Sign reads: Maintenance work is in progress

Executive Summary | September 2026

Six seasons, four summers in Five Graphs

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In Cornell GLI's 2023 *Higher Ground?* reports with Schroders, we analyzed the future costs for the fashion industry if its fails to adapt to extreme heat and intense flooding. We made our calculations from the literal and figurative outside, using global climate models to forecast outdoor wet-bulb globe temperatures and the losses to export earnings and jobs. In our new 'Six Seasons, Four Summers' analysis, we have built our analysis from the ground up and the inside out. We use our unique data-sets from eight Dhaka-region apparel factories and three dozen workers' homes to calculate the costs of high heat stress in 2025 and estimate the returns on cooling investments.

We find, first, that workers are bearing the costs of a seven-month long heat stress season that now begins in early April and ends in late October. Second, we find that cooling costs—in our small sample—are manageable with **an average payback period of one to four years**, depending on future costs and heat stress levels. A campaign to remediate high heat stress across the Bangladeshi apparel export industry would cost a total of USD 239 million (in capital expenditures) or, spread out of over three years, 0.2 percent of the industry's 2025 apparel export revenue.

7 months
long 'heat stress season' in 2025. Dhaka-area apparel workers face a heat-stress season lasting from early April through to late October

58%
of ironing workdays in 'High' heat. Ironing / finishing is consistently the hottest and most humid section: workers spent 58% of workdays in the High heat stress zone and nearly 18% at Severe levels

17%
of overnight hours above 28°C WBGT. In a typical June week in 2025, workers in the study experienced 100% of observed hours above 25°C WBGT and 31% above 28°C, including 17% of overnight hours. Some homes were hotter than workplaces in the late evening and cooled very little overnight.

4.1%
average productivity loss from heat. Heat stress was associated with an average 4.1% loss in working-time productivity for participating factories in the study

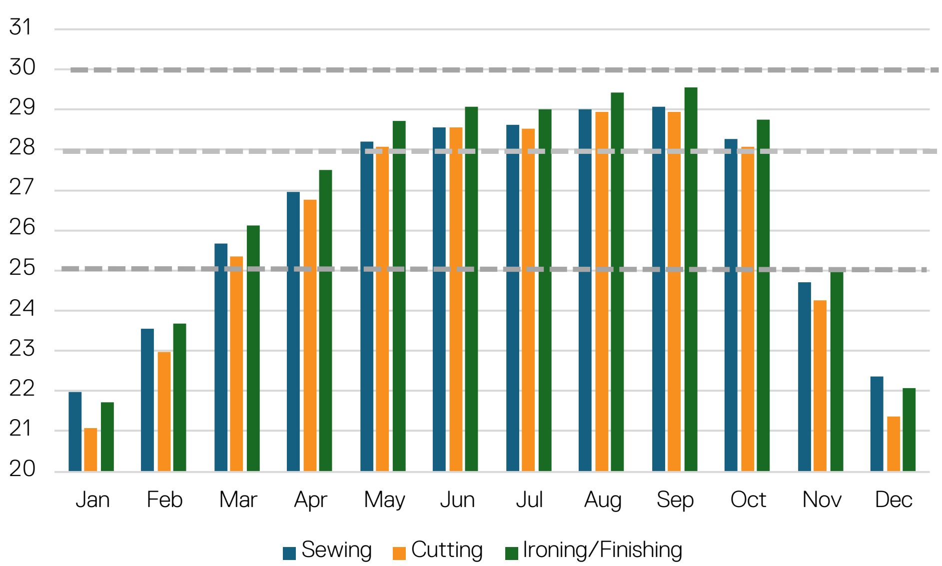
0.2%
of 2025 apparel export revenue. An estimated USD 239 million in capital expenditure—equivalent to 0.2% of 2025 apparel export revenue if spread over three years--to remediate high heat in Bangladesh's apparel export industry

2.9 years
average payback under "headwinds" scenario with lower revenue and productivity gains. In the report's worst-case scenario, the average is 4.4 years.

