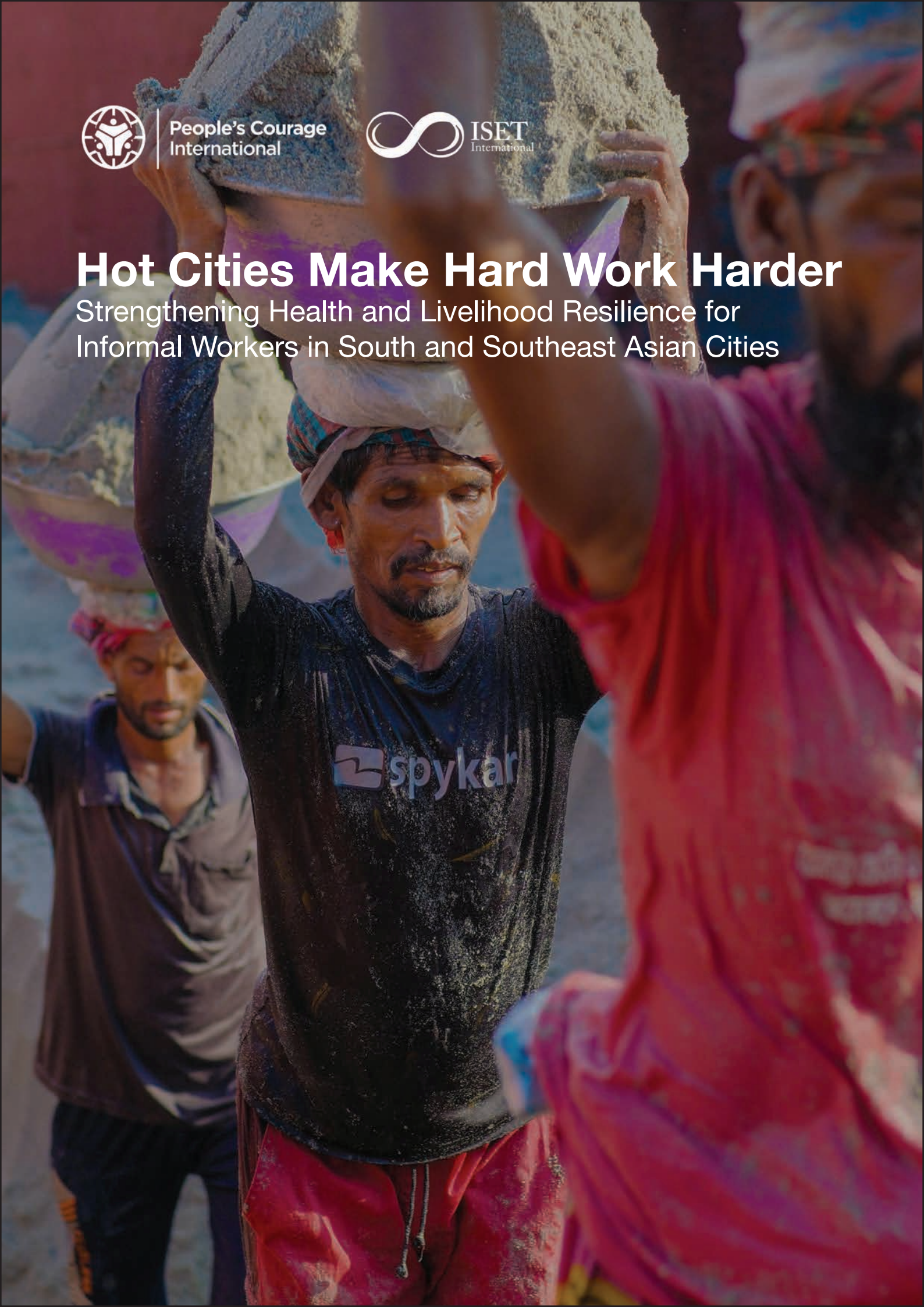
People's Courage International

ISET International

Hot Cities Make Hard Work Harder

Strengthening Health and Livelihood Resilience for Informal Workers in South and Southeast Asian Cities



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STUDY TERMINOLOGY

Destination locations

These refer to places where migrants have moved to within or outside a country. For the context of this study, this refers to cities within the country where internal migrants have moved to.

