$298.99 B	\$233.39 B	-21.94
	2050	\$2,073.44 B	\$649.03 B	-68.70

Source: Cornell GLI analysis undertaken in July 2023.

The compounding effect of slower growth under the no-adaptation scenario produces bleak estimates for 2050, with export earnings 68.8 percent lower than in the adaptation scenario. The analysis also predicts that in these four countries, the employment levels in a no-adaptation scenario would be 8.64 million lower in 2050 than in the adaptive scenario, as shown in Table 5.

TABLE 5. PROJECTED IMPACTS OF CLIMATE-RELATED HEAT AND FLOODING ON JOBS IN THE APPAREL INDUSTRY IN 2030 AND 2050

Country	Year	Climate-adaptive scenario (jobs)	No-adaptation scenario (jobs)	Change	Change (percent)
Bangladesh	2021 (Baseline)	4.22 m.			
	2030	4.83 m.	4.58 m.	-0.25 m.	-5.18
	2050	6.31 m.	5.05 m.	-1.27 m.	-20.05
Cambodia	2021 (Baseline)	0.70 m.			
	2030	0.94 m.	0.89 m.	-0.05 m.	-5.54
	2050	1.70 m.	1.14 m.	-0.56 m.	-32.66
Pakistan	2021 (Baseline)	2.75 m.			
	2030	3.43 m.	3.14 m.	-0.30 m.	-8.63
	2050	5.37 m.	3.51 m.	-1.85 m.	-34.53



Country	Year	Climate-adaptive scenario (jobs)	No-adaptation scenario (jobs)	Change	Change (percent)
Viet Nam	2021 (Baseline)	2.97 m.			
	2030	4.70 m.	4.35 m.	-0.35 m.	-7.41
	2050	11.70 m.	6.75 m.	-4.94 m.	-42.26
Totals	2021 (Baseline)	10.64 m.			
	2030	13.9 m.	12.96 m.	-0.94 m.	-6.76
	2050	25.08 m.	16.45 m.	-8.63 m.	-34.41

Source: Cornell GLI analysis undertaken in July 2023.

Box 1 illustrates the potential economic impacts of extreme heat and flooding on brands and manufacturers with operations in Cambodia and Viet Nam, and how they could cause losses of up to 5 percent in annual profits in 2030 (Judd et al. 2023).

► BOX 1. A CASE STUDY QUANTIFYING THE COSTS OF EXTREME HEAT AND FLOODING FOR GLOBAL BRANDS

Public disclosures of a leading brand's sourcing volumes from Cambodia and Viet Nam were used to quantify the economic impacts of climate change. Calculations indicate that the effects of extreme heat and intense flooding could reduce the brand's operating profits by as much as five percent annually, with impacts compounding over time.

Calculation method: Sourcing data showed that the brand spent \$2.94 billion on inventory from 55 factories in Viet Nam in 2022. Assuming that all factories are of equal size and operate 297 days per year, this implies that roughly \$179,000 is spent on apparel or footwear in each factory per working day. The potential consequences of flooding and extreme heat can be analyzed via the cost of goods sold (COGS) and operating profits of a brand or supplier revenues. The value at risk was calculated using the expected number of business days interrupted by heat or flooding in 2030, scaled accordingly to falls in COGS or revenues.ⁱ

Flooding: Estimates for interrupted business days were calculated for three different flood inundation levels: 0.5 meters or less, between 0.5 and one meter, and over one meter. It was assumed these would cost three, six, and 12 business days respectively. Using these calculations, researchers found that RP10 flooding would interrupt roughly 56 days across the brand's suppliers in Ho Chi Minh City by 2030. Based on the daily factory spend, this translates to \$9.99 million in the cost of goods sold over the course of a year, which is equivalent to 0.34 percent of the brand's total sourcing spend in Viet Nam in 2022. Similar disruption losses can be calculated for other production regions in Viet Nam and Cambodia.

ⁱ In calculating the COGS by country, two key assumptions were made. First, based on discussions with industry experts, apparel gross margins were assumed to be approximately 55 percent, while footwear gross margins were estimated at around 47 percent. Second, the proportionate country volume disclosures provided by the brand were assumed to be equivalent in value terms. In other words, the value of sourcing spend was considered to mirror the volume of production by country.



Heat: Research indicates that heat stress begins to impact productivity at 28°C WBGT (Han et al, 2024), or for every increase of 1°C above 25°C WBGT, productivity for moderate effort in manufacturing decreases by an average of 1.5 percent (Hsiang, 2010). For this research, a 1.5 percent productivity decline is assumed on days on which temperatures fall between 28-29°C, while there is a 3.7 percent decline between 29-30.5°C, and so on. When aggregated, the productivity decline from heat loss in Ho Chi Minh City amounts to 2.57 percent of the brand's COGS in Viet Nam.

Similar assessments for the brand's production in the rest of Viet Nam and in Cambodia are used to calculate overall projected losses.

► Implications for workers

According to ILO estimates, every year at least 2.41 billion workers, or 70 percent of employees worldwide, are exposed to excessive heat.¹³ This results in almost 23 million occupational injuries and 18,970 fatalities annually (ILO 2024). Occupational illnesses caused by heat stress range from mild to severe, as shown in Table 6, and can even be fatal.

