HIGHER GROUND? EXECUTIVE SUMMARY

Report 1:
Fashion's Climate Breakdown and its Effect for Workers

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Report 2:
Climate Resilience and Fashion's Costs of Adaptation

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13 September 2023

ILR Global Labor Institute

Schroders

KEY FINDINGS

- Analysis by the Global Labor Institute at Cornell University, ILR School and Schroders finds the climate-vulnerability from extreme heat and flooding of 32 apparel production hubs is widespread.
- **Report 1:** Four countries representing 18 percent of global apparel exports (Bangladesh, Cambodia, Pakistan and Vietnam) risk foregoing $65 billion in export earnings in 2030—equivalent to a 22% decline—and nearly 1 million new jobs due to slower growth. And 2050 figures are much higher: 68.8 percent lower for earnings in a non-climate-adaptive scenario and 34.5 percent for employment, or 8.64 million fewer jobs.
- **Report 2:** Researchers mapped the supply chain footprint of six global apparel brands across the four production centers. Findings show workers and manufacturers for all six brands face productivity impacts from extreme heat and flooding, that are conservatively estimated to be equivalent to 5 percent or more of brand's net operating profits after tax.
- Fashion brands and retailers tempted to shift sourcing away from climate-vulnerable centers ('cut and run') would struggle to build the large-scale capacity they benefit from in South and Southeast Asia.

KEY RECOMMENDATIONS

- **All:** Treat heat and flood events as health hazards, offering paid leave for such events and related illnesses, and providing the right to halt work. Alter work hours, effort levels, rest periods, and hydration based on indoor wet-bulb temperature standards.
- **All:** Develop social protection mechanisms and climate adaptation finance that redistributes costs and risks away from apparel workers.
- **Brands, employers, unions:** Establish binding agreements and foster formal partnerships between brands, manufacturers, unions, governments to address and adapt to climate breakdown.
- **Brands and suppliers:** Explore return on investment (ROI) from adaptation measures and support suppliers to retrofit or relocate nearby in lower risk locations.
- **Investors:** Engage with apparel companies and their stakeholders to encourage adoption of adaptation measures given the focus to date is almost exclusively mitigation.
- **Governments:** Integrate climate adaptation and worker-rights related factors within trade policies.

Introduction

Fashion focuses its climate change efforts on goals such as increasing use of recycled fabrics, reducing water usage, and cutting down its very high greenhouse gas emissions—fashion ranks third on greenhouse gases behind global food production and construction.[1]

But fashion's mitigation efforts largely ignore the effects of climate breakdown on the workers, communities and industries who produce the world's garments. This is the problem of adaptation and it is not part of fashion's plan.

In these two "Higher Ground?" reports from the Global Labor Institute at Cornell University and Schroders, we measure the present and future risks of exposure to extreme heat and flooding in some of the world's most climate-vulnerable countries for apparel workers, suppliers, fashion brands and investors.

The aim of these two reports is, first, to understand the industry's exposure to climate risks and the costs of climate adaptation for workers, manufacturers, buyers and investors, and governments. And, second, to inspire industry actors to formulate adaptation strategies that are large-scale and fit for purpose. We want to see these new measures and costs written into the business plans of the fashion industry, into collective agreements, and into budgets and objectives of regulators.

The fashion industry's exposure to physical climate risk

Table 1 below illustrates changes in exposure to four key physical risk measures in our 32 apparel and footwear production centers in 2030 and 2050. We represent relative heat stress levels using the number of days per year—'exceedance days'—for which the wet-bulb globe temperature (WBGT) readings reach above 30.5°C - the threshold noted above at which an hour of light-to-moderate work should be equal parts effort and rest. We also present exceedance days for daily average maximum (dry-bulb) temperatures above 35°C to capture changes in high heat levels in cities with lower humidity.

Our flooding projections include both coastal or tidal and 'storm surge' flooding (hereafter, 'coastal' flooding), and a combination of 'fluvial', or river flooding, with 'pluvial' or rainfall flooding (hereafter, 'riverine'). The indicators of flood vulnerability are the percentages of each center's populations that will be inundated—most of them at less than 0.5 meter—in a 10-year flood.

1 Debate over fashion's share of global greenhouse gas emissions, of which carbon dioxide emissions are by far the largest, continues and the likeliest figure is between two and five percent according to Sadowski et al., 2021, and the World Economic Forum, 2021.