How did we do it?

With 28 climate sensors collecting data hourly across eight factories, we calculated heat stress levels by section—sewing, cutting, ironing and so on—in mid-late 2025.

Figure 3. Daily average monthly WBGT in eight factories, Dhaka, Jan – Dec 2025



Source: Cornell GLI and Liu/Liu/Yang from GLI, BRAC and Iowa Environmental Mesonet data.

Factory heat stress levels are consistently higher than the outdoor levels, all year long, and ironing/finishing

are consistently the hottest and most humid. Based on the heat stress thresholds identified in the academic literature and those used by workplace heat specialists globally, we define three heat stress 'zones': 25 - 28 °C WBGT, 28 – 30 °C WBGT and >30 °C WBGT. The risks for workers correspond to the intensity of their work: sewing work (light intensity and often seated) at 25 – 28 °C WBGT is in the 'Moderate' zone, 28 – 30 is 'Caution' and levels above 30 are 'High', moving quickly towards 'Severe.' For iron/finishing work, the effort required and the risks are higher at the same wet-bulb globe temperatures: 25 – 28 °C WBGT is the 'Caution' zone, 28 – 30 °C is 'High' and levels above 30 °C are 'Severe' and—at higher levels—hazardous.

Table 1. Heat stress zones by apparel industry work type/intensity

Section/intensity	25 – 28 °C WBGT	28 – 30 °C WBGT	>30 °C WBGT
Sewing	Moderate	Caution	High
Cutting	Caution	High	Severe
Ironing/Finishing	Caution	High	Severe

Above 25 C WBGT, ironing workers in our aggregate data are already in our 'Caution' heat stress zone and they spent all of the industry's April – October 'heat stress season' in the 'High' (above 28 C WBGT) and 'Severe' (above 30 WBGT) zones.

Table 4. Ironing/finishing monthly average time in heat stress zones, Dhaka, 2025

Month	Avg. WBGT (°C)	Avg. daily Caution hrs	Avg. daily High hrs	Avg. daily Severe hrs	Caution share (%)	High share (%)	Severe share (%)
Jan	21.7	0.1	0.0	0.0	0.4%	0.0%	0.0%
Feb	23.7	2.7	0.0	0.0	24.3%	0.1%	0.0%
Mar	26.1	7.0	1.5	0.1	63.5%	13.6%	0.5%
Apr	27.5	7.1	3.6	0.1	64.2%	32.7%	0.9%
May	28.7	2.9	6.4	1.7	26.4%	58.6%	15.0%
Jun	29.1	1.7	7.1	2.2	15.9%	64.3%	19.8%
Jul	29.0	1.8	7.4	1.8	16.2%	67.4%	16.3%
Aug	29.4	0.5	7.9	2.6	4.6%	71.3%	24.0%
Sep	29.5	1.0	6.3	3.7	9.3%	57.3%	33.4%
Oct	28.8	3.0	6.2	1.8	27.3%	56.6%	16.1%
Nov	25.1	4.1	1.2	0.1	37.4%	10.8%	0.6%
Dec	22.1	0.7	0.0	0.0	6.2%	0.0%	0.0%

Source: Cornell GLI and Liu/Liu/Yang from GLI, BRAC and Iowa Environmental Mesonet data. Note on color-coding: Caution > 50% is in yellow; High > 30%, orange and Severe > 5 percent, red.