The adverse impacts of heat stress and floods on workers' health and ability to earn an income disproportionately affect women, who make up the majority of the apparel industry's workforce. Heat-

TABLE 6. EXAMPLES OF HOW HEAT STRESS CAN IMPACT OCCUPATIONAL HEALTH AND SAFETY

Mild effects	Serious effects	Other
• Heat fatigue • Miliaria or heat rash • Heat syncope • Heat cramp • Heat edema	• Heat exhaustion • Heatstroke • Fluid/electrolyte disorders • Cardiovascular impacts/disease • Respiratory impacts/diseases • Acute/chronic kidney injury	• Depression • Anxiety • Suicide • Accidents and injuries

Sources: ILO 2024; NIOSH 2022, Flouris et al. 2018; De Blois et al. 2015; Moyce et al. 2018; Amoadu et al. 2023.

and flood related illnesses and the unpredictability of work schedules are exacerbated by the additional unpaid care work and daily stress that falls mainly on women, making it even more important to consider the voices of female workers when agreeing on production schedules and other ways to adapt to climate risks. Particular attention should be paid to pregnant women and breastfeeding mothers, for whom access to potable drinking water is critical—both for their own health and the health of their children.

In addition to adverse health impacts, heat stress also interferes with productivity and workers' abilities to earn an income. As shown in Box 2, apparel workers in Dhaka reported missing three full days of work per month due to heat and flood-related illness in the hottest and rainiest quarter

¹³ Maintaining a core body temperature of around 37°C is essential. If this rises above 38°C, physical and cognitive functions are impaired, while core body temperatures above 40.6°C sharply increase the risk of organ damage, loss of consciousness, and even death (Smith et al., 2014).



► BOX 2. VOICES FROM THE FACTORY FLOOR

Climate change is already taking a toll on workers in the apparel sector. Apparel workers in Bangladesh say high heat and flooding are steadily worsening, and this not only hurts their productivity, it also causes health problems, drives up medical and electricity costs, longer commuting times, and impacts their purchasing power.

"The flood water becomes contaminated, and we have to wade through it to get to the factory. It's a risky situation," said Sumaiya, a worker in Dhaka, "This is causing people to fall ill, including me and my children, and it increases our medical costs a lot."

Ayesha, who also works in Dhaka, says extreme weather conditions put her and her family at risk of fevers, diarrhea, and colds. She says factory supervisors need to do more to support workers impacted by climate change.

"When the hot season arrives, it is very difficult to work, but we have to, even if we are unwell," said Ayesha. "When we have floods, water enters into our house."

Several factory workers said they often arrive at their workplaces soaked by rain and have to work in wet clothing. Hot and humid conditions also mean workers need to run fans to sleep at night, increasing electricity costs.

"It is hot at the factory. It is hot at home," says factory worker Shahjahan. "I get home from work at 10pm and often there's no electricity. We become sick mainly because of the heat."

Source: Cornell University, 2024. "Higher Ground? Fashion's climate breakdown and its Effect for Workers: Case Stories." ([Video](#))

of the year, resulting in a 10 percent drop in their incomes. Some had to take out high-interest loans to buy medicine or fans to sleep on hot nights (Judd et al. 2023).¹⁴

To complement ILO's research, GLI grouped four key climate risks among low-wage workers in 21 apparel production centers, as illustrated in Table 7. Among this group of producer countries, workers in Bangladesh are the most climate-vulnerable while workers in China are the least vulnerable. The climate vulnerability ranking uses ND-GAIN's index of a country's exposure, sensitivity and capacity to adapt to the negative effects of climate change. Alongside this ranking, GLI shows complementary measures of climate readiness—a country's ability to leverage investments and convert them to adaptation actions—plus the share of each country's population covered by at least one social protection cash benefit program and workers' wages represented in local purchasing power (PPP).

¹⁴ Apparel workers estimated spending \$31 for medicine and \$18 for electricity at home in the hottest months when fans are needed to sleep.


TABLE 7. CLIMATE VULNERABILITY AND READINESS, EARNINGS, AND SOCIAL PROTECTION, BY COUNTRY

Country	Climate vulnerability score	Climate readiness score	Average manufacturing wage (PPP\$)	Social protection coverage (percent)
Bangladesh	0.55	0.28	389.11	22.0
Myanmar	0.51	0.25	511.05	6.3
Pakistan	0.50	0.31	517.19	20.2
Cambodia	0.48	0.29	665.59	20.8
Sri Lanka	0.47	0.38	470.73	41.3
Nicaragua	0.46	0.27	917.34	15.3
Viet Nam	0.46	0.43	1,094.09	38.3
India	0.45	0.40	827.23	48.8
Honduras	0.45	0.26	1,122.11	30.1
Philippines	0.44	0.34	725.79	34.9
Indonesia	0.43	0.40	575.91	54.3
El Salvador	0.42	0.34	632.75	18.8
Thailand	0.41	0.49	1,445.47	70.1
Egypt	0.40	0.35	715.76	36.6
Tunisia	0.38	0.44	701.91	53.8
Mexico	0.37	0.36	857.25	80.8
Jordan	0.37	0.41	990.73	26.6
Malaysia	0.36	0.51	1,617.15	29.2
Türkiye	0.36	0.49	1,782.69	64.0
China	0.35	0.56	1,327.95	75.6

Notes: Vulnerability is ranked from 0-1, with lower being better. Readiness is ranked from 0-1, with higher being better. Social protection is a percentage of the total population, with 100 the best possible number.

Sources: University of Notre Dame-Global Adaptation Initiative; ILO World Social Protection Report, 2024-26; ILOSTAT data explorer.