Table 1: Heat and flood projections by apparel and footwear production center, 2030 – 2050.

Major production centers		Annual exceedance days at 30.5 C WBGT		Annual exceedance days at 35 C (dry bulb) daily maximum		Riverine flood population % inundated		Coastal flood population % inundated	
City	Country	2030*	2050	2030	2050	2030	2050	2030	2050
Karachi	Pakistan	189.95	202.71	17.76	19.59	13.02	13.02	0.27	0.29
Colombo	Sri Lanka	144.52	157.76	1.12	1.65	24.07	24.29	0.15	0.15
Managua	Nicaragua	133.29	151.9	3.41	6.82	0.01	0.02	-	-
Port Louis	Mauritius	104.29	104.43	0	0	-	-	0.64	0.64
Dhaka	Bangladesh	64.81	104.48	69.94	82.88	36.86	37.09	14.64	17.86
Yangon	Myanmar	58.9	91.62	37.12	48.76	11.32	11.53	2.97	3.27
Delhi	India	55.14	75	164.35	176.41	28.55	28.95	-	-
Ho Chi Minh	Vietnam	55.14	97.76	22.82	29.59	25.78	25.73	3.74	6.23
Chattogram	Bangladesh	50.1	84.86	6.53	9.65	40.08	41.21	16.95	18.07
San Salvador	El Salvador	42.33	57.29	0.76	1.12	0.1	0.1	-	-
Bangkok	Thailand	42.19	74.48	37.59	46.35	41.53	42.44	3.37	3.66
Phnom Penh	Cambodia	41.38	75.05	19.94	24.65	41.7	42.28	-	-
Hanoi	Vietnam	37.29	55.86	36.53	43.94	40.49	40.69	0.59	0.82
Guangdong	China	33.29	48.81	1	1.82	42.00	42.13	8.96	11.44
Dongguan	China	33.29	48.81	1	1.82	41.22	41.91	17.74	20.06
Shenzhen	China	33.29	48.81	1	1.82	3.96	4.12	12.63	12.98
Kuala Lumpur	Malaysia	22.86	57.1	13	15.41	7.82	7.72	-	-
Izmir	Turkey	17.9	18.71	6.41	9.41	18.77	18.77	1.81	1.82
Tiruppur	India	15.38	29.14	50.88	59.59	0.94	0.94	-	-
Manila	Philippines	10.43	27.24	9.76	12.35	10.55	10.75	2.51	2.59
Jakarta	Indonesia	9.81	38.29	2.35	2.18	29.12	29.05	2.99	3.71
Ningbo	China	8.52	17.52	6.41	9.41	57.13	55.83	26.97	32.18
Monastir	Tunisia	6.67	11.24	62.35	71.24	2.71	2.71	0.12	0.37
Tangier	Morocco	2.05	2.48	13.12	14.76	10.69	10.67	0.63	0.63
Cairo	Egypt	1.52	4.24	118.47	128.29	9.56	9.81	-	-
Istanbul	Turkey	0.86	1.29	21.06	23.47	0.13	0.13	0.08	0.76
Mexico City, D.F.	Mexico	0.57	2.14	36.65	45.12	7.02	7.04	-	-
Taipei	Taiwan	0.48	1.9	0.41	0.88	16.25	16.26	0.74	0.74
Amman	Jordan	0.33	0.62	83.71	93	-	-	-	-
Prato	Italy	0.24	0.24	15.76	17.29	41.63	41.36	-	-
San Pedro Sula	Honduras	0.19	1.48	38.06	44.82	25.26	25.13	-	-
Blumenau-Florianopolis	Brazil	0.1	0.33	3.29	4.41	35.26	35.39	-	-

* Annual exceedance days are based on 10-year projection cycles.

Sources: Schroders, WorldPop, World Resources Institute, Copernicus EU. Flooding based on RP-10 Event, RCP4.5. Heat levels are based on Wet Bulb Globe Temperature, SSP 2-4.5. Analysis undertaken July 2023.

Several production centers stand out in 2030 and beyond for their vulnerability to high heat and humidity and flooding: Colombo, Dhaka and Chattogram (Chittagong), Yangon, Delhi, Bangkok, Phnom Penh and the massive Dongguan-Guangdong-Shenzhen region.