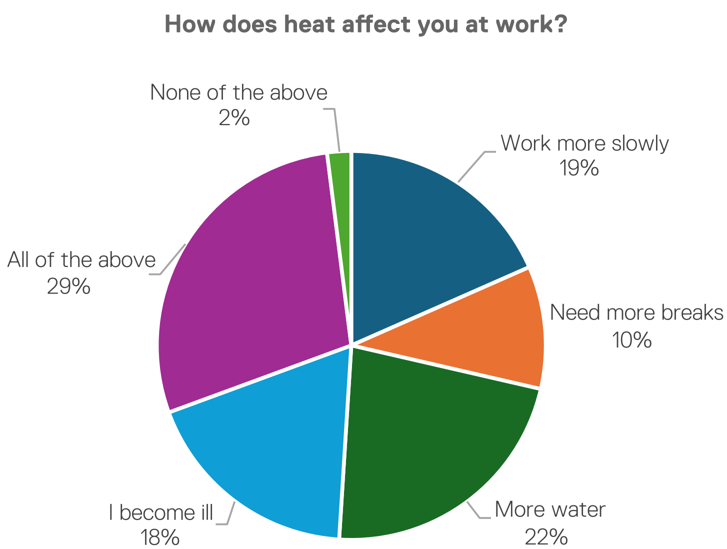
All year long, workers in sewing sections spent an estimated 65 percent of workdays in the sewing-specific Caution zone. Cutting workers were in Caution and High heat stress zones for 35 and 62 percent of the year, respectively. **Ironing workers spent more than half their workdays (58 percent) in High heat stress and nearly 18 percent at Severe levels.**

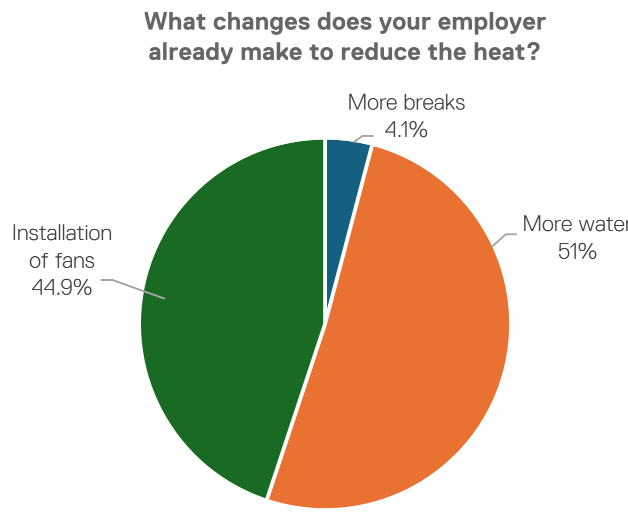
How do managers and workers respond this the high heat?

In surveys led by BRAC University for this report, management teams in seven of eight factories acknowledged that their workers slowed down in high heat. And while several factories reported having made significant investments, none had analyzed changes in physical work capacity or worker effort levels at high heat stress levels. All noted that output nonetheless held up during the hottest months and a few said the quiet part out loud: **delivering on time for buyers means pushing through the effects of high heat stress. 'Workers need to meet the targets, whatever the weather.'**

How do workers in these same factories react to high heat stress at work? Two-thirds of workers surveyed (65 percent) told us they always or almost always report for work even when they feel it's too hot to work. Workers report that managers provide more water (51 percent) and use of fans (45 percent)—when the heat is too high.

Figure 4. Worker survey responses on impacts of heat stress and factory efforts to reduce it (n=49)