Countries where workers have low purchasing power and below average levels of social protection, such as Bangladesh, Myanmar, Pakistan, and Cambodia, also have high climate vulnerability and low climate readiness scores. Workers in Honduras and Nicaragua have relatively higher purchasing power, but their vulnerability scores remain high, their readiness scores low, and they also have low social protection. Workers in Thailand, China, and Türkiye fare better due to higher wages, better social protection schemes, stronger climate readiness, and lower climate vulnerability.



3. International, National, and Voluntary Standards on Heat Stress

The ILO, World Bank, IFC, and the International Organization for Standardization (ISO), have all introduced new international standards on heat stress. A growing number of national policies, laws, and initiatives have also been put in place recently with the aim of addressing the impact of heat stress on workers. In parallel, global brands are adopting voluntary standards for their suppliers—including in countries where Better Work operates.

► International standards

In 2021, ILO adopted a new [code of practice](#) for health and safety in the textiles, clothing, leather and footwear industry. The code defines heat stress as situations when:

- temperature and/or humidity are unusually high, with limited movement of air;
- workers are exposed to high radiant heat;
- high temperatures and/or humidity occur in combination with the use of protective clothing, physical exertion, or a high work rate;
- workers do not have access to, or drink, sufficient water.

In 2022, ILO recognized a [safe and healthy working environment](#) as a fundamental principle and right. Heat-related standards are part of this commitment. Governments are adopting ILO standards on workplace health and safety, including its long-standing guidance that “a competent authority should establish maximum and minimum standards of temperature,” and “all appropriate measures should be taken by the employer” to avoid excessive humidity and heat (ILO 1953).

The World Bank Group provides specific guidelines for [textile manufacturing](#), and this includes how heat can pose an occupational health and safety hazard. Since 2006, IFC has developed



Performance Standards that set internationally recognized benchmarks for sustainably managing environmental and social risks across industries. These standards apply to companies receiving financing from IFC. Other financial institutions that are signatories to the so-called 'Equator Principles' also use IFC's performance standards.

A [guidance note](#) on IFC Performance Standards for Labor and Working Conditions specifies that excessive temperatures pose a workplace hazard. It references World Bank Group [environmental, health, and safety guidelines](#) that recommend the use of engineering controls and ventilation to avoid extreme temperatures in permanent work environments. Where this is not possible, it recommends employers:

- adjust work and rest periods according to guidelines set by the American Conference of Governmental Industrial Hygienists;
- provide workers with temporary shelter to protect against the elements during work activities or rest breaks;
- provide workers with easy access to adequate hydration such as clean water or electrolyte drinks and avoid consumption of alcoholic beverages.

ISO, a worldwide federation of national standards bodies, provides internationally recognized guidelines for assessing and managing heat exposure in workplaces. Key standards include [ISO 7243](#), which uses the WBGT index to evaluate heat stress, [ISO 7933](#), which predicts physiological strain and limits of tolerance, and [ISO 9886](#), which outlines methods for measuring physiological responses such as core temperature, heart rate, and sweat rate. Together, these standards are intended to help companies and organizations set safe exposure limits, design preventive measures, and protect workers from heat-related risks.

New international standards are adopted in the context of an increased focus on cooling as part of global efforts in climate mitigation and adaptation. Since 2023, over 70 countries signed the [Global Cooling Pledge](#), which introduced global targets to reduce cooling-related emissions by 68 percent by 2050 and to significantly increase access to sustainable cooling by 2030. The United Nations Environment Programme (UNEP) has been leading the Cool Coalition, a steering group of both state and non-state actors who have signed the pledge, working together to operationalize its commitments.

► National standards

In 2024, ILO published *Heat at Work: Implications for safety and health*, which includes an analysis of national legislation on 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 8.

In countries where Better Work is active and where legislation on heat stress exists, Better Work assesses whether apparel manufacturers comply with these requirements.

In **Viet Nam**, the [Occupational Safety and Health Law](#) of 2015 requires employers to regularly inspect and meet requirements for steam, heat, moisture, and other factors. The 2016 [Technical Regulation on Microclimate](#) provides specific requirements for heat and humidity, and limits the



amount of time that workers are exposed to heat and humidity based on their level of effort and the wet-bulb temperature in the workplace, as shown in Table 9. For example, employees in a garment factory are classified as engaging in ‘medium work’ and are therefore permitted to work continuously at wet-bulb readings of 26.7°C WBGT or lower. But at 28°C wet-bulb, workers should rest 25 percent of the time, which would translate to 15 minutes of rest in an hour.

TABLE 8. 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 20.7–24.7°C for ‘very high intensity’ work
China	Air temperature	37–39°C is considered ‘high risk’ 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, 32°C for ‘medium’ effort, 30°C for ‘heavy’ work
Thailand	WBGT	34°C for ‘low intensity’ work, 32°C for ‘moderate’ work, 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.

TABLE 9. INDOOR WBGT TEMPERATURE THRESHOLDS FOR MANUFACTURERS IN VIET NAM

Heat exposure duration	Temperature Thresholds (WBGT)		
	Light work	Medium work	Heavy work
Continuous	30.0	26.7	25.0
75%	30.6	28.0	25.9
50%	31.4	29.4	27.9
25%	32.2	31.4	30.0

Source: Viet Nam Ministry of Health.