Many of these centers are tropical and sub-tropical hotspots. Are these projected exposures to extreme heat and humidity much higher than recent levels? We compared 2004 – 2014 WBGT using the same climate models to our 2030 exceedance days estimates. Among cities in our focus countries—Karachi, Dhaka, Ho Chi Minh City and Phnom Penh—the average number of 30.5°C WBGT exceedance days climbs 50.9 percent from 39 days in 2014 to 59 by 2030. Starting from relatively low levels, exceedance days more than double by 2030 in Ho Chi Minh City, Hanoi and Phnom Penh. Starting from relatively higher levels, Dhaka's exceedance days will be 63 percent higher and Karachi's 20 percent.

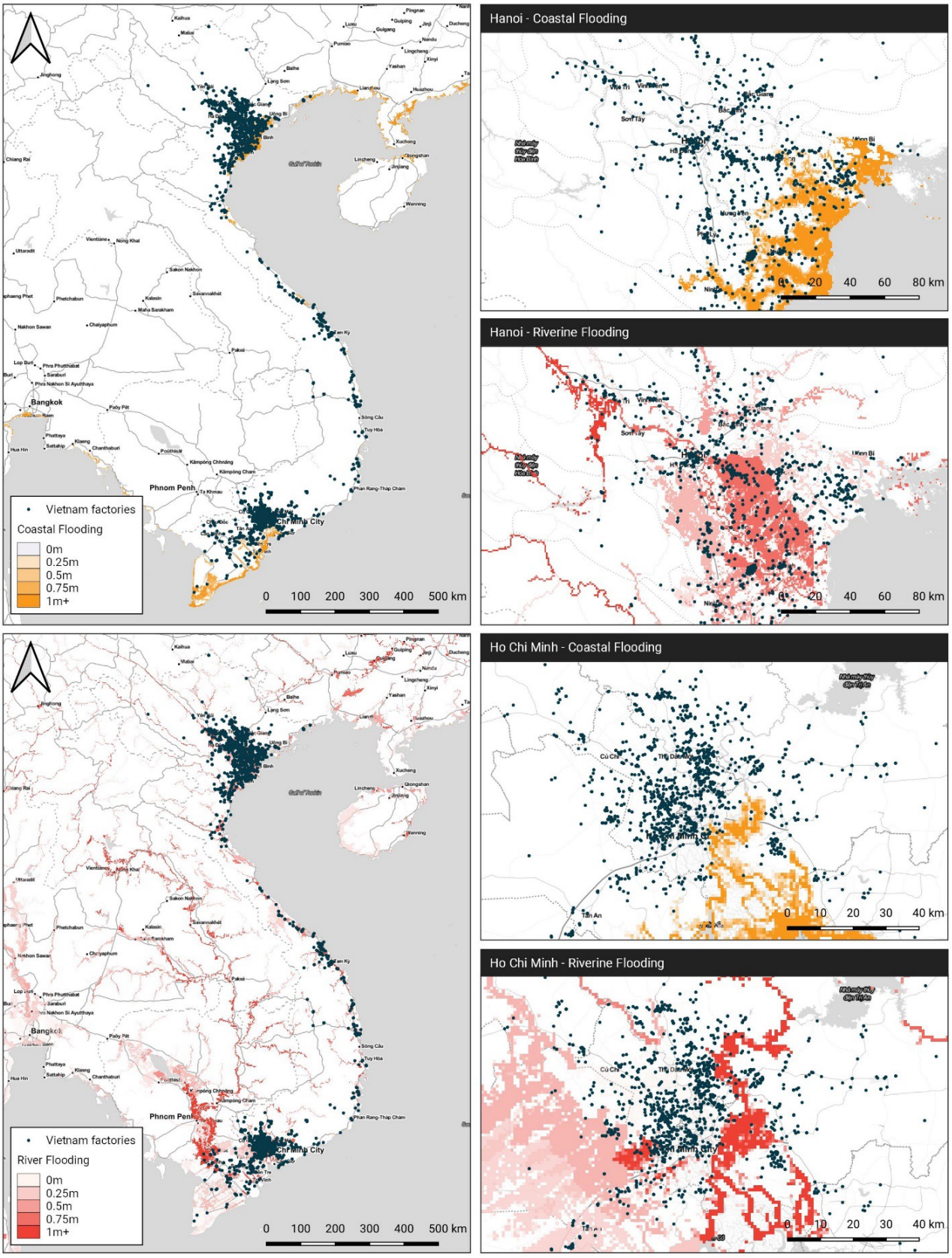
Using flooding models based on our middle-of-the-road climate scenario (RCP 4.5),2 we map inundation levels for more than eight thousand apparel and footwear factories in our four focus countries. We estimate annual disruption days - production days lost to flooding and recovery - in a non-adaptive scenario for each factory in 2030 and 2050. This estimation is based on the maximum 'inundation depths' from coastal and riverine flooding for two-, ten-, and one hundred-year events, or 'return periods' (RP2, RP10, and RP100). As with heat-productivity impacts, we convert these disruptions into aggregate annual impacts on export earnings and jobs.