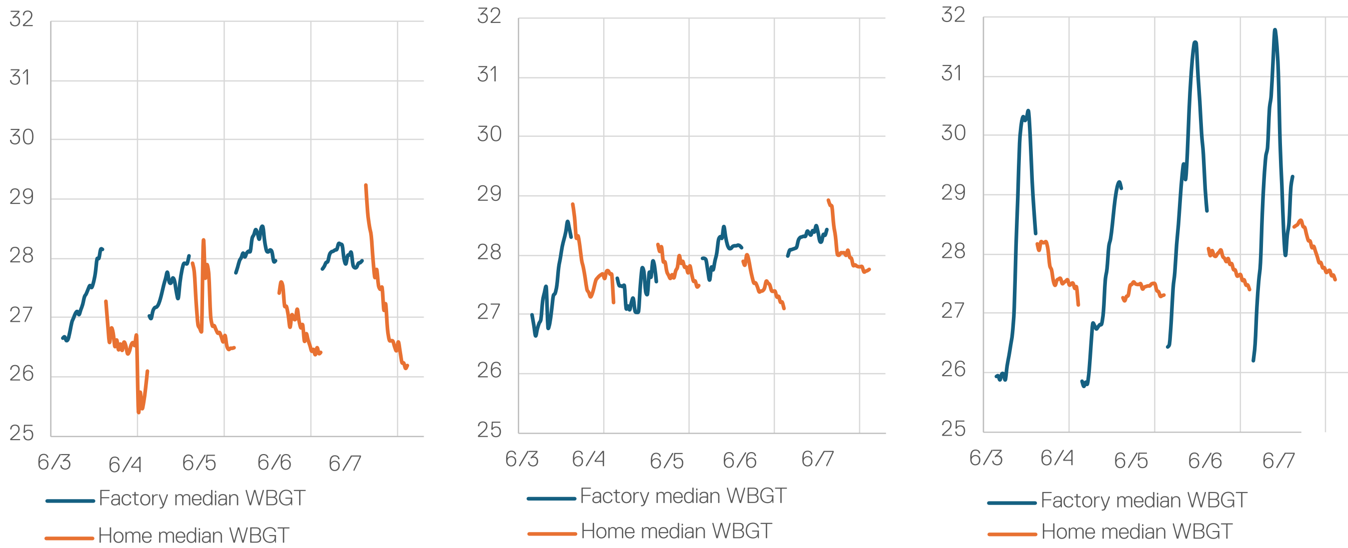


Source: BRAC CED and BCWS worker surveys, Dhaka, July – August 2025

What about heat stress at home?

We traced the day-and-night heat stress levels of workers in our median factory from home to work and back again over a representative summer week in early June 2025. These workers spend 100 percent of these few days above 25 WBGT and 31 percent above 28 WBGT, including 17 percent of their overnight hours. Over a typical summer week in early June 2025 for workers in three of our factories—one of lower heat factories (Factory 3), our median (Factory 7) and one of our hottest (Factory 6)—we compare their heat stress exposure at work (in blue) and at home (orange).

Figure 7. Workday and overnight heat stress levels (average) in factories and homes in low, median and high heat factories, early June 2025.



Source: GLI analysis of BRAC and BCWS data.

In all three, **these workers spent 100 percent of these few days and nights above 25 °C WBGT, and 31 percent of the total hours above 28 °C WBGT**, including 17 percent of their overnight hours. For some of these workers, heat stress levels at home in the late evening are higher than at work and their homes cool very little overnight.

Using the quantitative data on factory heat stress levels—hour-by-hour, by section, by factory—we calculated work-time losses that tell us how much each factory lost to heat-induced declines in productivity: 4.1 percent on average and as high as 6.6 percent in our study's only fabric mill (where processes push up temperatures and humidity).

At this point, we drew together the parts of our analysis: capital and operating costs of cooling solutions based on factory heat stress-specific data and engineering studies with estimated productivity benefits of cooling. Annual returns on these investments are net benefit (or annual productivity gains minus annual operating costs) divided by the initial investment (capex).[1]

1 The standard formulas used here are: ROI = (Benefit – annual opex) / Capex; and Payback period = Capex / (Benefit – annual opex) where Benefit is our estimate productivity gain.