In **Bangladesh**, the [Labour Act of 2006](#) requires ‘adequate ventilation’ and ‘comfortable temperatures’ for workers. The 2015 Bangladesh Labour Rules provide further specifics such as opposite facing windows for ventilation, exhaust fans where ventilation is not possible and at least one thermometer in every workroom in operation with proper standards.¹⁵ The law does not specify temperatures or thresholds, and unregulated third parties often certify compliance. The Accord on Fire and Building Safety—agreed by unions and apparel buyers in 2013 after the deaths of more than 1,100 apparel workers in the Rana Plaza fire—requires that manufacturers ensure the health and safety of workers, but indoor heat is excluded from its remit.

¹⁵ Rule 45 of [Bangladesh Labour Rules 2015](#)



In **Jordan**, regulations state that employers must take necessary precautions to preserve the safety and health of employees who are required to work in exceptional weather conditions.¹⁶ In exceptional weather conditions, the hours during which work is prohibited may be determined by a ministerial decision.¹⁷

In **Cambodia**, Better Work uses a dry-bulb thermometer to obtain consistent and reliable readings in the hottest production areas of all exporting apparel, travel goods, and footwear factories in the country.^{18,19,20} As Cambodia does not have specific regulations on heat stress, Better Work considers 32°C to be the high-heat level in factories.²¹ Findings from over 800 assessments conducted during the hottest months of March, April, and May from 2015 to 2024 indicate:

- 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.

► BOX 3. EXAMPLES OF BETTER WORK COUNTRY INITIATIVES

In **Cambodia** Better Work is known as Better Factories Cambodia. It has worked with the Ministry of Labour and Vocational Training to develop a joint action plan for 2025-2026 that includes steps to prevent and address heat stress in the workplace. It is also advocating for temperature regulations to be incorporated into Cambodian labor laws. These include the establishment of heat stress indicators and maximum temperature thresholds within a regulation (*Praskas*), to be issued alongside the country's new Occupational Safety and Health Law in 2026.

Better Work **Bangladesh** prepared awareness raising materials on heat waves and conducted a webinar on heat stress management. It also partnered with a Bangladesh-based occupational safety, health, and environment foundation to share knowledge and peer learning on ways to ensure worker health and safety during heat waves.

In **Viet Nam**, Better Work is collecting information on the impacts of high temperatures on workers and productivity levels, and on adaptation measures among participating apparel and footwear factories. This information will be used to develop advisory and training activities for factories.

¹⁶ Regulation No. 31 of 2023 on the occupational safety and health system and prevention of occupational hazards in institutions.

¹⁷ In June 2025, Better Work paused its operations in Jordan.

¹⁸ In Cambodia, the Better Work program is called Better Factories Cambodia (BFC).

¹⁹ Temperature readings are typically taken between 12:00-14:00, both indoors and outdoors.

²⁰ Participation in BFC is voluntary for footwear factories as not all exporting footwear factories are required to register with BFC. The most recent mandatory requirement for BFC participation applies to all exporting travel goods and bag factories.

²¹ The 32°C threshold that BFC uses is a dry bulb measurement, not WBGT.



► Voluntary industry standards

Better Work has formal partnerships with 48 global brands and retailers. Most global brands and retailers have supplier codes of conduct on working conditions. Some of these codes include guidelines for drinking water accessibility, but most do not include specific requirements that protect workers during extreme climate events and only a handful have clear heat thresholds. Prominent multi-stakeholder initiatives for the industry currently lack specific heat thresholds, including the Fair Labor Association, the International Accord, the Bangladesh Ready-Made Garments Sustainability Council, and the Social and Labor Convergence Program.

While temperature-specific standards are not yet widespread in the industry, a growing number of brands such as Nike, Levi Strauss & Co., and VF Corporation require suppliers to have protocols connected to high temperatures. For example, they require suppliers to provide workers with access to shade or cooler environments as well as rest breaks during high temperatures. See Box 4 for more details.

► BOX 4. GLOBAL BRAND INITIATIVES ON HEAT STRESS IN THE WORKPLACE

In 2011, **Levi Strauss & Co.** launched its Worker Well-being initiative across its global supply chain, based on the belief that a healthy, satisfied, and engaged workforce leads to improved business performance. The initiative identifies the workplace environment as one of the key drivers of worker well-being. Guidelines require suppliers to uphold and improve the physical conditions that protect and advance worker health by regularly consulting workers' opinions on workplace temperature and ventilation and providing access to drinking water. It says workers should be consulted about the best ways to organize production, ensuring that work schedules are more predictable and provide sufficient rest time. The company's [guidebook](#) and tools are publicly available.

VF Corporation developed [Facility Compliance Standards](#) for its manufacturing partners/suppliers, based on its [Global Compliance Principles](#) for auditing and monitoring apparel production facilities 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. 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

Like VF Corporation, **Nike** has established specific heat thresholds to protect workers from excessively high temperatures. According to the [Nike Code Leadership Standards](#), its facilities must develop and implement processes to reduce or eliminate risks associated with heat stress in the workplace. The code outlines requirements, policies, and procedures on factors such as:



- **Hydration:** Facilities must provide access to sufficient potable drinking water to supply each worker with up to one liter per hour, with ice made available when temperatures exceed 30°C.
- **Shade and recovery:** Shade must be accessible within 200 meters or a five-minute walk, and workers must be allowed preventative recovery periods if they feel the need for rest or show signs of heat-related illness.
- **Safe temperatures:** Work environments should maintain safe and comfortable temperature ranges of 16–30°C for sedentary work and 13–27°C for physically-exertive work.
- **Protective clothing:** Employers must consider the impact of protective clothing or equipment on a worker's ability to manage heat.
- **Medical response:** Procedures must be in place to respond promptly to symptoms of possible heat illness, including contact with emergency medical services.
- **Training:** Workers and supervisors must be trained to recognize, prevent, and respond to heat stress.