Taking one example, Figure 1 illustrates flooding in Vietnam, with coastal flooding represented in gold and riverine flooding in red. Deeper shades signal higher inundation levels at 0.25 meter intervals, up to 1 meter and higher. Apparel and footwear factories are shown in blue.

Dhaka, Bangladesh 2004. Photo credit: Dougsme on Flickr.com

2 The RCP 4.5/SSP2 scenario used the World Resources Institute's Aqueduct Floods Tool, which corresponds to the SSP2-4.5 scenario used in our heat analyses. For more on climate scenarios see https://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf and O'Neill et al., 2014 https://link.springer.com/article/10.1007/s10584-013-0905-2.

Figure 1. Coastal and riverine/rainfall inundation levels for 2030 (RP10), Hanoi and Ho Chi Minh City, Vietnam.



Sources: Schroders, WRI, brand disclosures, OSH.

Phnom Penh, Cambodia. Photo credit: Cornell GLI

Measuring economic damage.

How will extreme heat and intense flooding impact apparel production in our four focus countries? We project earnings and employment impacts in 2030 and 2050 under two growth scenarios.

Our 'climate-adaptive' scenario presents the growth trajectory of apparel industries that move quickly to reduce heat stress for workers. Our non-adaptive scenario calculates the damage of high heat stress and flooding in terms of export earnings and jobs foregone in a non-adaptive apparel industry. All four industries continue to grow in nominal terms between 2025 and 2050 but the effects of slower year-on-year growth are dramatic when compounded over just five years. The widening of the gaps between the scenarios is more extreme by 2050.

Why? Our analysis cannot account for the ways in which governments, employers and workers adapt to higher heat and 'claw back' some of what extreme heat is taking away in earnings and jobs. Our analysis also reflects the compounding effects of lower productivity in long-term projections. The result is that growth paths for non-adaptive industries are effectively redrawn by high heat and lower productivity.

Table 2. **Combined heat- and flood-related impacts for apparel export earnings under climate-adaptative and high-heat and flooding scenarios, 2030 and 2050.**

Country	Year	Climate-adaptive export earnings (USD)	High heat + flood earnings (USD)	Change (USD)	Change (percent)
Bangladesh	2021	46.55 b.			
	2030	122.01 b.	95.22 b.	(26.78) b.	-21.95%
	2050	1,038.22 b.	326.90 b.	(711.32) b.	-68.51%
Cambodia	2021	15.24 b.			
	2030	35.64 b.	28.89 b.	(6.75) b.	-18.94%
	2050	235.41 b.	79.09 b.	(156.32) b.	-66.40%
Pakistan	2021	9.07 b.			
	2030	24.54 b.	16,95 b.	(7.59) b.	-30.94%
	2050	224.35 b.	43,70 b.	(180.65) b.	-80.52%
Vietnam	2021	56.99 b.			
	2030	116.80 b.	92,04 b.	(24.77) b.	-21.20%
	2050	575.46 b.	197.12 b.	(378.34) b.	-65.74%

Source: Cornell GLI

Table 3. Combined heat- and flood-related impacts for apparel employment under 'climate-adaptative' and high-heat and flooding scenarios, 2030 and 2050.