Table 13. Estimated return on investment and payback period, initial scenario

Factory	Annual revenue	Solutions capex (USD)	Solutions opex (annual, USD)	Heat loss rate	Heat-induced loss (USD)	Cooling benefit (USD)	ROI (Year 1, %)	Payback period (years)
1	$165,300,000	$205,453	$8,331	3.5%	$1,163,712	$930,970	349.1	0.2
2	$32,500,000	$147,005	$8,665	3.9%	$255,450	$204,360	33.1	0.8
3	$65,900,000	$60,646	$6,077	3.6%	$467,890	$374,312	507.2	0.2
4	$79,400,000	$264,697	$34,554	3.6%	$568,504	$454,803	58.8	0.6
5	$26,100,000	$78,736	$5,411	4.1%	$211,932	$169,546	108.5	0.5
6	$26,000,000	$78,687	$4,769	4.1%	$212,680	$170,144	110.2	0.5
7	$29,000,000	$183,760	$10,227	3.6%	$207,640	$166,112	-15.2	1.2
8	$52,700,000	$303,828	$39,201	6.6%	$696,694	$557,355	70.5	0.6
Averages	$59,612,500	$127,470	$14,654	4.1%	$473,063	$378,450	152.8	0.6

Source: YGEN Engineering with data from participating factories

The estimated payback periods in our analysis range from a few months in the case of Factory 1—very high revenue and relatively low heat stress—to 14 months in Factory 7 which is among the smallest in our group and has a significant heat stress problem and a relatively high solution capex. A more pessimistic (or 'headwinds') scenario that assumes lower revenue, productivity gains and so on—each with a basis in possible near-future scenarios. But we increase the force of each headwind to make a point: the economic logic of these cooling solutions holds in hard times. Payback periods in this headwinds scenario average 2.9 years. And in a 'worst case' scenario—with revenue down, capex and opex up, heat levels higher and labor productivity gains at very low levels—the average payback period is 4.4 years. An oft-referenced rule of thumb amongst apparel industry manufacturers, buyers and creditors alike in Bangladesh is that a three- or four-year payback period is tolerable, if not encouraging.

What's next?

First, manufacturers and buyers should measure heat stress with attention to how it varies by location, process, factory design and even worker. They should engage qualified engineers to evaluate the costs of cooling workers, calculate the likely return on those investments and engage their buyers on the sharing of costs. It is the capturing and comparison of the costs and benefits of these different interventions that can produce the confidence needed to scale and speed these investments.

Manufacturers and industrial engineers in elsewhere should also test, refine and scale up solutions that reduce heat stress to safe levels. These will differ by climate and economy. Dhaka differs from Chittagong, Delhi from Chennai and Jakarta from Ho Chi Minh and so on. Each center needs an approach and a plan. And while they are at it, integrate the solutions that help employers meet their obligations both to cool workers and to reduce carbon emissions.

Second, the government of Bangladesh should engage employers, workers and apparel brands to draft, enact and enforce a specific heat stress standard to protect workers' health and safeguard Bangladesh's competitiveness in a rapidly warming world. As we argued in Higher Ground?, those with power in the industry need to treat extreme heat as a health hazard, and cooling as an urgent investment in safety for workers and stronger margins for management. Brands must do the same in their sustainability, sourcing and pricing strategies for Bangladesh and almost everywhere they buy apparel. Their new EU reporting and due diligence obligations confirm this.

The International Accord with its mandate to protect worker safety and health and its binding obligations for employers and apparel brands—including by sharing costs—can show the way. Of equal importance to the engineering solutions are administrative changes—more accurately, 'worker safety protocols'—to make work in high heat stress seasons safe and healthy. These include changes in hours, work-rest balance, worker pay including piece-rates and targets, medical leave policy and more. (The subject of an upcoming Cornell GLI study).

Third, easier access to (concessional, green) finance for smaller and medium-sized factories ranks high in our list of recommendations, as does forbearance by brands on terms of trade including long-term commitments, prices that reflect new capital and operating costs or finance mechanisms with longer payback periods for suppliers that are making meaningful investments to cool workers.

At one level, making an industry safe for its workers is a technical exercise. And despite the acceleration in climate breakdown, the science and the solutions remain relatively simple. And the business and rights cases are clear. Our fourth recommendation is to challenge the catastrophists who argue that "the electrical grid will break" or "emissions will be impossibly high" or "workers hate cool air". These are often political objections—or problems of power in the fashion industry—posing as technical problems.

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