4. Investing in Cooling

► Investing in active and passive cooling

The cooling market in developing economies is expected to grow from roughly \$300 billion to at least \$600 billion annually by 2050.²² Most of this growth will come from active cooling solutions while passive measures are expected to account for about 10 percent of the market.

Active cooling includes mechanical systems that require external power to cool factory workspaces. These include low-energy active systems or technologies that provide significant cooling with a much lower energy footprint than traditional air conditioning, for example. They are often the most cost-effective solution for cooling large industrial spaces. These solutions include industrial evaporative coolers, which use the evaporation of water to cool air, and high-volume, low-speed fans, which create a cooling breeze over a large area with minimal energy use.²³ High-energy active systems are dominated by conventional compressor-based air conditioning. While highly effective at cooling and dehumidifying, high capital and operational costs, coupled with immense energy consumption, often make it prohibitively expensive and impractical for cooling large-scale factory floors, especially in regions with constrained energy supplies.

Passive cooling focuses on low-energy, high-impact solutions for the factory building itself, such as high ceilings, large windows that maximize ventilation, and 'green' roofs that reduce the

²² Cooler Finance, Mobilizing Investment for the Developing World's Sustainable Cooling Needs, IFC and UNEP, September 2024.

²³ While evaporative cooling is a common and low-cost solution for cooling factories, factory management in Bangladesh regularly reports that during the monsoon season or on rainy days, increased humidity causes fabric to absorb moisture, and negatively affects product quality. Evaporative cooling is not suitable for all production processes, factory types, or product categories.



baseline heat load. These strategies work by preventing solar heat from entering the building and facilitating the dissipation of internally generated heat without significant energy consumption. They are foundational measures that make all other cooling efforts more effective.

Strategies like reflective surfaces, shading and reduced window areas, when combined have payback periods between 2–4 years. In India, for example the payback period for external reflective surfaces and shading systems is between one to two years. In Viet Nam, payback periods for solar reflective roofs and solar reflective walls are three and 4.5 years respectively.²⁴ IFC's EDGE App can help project owners and developers understand the best options to achieve thermal comfort while reducing their energy footprint and energy bills.

Apparel manufacturers in high-heat climates have already begun investing in ways to cool working areas, often as part of relocating to purpose-built facilities. Better Work staff observed an increase in the number of apparel manufacturers in Bangladesh, Cambodia, Egypt, Nicaragua, and Viet Nam implementing cooling initiatives.²⁵

For example, over half of the factories visited by Better Work in **Egypt** had a fan at workstations, while 37 percent had a fan at each workstation, as well as ceiling fans and exhaust fans. Fifteen percent had evaporative cooling systems.

In **Nicaragua**, over half of the factories visited by Better Work only had workstation fans, and 60 percent of that group also had ceiling and exhaust fans. Slightly more than one-third of factories that were visited had evaporative cooling systems.

In **Viet Nam**, a majority of factories use a combination of multiple ventilation solutions and cooling measures, including water evaporative coolers, fans at each workstation, exhaust fans, ceiling fans, and general wall ventilations. Participating factories are also proactively applying integrated adaptive measures and solutions.

In **Pakistan**, a major textile and apparel manufacturer invested in a combination of exhaust fans, refrigerant air-cooling systems, and evaporative air-conditioners. These solutions kept average monthly indoor temperatures between 27 to 31°C in the three hottest months of 2022, within the legal thresholds for manufacturing work. The investments were also relatively energy-efficient, with energy consumption during the peak heat months of April, May, and June 2022 only 6.2 percent, 7.5 percent, and 19 percent greater than the factory's monthly average for the whole year.

In **Cambodia**, a large-scale apparel manufacturer invested in an evaporative cooling system, exhaust fans, 13-meter ceilings, and a heat shield on its roof. This enabled the factory to keep recorded dry-bulb temperatures below 32°C.

24 Cooler Finance, Mobilizing Investment for the Developing World's Sustainable Cooling Needs, IFC and UNEP, September 2024, Box 3.5.

25 The data collection methodology is detailed in Annex 1.



► IFC initiatives on cooling

Since 2013, IFC has been implementing programs to enhance resource efficiency and minimize environmental impacts in the textile and apparel industry, including through the IFC's flagship [Partnership for Cleaner Textile \(PaCT\)](#) program. The program aims to reduce environmental impact and improve the competitiveness and sustainability of the Bangladesh's textile and apparel sector. Over the past decade, this work has highlighted clear returns on investments in adaptation and economic gains from taking proactive measures to promote resource efficiency in the textile and apparel industry.

Now active in Bangladesh, India and Sri Lanka, PaCT offers a wide range of factory-level advisory services—covering resource efficiency and decarbonization—to support continuous improvement and lower water, energy, greenhouse gas emissions, and chemical use. While the program promotes resource efficiency more broadly, specific recommendations on reducing heat loss can reduce indoor temperatures, as shown in Box 5.