Country	Year	Climate-adaptive employment	High heat + flood employment	Change	Change (percent)
Bangladesh	2021	4.22 m.			
	2030	4.83 m.	4.57 m.	(0.25) m.	-5.29%
	2050	6.31 m.	5.04 m.	(1.27) m.	-20.17%
Cambodia	2021	0.70 m.			
	2030	0.94 m.	0.89 m.	(0.05) m.	-5.63%
	2050	1.70 m.	1.14 m.	(0.56) m.	-32.76%
Pakistan	2021	2.75 m.			
	2030	3.43 m.	3.14 m.	(0.30) m.	-8.65%
	2050	5.37 m.	3.51 m.	(1.85) m.	-34.56%
Vietnam	2021	2.97 m.			
	2030	4.70 m.	4.34 m.	(0.35) m.	-7.53%
	2050	11.70 m.	6.74 m.	(4.96) m.	-42.38%

Source: Cornell GLI

Taken together, projected earnings foregone under the non-adaptive 'high heat and flooding' scenario between 2025 and 2030 are USD 65.89 billion in 2030. That represents a 22 percent fall-off in export earnings against the 'climate-adaptive' scenario. New jobs foregone are over 950,000, or nearly 7 percent, by 2030.

The projected 2050 figures are much higher. The effects of lower year-on-year growth in the non-adaptive scenario widens the gaps between the two scenarios: 68.8 percent lower for earnings in the non-adaptive scenario and 34.5 percent for employment, or 8.64 million fewer jobs.

Apparel and footwear's historically high share of goods export earnings in Bangladesh, Cambodia and Pakistan mark export earnings in these three economies as particularly vulnerable to changes in future earnings and employment in apparel production. Governments and apparel industries in all four countries have promised or taken steps to move away from reliance on economic growth from cut-and-sew apparel industries. Vietnam is furthest along this path to higher-value exports.

But for industry investors and national policymakers, an end-run on projected economy-wide losses from heat stress and flooding is not possible. The costs of a 'just resilience' include not just physical adaptation costs for active cooling systems and local flood defenses, for example, but changes in apparel production processes and the governance of work in apparel and other climate-vulnerable industries.

For workers, where does relief come from?

What in the public and private governance of work brings relief and remedy for workers? We surveyed climate-related safety and health standards in our four countries.

There are two stand-outs: Cambodian labor law is silent or designedly vague on climate-adaptative labor issues. There are no requirements for paid breaks, pay during work stoppages, or rights during work stoppages. Cambodia's legal framework, despite 30 years of intensive technical cooperation from the ILO and engagement by fashion brands, is clearly the weakest in this group. Vietnamese labor law stands out here for its relative stringency on climate adaptation

issues, including clear heat thresholds, paid breaks, paid sick leave, pay during force majeure work stoppages, and the right to halt dangerous work. The table below sets out national legal standards for indoor workplace temperatures.

Table 4. National legal standards for indoor workplace temperatures.

	Bangladesh	Cambodia	Pakistan (Sindh)	Vietnam
Indoor heat	Temperature 'limited to a tolerable limit', with requirement for one thermometer per workroom.	'Work [must be] undertaken in a thermal environment that does not affect worker's health… Employer must take appropriate heat reduction measures.' Requirement for 'thermometers in the workplace.'	Maintain indoor temperatures for 'reasonable conditions of comfort and [prevention of] injury to health' with wall and roofs 'of such material and so designed that such temperature shall not be exceeded. 'Correct wet and dry bulb temperatures' recorded three times/day.	Indoor workplace temperatures should not exceed 34°C, 32°C and 30°C for light, medium and heavy work, respectively. Relative humidity should not exceed 80%. Employer contracts for assessment of temperature, humidity, etc.'

Sources: Labor laws and regulation.

Voluntary, private regulation standards are typically aligned to national legal standards. In the context of extreme heat and intense flooding already prevalent in production hubs in Bangladesh, Pakistan, India, China and elsewhere, existing global public, mandatory and private voluntary standards are inadequate.

What is the impact for individual brands and suppliers?

In the second report, we focus on how heat and flooding risks manifest at the brand and supplier level. In order to do this, we selected six focus brands to analyze in depth. The six brands were chosen to represent a wide variety of business models as well as geographical concentration in the four principal production centers of Dhaka (Bangladesh), Ho Chi Minh (Vietnam), Karachi (Pakistan) and Phnom Penh (Cambodia). This set of six brands is obviously not comprehensively representative of the whole apparel industry, but in order to undertake in-depth and meaningful climate analysis, researchers hone in on a limited group covering fast fashion, value, online only and mid-market retailers.