► BOX 5. IFC'S PARTNERSHIP FOR CLEANER TEXTILE (PaCT)

At Comfit Composite Knit Ltd., an apparel factory in Bangladesh, three gas generators provide electricity for the operation of various equipment. The gas generators are connected to an exhaust gas boiler which recovers heat from the exhaust to produce steam for the pressing section.

Before PaCT's advisory engagement, the exhaust gas boiler and the connect pipes were uninsulated and a surface temperature of more than 100° C was observed at the factory, causing substantial heat loss. Following recommendations from the PaCT program, the factory insulated its pipes and boiler, using materials such as glass wool with aluminum cladding and resin-bonded rock wool. As a result, it significantly reduced heat loss, lowered energy consumption, increased annual savings, and improved indoor air temperature, contributing to better working conditions.

Source: [IFC case study](#) (2022)

Since 2015, IFC's [EDGE](#) ("Excellence in Design for Greater Efficiencies") Green Buildings Program, a free software and internationally recognized green building standard, reached more than 120 million square meters of green floor space across 122 countries.

It includes a cost calculator that guides users through passive and active cooling and other energy efficiency measures to understand which technical measures will yield the best results. The EDGE App includes an option to model the building not only as it is today, but also in the future by overriding temperature data with future projections.

The EDGE App models projected cooling load needed for workers' comfort, with suggestions to reduce the energy spent on cooling. For each suggested measure, the EDGE App provides a cost / benefit ratio and payback period, matching upfront costs with utility costs savings. This type of comparison of costs and benefits can be used by policy makers to understand which measures



would be most effective and can be included in revised building codes and factory construction standards.

Since 2019, IFC has been working with the private sector to design, pilot, de-risk, and scale new cost-effective, efficient, climate-smart cooling solutions for emerging markets, as shown in Box 6. These solutions are relevant across industries, including the textile and apparel industry.

Finally, IFC's [Building Resilience Index](#) is a web-based natural hazard mapping and resilience assessment framework for the building sector. It is designed to facilitate access to location-specific hazard information, provide resilience measures to mitigate applicable risks, and improve transparency for disclosing a building's resilience information between sector stakeholders. Building Resilience Index makes it easy for building sector stakeholders, including construction developers, financial institutions, insurers, and governments to assess, improve, and disclose the resilience of buildings.

► BOX 6. IFC COOLING INITIATIVES

From 2019 to 2024, IFC's [TechEmerge](#) program matched 40 competitively-selected cooling innovators from across the world with 51 leading corporates in Bangladesh, Colombia, Ecuador, India, Kenya, Mexico, Nigeria, Rwanda, Türkiye, and Viet Nam. Backed by grant funding and IFC technical and market expertise, these partners field-tested more than 80 new sustainable cooling solutions on the ground in real world conditions.

Nearly two-thirds of the completed pilots reported reductions in energy consumption and greenhouse gas emissions ranging from 15 to 100 percent. In addition, approximately three-quarters of the pilots achieved cost savings of similar magnitudes. The program focused on cooling in cities, retail cold chains, temperature-controlled logistics, space cooling, and cooling-as-a-service business models.

In 2024, IFC and the UK Department for Energy Security and Net Zero leveraged learnings from TechEmerge to launch an expanded [Sustainable Cooling Initiative](#). This program aims to help emerging market countries and their private sectors to lower emissions from cooling and take action to adapt to extreme heat. In addition to scaling innovative technologies and business models, the initiative also focuses on transformative cooling systems for district cooling, space cooling, cold chains, and innovations for manufacturing and agribusiness, as well as improving access to finance for consumers and small and medium enterprises to meet their cooling needs. In 2025, IFC began to explore if and how its Sustainable Cooling Initiative can support aggregate demand for financing among apparel manufacturers.

Factories that meet international sustainability standards, whether by upgrading existing buildings or constructing new ones, can qualify for sustainable finance. IFC's [Sustainable Buildings: Finance Reference Guide](#) offers a clear, step-by-step process to help building owners and managers design investment programs. The guide covers different types of sustainable finance, such as green, blue, nature-based, and circular finance. It also highlights benefits such as lower interest rates on sustainability-linked loans for investments that achieve decarbonization targets. Certification through this process can further boost a company's global competitiveness.



5. Recommendations

Despite alarming projections for 2030 and 2050, actions taken now can still alter these outcomes. 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. This may include earlier start times and different work schedules, longer rest breaks, better access to potable drinking water, and training in symptoms of heat-related illnesses and appropriate first aid. Governments can also require manufacturers to collect and disclose heat and humidity levels. Instead of auditors measuring heat levels once per day, Wi-Fi-enabled sensors could deliver accurate heat and humidity readings in real-time. Utilize tools such as IFC's EDGE and Building Resilience Index to understand the best technical measures for each local context.
- **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 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. Particular attention should be paid to the needs of women, especially pregnant women and breastfeeding mothers.



- **Treat heat stress and floods as health hazards:** In most apparel producing countries, workers receive minimum wages and many cannot afford safe transport, sufficient clean drinking water, proper meals, or fans to sleep during hot nights. This negatively impacts their health and productivity. 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.

Along with these strategies, there is an urgent need for effective public awareness campaigns that highlight the dangers of working in unhealthy conditions. Better Work is playing its part globally, including by advocating for regulations in Cambodia, conducting surveys of temperatures and productivity levels in Viet Nam, and providing guidance to manufacturers and brands in Bangladesh.



► References

- Bach, A. J., Palutikof, J. P., Tonmoy, F., Hossain, M., & Joarder, A. R. (2022). *Adaptation to present-day and future thermal stress in a Bangladesh ready-made garment factory*. <https://research-repository.griffith.edu.au/handle/10072/417015>
- Boumis, G., Moftakhari, H. R., & Moradkhani, H. (2023). "Co-evolution of extreme sea levels and sea-level rise under global warming." *Earth's Future*, 11, e2023EF003649. <https://doi.org/10.1029/2023EF003649>
- Copernicus Climate Change Service, Climate Data Store. (2023): ERA5 hourly data on single levels from 1940 to present. Copernicus Climate Change Service (C3S) Climate Data Store (CDS), DOI: 10.24381/cds.adbb2d47 (Accessed on 30-09-2024)
- Dayal, S. and Singh, P. "Indian capital swelters as temperature hits all-time high of 52.9°C." *Reuters*. May 30, 2024. <https://www.reuters.com/world/india/india-issues-heat-wave-alert-delhi-posts-record-high-temperature-2024-05-29/>
- Dell, M., Jones, B. F., & Olken, B. A. (2012). "Temperature shocks and economic growth: Evidence from the last half century." *American Economic Journal: Macroeconomics*, 4(3), 66-95.
- European Commission. (2022). Directive (EU) 2022/2464 of the European parliament and of the Council amending regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022L2464>
- Flouris, A., Azzi, M., Graczyk, H., Nafradi, B., and Scott, N., eds. (2024). *Heat at Work: Implications for Safety and Health. A Global Review of the Science, Policy and Practice*. ILO. https://www.ilo.org/sites/default/files/2024-07/ILO_OSH_Heatstress-R16.pdf
- Han, S., Dong, L., Weng, Y. et al. (2024). "Heat exposure and productivity loss among construction workers: a meta-analysis." *BMC Public Health* 24, 3252. <https://doi.org/10.1186/s12889-024-20744-x>
- Hsiang, S. M. (2010). "Temperatures and cyclones strongly associated with economic production in the Caribbean and Central America." *Proceedings of the National Academy of Sciences of the United States of America*, 107(35), 15367–15372. <https://doi.org/10.1073/pnas.1009510107>
- IFC and UNEP. (2024). *Cooler Finance: Mobilizing Investment for the Developing World's Sustainable Cooling Needs*. <https://www.ifc.org/en/insights-reports/2024/mobilizing-investment-for-the-developing-world-s-sustainable-cooling-needs>
- IFC. (2025). *Sustainable Buildings: Finance Reference Guide*. <https://www.ifc.org/en/insights-reports/2025/sustainable-buildings-finance-reference-guide>
- International Labour Organization (ILO). (1953). *Protection of workers' health recommendation*, 1953 (no. 97). https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_INSTRUMENT_ID:312435#:~:text=1.,risks%20of%20injury%20to%20health



International Labour Organization. (2019). *Working on a warmer planet: the impact of heat stress on labour productivity and decent work*. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_711919.pdf

International Labour Organization. (2022). Resolution on the inclusion of a safe and healthy working environment in the ILO's framework of fundamental principles and rights at work. https://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_848632.pdf

International Labour Organization. (2023). Heat Stress Legislation in Qatar. Available at: https://www.ilo.org/wcmsp5/groups/public/---arabstates/documents/genericdocument/wcms_794519.pdf

Judd, Jason, Wakamo, Brian, Evans, Colin P., & Kuruvilla, Sarosh. (2024). *Hot Air: How will fashion adapt to accelerating climate change?* Global Labor Institute, Cornell University. <https://www.ilr.cornell.edu/sites/default/files-d8/2024-12/gli-hot-air-4-december-2024.pdf>

Judd, Jason, Bauer, Angus, Kuruvilla, Sarosh and Williams, Stephanie. (2023). *Higher Ground? Report 1: Fashion's Climate Breakdown and Its effects for Workers*. Global Labor Institute, Cornell University.

Judd, Jason, Bauer, Angus, Kuruvilla, Sarosh and Williams, Stephanie. (2023). *Higher Ground? Report 2: Climate Resilience and Fashion's Costs of Adaptation*. Global Labor Institute, Cornell University.

Tord Kjellstrom, Ingvar Holmer & Bruno Lemke (2009) Workplace heat stress, health and productivity – an increasing challenge for low and middle-income countries during climate change, *Global Health Action*, 2:1, 2047, DOI: 10.3402/gha.v2i0.2047

Kuruvilla, Sarosh. (2021). *Private regulation of labor standards in global supply chains: Problems, progress, and prospects*. Cornell University.

Malaysia Ministry of Human Resources. (2016). Guidelines for heat stress management at workplace 2016. <https://intranet.dosh.gov.my/index.php/competent-person-form/occupational-health/regulation-2-1/guidelines/industrial-hygiene-1/2017-guidelines-heat-stress-management-at-workplace>

Schwingshackl, C., Sillmann, J., Vicedo Cabrera, A. M., Sandstad, M., & Aunan, K. (2021). "Heat stress indicators in CMIP6: estimating future trends and exceedances of impact relevant thresholds." *Earth's Future*, 9(3), e2020EF001885.

Slater, L., Villarini, G., Archfield, S., Faulkner, D., Lamb, R., Khouakhi, A., & Yin, J. (2021). "Global changes in 20-year, 50-year, and 100-year river floods." *Geophysical Research Letters*, 48, e2020GL091824. <https://doi.org/10.1029/2020GL091824>.