Ho Chi Minh City, Vietnam. Photo credit: ILO Better Work

Table 5. Summary of brand exposure to heat and flooding in 2030 and 2050.

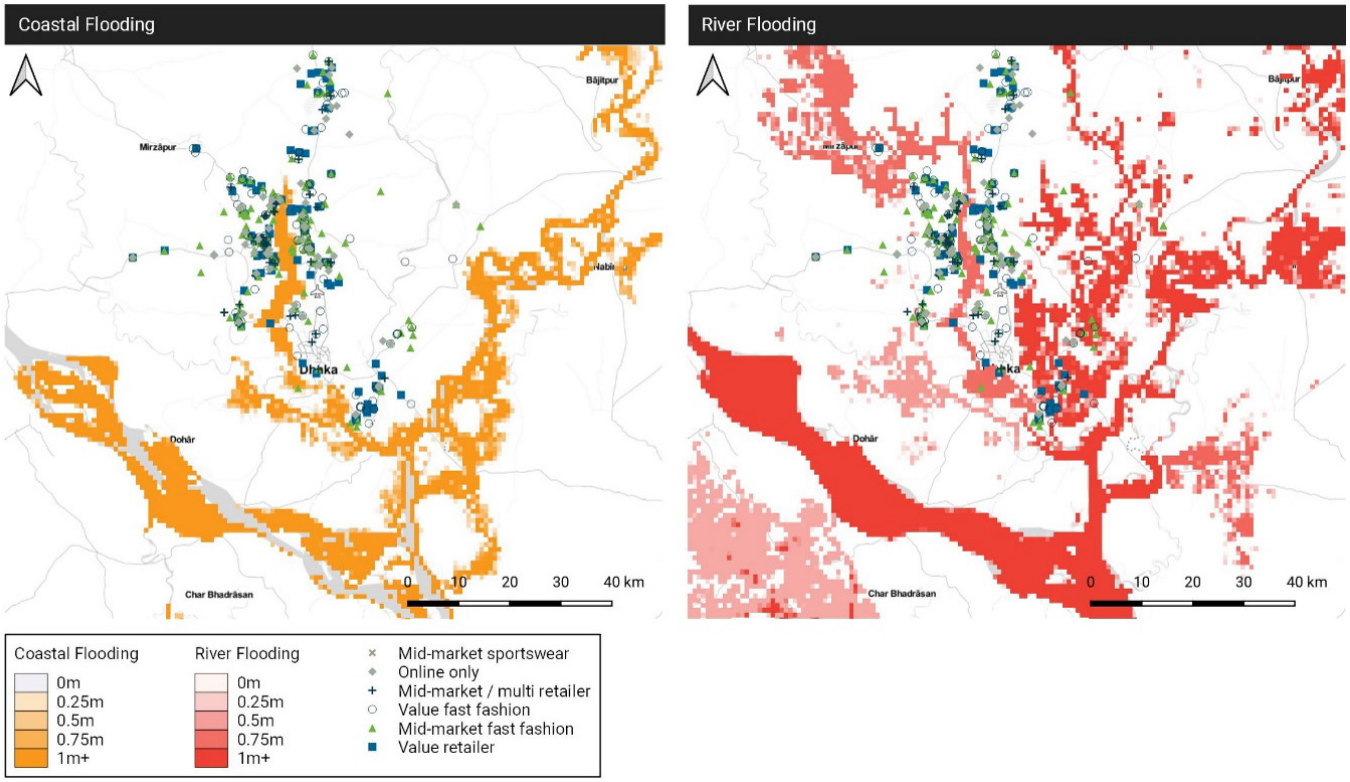
Focus Brand	Production center	Number of factories in production center	% of total factory footprint in production center	2030			2050		
				% of factories in region affected by riverine flooding	% of factories in region affected by coastal flooding	Average days exceeding 30.5 °C	% of factories in region affected by riverine flooding	% of factories in region affected by coastal flooding	Average days exceeding 30.5 °C
Value fast fashion	Dhaka	146	11.23%	11%	1%	65	11%	2%	104
	Ho Chi Minh	13	1.00%	15%	0%	55	15%	0%	98
	Karachi	15	1.15%	0%	0%	190	0%	0%	203
	Phnom Penh	9	0.69%	18%	0%	41	18%	0%	75
Value retailer	Dhaka	89	10.08%	11%	1%	65	12%	3%	104
	Ho Chi Minh	8	0.91%	14%	0%	55	29%	0%	98
	Karachi	8	0.91%	0%	0%	190	0%	0%	203
	Phnom Penh	15	1.70%	6%	0%	41	6%	0%	75
Fast fashion mid-multi retailer	Dhaka	158	8.75%	11%	5%	65	10%	7%	104
	Ho Chi Minh	0	0.00%	-	-	-	-	-	-
	Karachi	12	0.66%	0%	0%	190	0%	0%	203
	Phnom Penh	42	2.33%	12%	0%	41	12%	0%	75
Mid-market sportswear	Dhaka	0	0.00%	-	-	-	-	-	-
	Ho Chi Minh	40	9.93%	24%	2%	55	27%	5%	98
	Karachi	0	0.00%	-	-	-	-	-	-
	Phnom Penh	13	3.23%	21%	0%	41	21%	0%	75
Mid-market multi retailer	Dhaka	40	5.79%	2%	2%	65	5%	2%	104
	Ho Chi Minh	46	6.66%	15%	0%	55	18%	0%	98
	Karachi	13	1.88%	8%	0%	190	8%	0%	203
	Phnom Penh	50	7.24%	2%	0%	41	4%	0%	75
Online only	Dhaka	54	4.91%	6%	0%	65	6%	2%	104
	Ho Chi Minh	2	0.18%	50%	0%	55	50%	0%	98
	Karachi	19	1.73%	0%	0%	190	0%	0%	203
	Phnom Penh	4	0.36%	0%	0%	41	0%	0%	75

Sources: Schroders, Worldpop, WRI, Copernicus E.U. Flooding based on RP-10 Event, RCP 4.5 Climate Scenario in 2050. Heat stress based on WBGT in SSP2-4.5, in 2030-2039 and 2050-2059.[3] For each brand, we have highlighted the most striking exposure to climate risks across heat and flooding. Analysis undertaken July 2023.

3 Note that one cannot aggregate number of factories flooded in riverine and coastal scenarios, because these represent discrete model outputs. Nevertheless, it is appropriate to conclude that riverine flooding represents a much greater impact in the relevant climate scenarios.

Given the location-specific nature of flooding, the report also undertakes geospatial analysis of the focus brands' suppliers. A sample of this is provided for Dhaka.

Figure 2: Brand exposure to Dhaka riverine and coastal flooding in 2030.



Source: Schroders, WRI, Brand disclosures.

Pausing to reflect on the analysis presented above, we can make a couple of observations. The effects of heat become meaningfully worse, according to our analysis, between 2030 and 2050. Per table 5 above, workers manufacturing goods for our focus brands face a sevenfold increase in exposure to extreme heat in these production centers, on average, between 2030 and 2050.

Flooding risk increases more gradually, however, and is generally a smaller, more isolated issue. The picture here is largely consistent with the findings presented in our first report. As we show, the consequences that these exposures could yield, in terms of value-at-risk or productivity headwinds, are potentially meaningful to brands and suppliers. They have additional consequences for workers that depend on how their employers and buyers react. While the pervasive and large scale effects of heat make it a systemically important subject for adaptation, the unpredictability of flooding means it is a potentially idiosyncratic cost, with severe impacts on individual suppliers and their workers, and therefore on brands and their investors.

Taking this assessment a step further, we sought to estimate the financial costs of these productivity risks at brand level. Presenting the potential consequences of flood and heat impacts for brands or their suppliers in terms that can be considered proportionate either to the Cost of Goods Sold (COGS) and operating profits of a brand, or revenues of a supplier, we found that productivity headwinds amounted up to 3 percent of COGS for Ho Chi Minh and Phnom Penh, or approximately 5 percent of our sample brand's global net operating profit after tax.

For brands and retailers operating on competitive margin profiles, with limited cushion for absorbing productivity burden or excess costs, these climate-related challenges could pose a meaningful headwind. From an investor perspective,

the value of getting it right is important if the effects compound over time. This is true of estimates for large brands that book out entire factories and thus are on the hook to pay workers regardless of the disruption caused by heat or flooding, and for brands who expect these costs to be absorbed exclusively by suppliers.