Smith, K.R., A.Woodward, D. Campbell-Lendrum, D.D. Chadee, Y. Honda, Q. Liu, J.M. Olwoch, B. Revich, and R. Sauerborn. 2014. "11: Human health: Impacts, Adaptation, and Co-Benefits". In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the*



Intergovernmental Panel on Climate Change, edited by Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White, pp. 709-754.

https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap11_FINAL.pdf

Somanathan, E., Somanathan, R., Sudarshan, A., & Tewari, M. (2021). "The impact of temperature on productivity and labor supply: Evidence from Indian manufacturing." *Journal of Political Economy*, 129(6), 1797-1827.

Visual Crossing Corporation. (2024) Visual Crossing Weather (2000-2024). [data service].

Retrieved from <https://www.visualcrossing.com/>

World Resources Institute. (2023). Data. https://www.wri.org/data?_gl=1*7g6ikj*_up*MQ..&gclid=CjwKCAjw_aemBhBLEiwAT-98FMkjdnvL6s5bBLzB6HkWKDpMUoFb8KzZZ_1Asi2Hvz3R54umu0NvdzhoC54MQAvD_BwE



► Annex 1

As part of this note, the research team gathered inputs from Better Work Enterprise Advisors at ILO in five Better Work program countries: Bangladesh, Cambodia, Egypt, Nicaragua, and Viet Nam. These advisors regularly visit factories, provide advisory support, and observe working conditions, giving them unique insights into workplace practices such as temperature, ventilation, and heat-stress mitigation.

Conducted with representatives of ILO's Enterprise Advisors from the selected five Better Work country offices, data collection combined focus group discussions guided by open-ended questions and a structured online survey. Together, these methods captured both qualitative observations and quantitative estimates on cooling methods, temperature monitoring, worker complaints, coping strategies, schedule adjustments, and the impacts of heat on productivity.

This exercise was designed to capture anecdotal perspectives from Enterprise Advisors rather than to produce statistically representative findings. The information reflects the advisors' observations in the factories they personally assess or advise and should not be interpreted as representative of all factories in the countries studied, nor of factories in other Better Work countries. The findings are therefore illustrative, providing examples of current practices, challenges, and emerging trends in managing heat stress in apparel factories, as observed by the advisors in their day-to-day work.

► Questions for focus group discussions and online survey

I. Questions for focus group

The questions below are related to the factories you assess/advise.

1. What are the most common actions factories take to reduce workplace temperature?
2. What are common actions that factories take to help workers manage health issues related to high temperatures?
3. Have you observed worker complaints about excessive heat or heat stress?
4. Could you estimate the percentage of factories that protect adequately against heat, cold, and dampness?
5. Could you estimate the percentage of factories that maintain acceptable levels of temperature and ventilation? How do you decide if the temperature is acceptable?
6. Can you estimate how much more slowly workers produce when the heat is at its highest?

II. Questions for online survey

Basic Information:

1. Country:
2. Number of factories you assess/advise:

The questions below are related to the factories you assess/advise.



-
3. For each cooling method listed below, could you estimate the percentage of factories that use it? Please provide your best estimate for each category.
 - a. No cooling methods
 - b. Workstation/ceiling fans only
 - c. Workstation/ceiling fans and exhaust fans
 - d. Water evaporation cooling (e.g., water walls, swamp coolers) in combination with workstation/ceiling fans and exhaust fans
 - e. Refrigerant cooling systems (e.g., air conditioning)
 - f. Improved air flow systems
 - g. Other. Please specify: _____
 4. Have you observed an increase in cooling initiatives in recent years?
 - a. Yes.
 - b. No
 5. What do you think is driving this increase (select all that apply)?
 - a. Rising local temperatures
 - b. New policies or legislation
 - c. Requirements from brands
 - d. Demand from workers
 - e. Other. Please, specify _____
 6. Could you provide an average range of the amount spent by factories that invested in cooling initiatives over the past two years (in USD)?
 7. Who is primarily funding these cooling initiatives?
 - a. Factories
 - b. Brands
 - c. Government-sponsored grants or subsidies
 - d. Others. Please specify: _____
 8. What percentage of factories measure temperature at the following frequencies?
 - a. Continuously or daily (e.g., using digital Wi-Fi thermometer) _____
 - b. Monthly _____
 - c. Annually _____
 - d. Only when required by auditors _____
 - e. Never _____
 9. In the last two years, have any factories temporarily closed operations es due to excessive heat?
 - a. Yes.
 - b. No

If yes, what is the percentage of factories that changed work schedules among the factories you advise? _____
 10. In the last two years, have any factories temporarily changed work schedules due to excessive heat?



a. Yes.

b. No

If yes, what is the percentage of factories that temporarily closed operations among the factories you advise? _____

11. On days with record high temperatures, are workers affected in any of the following ways?

Check all that apply.

a. Difficulty in commuting to work

b. Low productivity at work

c. Lunch food gets spoiled at work

d. Increase incidents of unexcused absences at work

e. Others. Please specify: _____

12. Have the following types of incidents occurred in the factories you assess/ advise? Check all that apply.

a. Fainting

b. Heat Stroke

c. Psychological distress

d. Other health issues. Please specify: _____

13. Have you noticed a connection between high heat and worker productivity?

a. Yes

b. No



International
Labour
Organization



IFC

**International
Finance Corporation**
WORLD BANK GROUP