So where are companies and suppliers in anticipating these risks? We undertook a bottom up analysis of the six focus companies' Task Force on Climate-related Financial Disclosures (TCFD) reports to determine the level of sophistication around reporting on physical climate risks. Whilst many brands have developed policies, processes and targets to address climate mitigation (e.g. establishing SBTi targets), we found that adaptation in the context of apparel manufacturing is lacking.

Table 6. **Focus brand reporting on physical risks and supply chain impacts.**

Company	Has a TCFD report	TCFD report identifies both heat and flood risks in supply chain	TCFD or risk management framework discusses specific climate scenarios	TCFD or risk management framework stress tests value at risk	Measures in place to minimize physical climate risks in supply chain	Supplier audits assess both heat and flood risks
Value fast fashion	Yes	No	Yes	No	Yes	No
Value retailer	Yes	Yes	Yes	No	Yes	No
Fast fashion mid-multi retailer	Yes	Yes	Yes	Yes	Yes	No
Mid-market sportwear	Yes	Yes	No	No	No	No
Mid-market multi-retailer	Yes	Yes	No	Yes	No	No
Online only	No	No	No	No	No	No

Source: Schroders, Brand disclosures. Shown for illustrative purposes only and should not be interpreted as investment guidance.

The conclusions of Report 2 suggest there could be meaningful productivity loss within brands' supply chains associated with the physical effects of climate change. This would imply that unless the costs of adaptation are equal to the gain in productivity for suppliers – unlikely to be the case – climate-related risk could be added to decisions between suppliers when brands are making their selection. In other words, when evaluating potential new suppliers, it is conceivable that brands will begin (if not already doing so) to consider price, certainty, volume and physical risk exposure or adaptation preparedness. This increases the emphasis for investors on responsible sourcing practices.

When thinking about the acute need to adapt and the question of who pays, we have tried to frame the return on investment (ROI) of such activity as it might appear to both brands and suppliers.

We see four principal choices:

- Take the hit to productivity from climate breakdown with no measures put in place;
- Adapt current supplier facilities to lessen the impacts of heat and flooding for the benefit of all value chain stakeholders;
- Move production sites to lesser affected regions within the existing sourcing countries; or
- Move production sites to other countries which will be less impacted by the physical risks of climate change.

Multiple factors will come into play when it comes to deciding on an option, with cost likely to be the highest prevailing. This may lead to the uncomfortable question of whether companies will 'cut and run' from suppliers in higher risk regions in favor of safer production centers – either within the same countries or abroad (e.g., North African countries). Given the relatively lower levels of saturation in these markets, construction of production facilities may well be cheaper. This, combined with potentially lower physical risk impacts compared to Asia, could make this option increasingly appealing for brands. However, significant barriers for relocation exist, including worker skill levels, workforce capacity, infrastructure limitations, and supporting logistics. These will all incur cost. It is not as simple as asking the question "stay or go". Relocation can have profound consequences on workers that are left behind, in addition to the broader economies of these production centers.

Conclusion

The climate vulnerabilities of workers, manufacturers and of fashion's substantial output in tropical and subtropical centers are measurable, and our (and others') projections show them growing. They are cutting deeply into export earnings, employment and worker health. Without rapid adaptation, these falloffs in earnings and jobs will compound.

The more urgent recommendations made above are obvious, or should be. With years of experience and a constant flow of relevant climate reporting, do global fashion brands, manufacturers and governments really need to be confronted with these data? Probably not.

And yet there is real risk that brands and retailers will stay on the low road when it comes to climate adaption: heat measures as part of worker 'wellness' programs and commissioning of flood hazard certifications, for example.

So, where is the higher ground?

It is where these financial, social and environmental risks overlap: adaptation and mitigation, productivity and earnings, worker income and worker health, and jobs. For workers, the need is clear enough. For manufacturers, the re-couping of heat- and flood-related shortfalls in earnings makes adaptation feasible, if not attractive. For buyers and investors, unmeasured risk can mean long-term losses, and adaptation investments can yield both relief and rewards. For governments, new jobs and export earnings are crucial. Higher ground is where new rules generate action, accountability and a just resilience.

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