Heat/Extreme heat

Abnormally high day and/or nighttime temperatures relative to the local climatological norms. What is considered "extreme" varies by region and season, depending on typical temperature ranges and/or local thresholds for heat-related impacts. In practice, intensity is gauged not only by high day/night temperatures and the count of consecutive days above a local threshold, but also by heat-stress metrics like Wet Bulb Globe Temperature (WBGT, see definition below) and warm-spell indices such as the Warm Spell Day Index (WSDI, average number of consecutive days with max temp > 90% the historical average, see https://climate-scenarios.canada.ca/?page=climdex-indices).

Heat stress

What happens when an object (human body, animal, plant, piece of infrastructure) is exposed to more heat over time than it can accommodate. For people and animals, heat stress occurs when heat builds up faster than the body can cool and the internal temperature begins to rise; this can lead to heat-related illnesses like heat exhaustion or heatstroke. For plants, heat stress causes wilting, reduced yields, die back, and/or death. For physical infrastructure, heat stress softens or melts materials, increasing the chance of failure.

Heatwave 

Multiple days and nights of unusually hot weather or extreme heat, during which local excess heat accumulates.[i] There is no universal definition of heatwave; most heatwave criteria are based on thresholds that represent extreme values for a given location and time of year, often with implications for human health, infrastructure, and ecosystems. For example, the daytime maximum threshold at which heat is considered a heatwave in Delhi is 45°C, while in Kathmandu a heatwave is temperatures exceeding a daily maximum of 30°C for a specific period.

Informal workers 

People working in jobs that are not formally recognised. Because they lack formal recognition, informal workers often experience highly exploitative and poor labour conditions. They can be piecemeal workers and day labourers without formal hiring mechanisms and/or hired by sub- and sub-sub-contractors on an irregular basis. As a consequence of the lack of formal recognition under existing laws and policies, informal workers often lack access to critical services, and they typically live in informal, poorly constructed settlements located in highly climate hazard exposed areas.

Internal migrants 

People who have migrated within their own country, typically in search of employment or better wages, but often also pushed into migration by factors such as climate change, lack of livelihood options, loss of jobs, and/or loss of crops at their source location. Internal migrants are a significant proportion of the informal worker population.

Urban Heat Island (UHI) 

Urban areas often experience significantly higher temperatures than their rural surroundings due to heat-absorbing surfaces (e.g., asphalt, buildings), limited vegetation, paved surfaces, and heat emissions from machines like cars and air conditioners. UHI effects increase both daytime and nighttime temperatures and can significantly increase heat risk. UHI effects are typically not taken into consideration in weather forecasts and heat warnings; as a result, areas with high UHI effects can be at significantly greater risk than the forecast suggests. Due to high building density, high-thermal-mass building materials, poor ventilation, and limited tree canopy cover, informal settlements are particularly exposed to the UHI effect.

Wet Bulb Globe Temperature (WBGT) 

A physiologically grounded index of environmental heat stress that reflects the body's actual heat load by integrating air temperature, humidity (evaporative cooling potential), radiant heat from sun or other sources, and air movement. Unlike simple "feels-like" metrics, WBGT was built to track the drivers of core-temperature rise, cardiovascular strain, and dehydration risk, and is widely used to set work–rest cycles and activity adjustments in labour, sport, and military settings. Because it incorporates radiant heat and ventilation, it is the preferred basis for many heat-safety decisions indoors and outdoors.

[i] World Meteorological Organization. (2025). Heatwave. Retrieved September 29, 2025, from https://wmo.int/topics/heatwave


TRIBAL
STEETWEAR

Preface

Extreme heat is no longer a future climate threat – it is already disrupting lives and livelihoods across South and Southeast Asia. For informal workers and internal migrants who sustain our cities, rising temperatures are increasing health risks, reducing productivity, and pushing households deeper into financial insecurity.

In 2024, our flagship report, Coping with Climate: How Extreme Weather is Already Impacting Internal Migrants, revealed that 70% of respondents reported extreme heat had significantly affected their lives and work. That finding became the catalyst for this study.

This report captures the lived realities of informal workers across five cities – Delhi, Kathmandu, Dhaka, Jakarta, and Quezon City – drawing from focus group discussions, in-depth interviews, and key informant consultations. It highlights how hotter days, warmer nights, and the urban heat island effect are intensifying vulnerability, particularly for those with the least protection and visibility in urban planning and policy.

But this report is not only about risk – it is a call to action. Heat must be recognised as a serious hazard, and city responses must move beyond reactive measures. Governments, employers, and communities must work together to strengthen heat governance, extend social protection, and integrate worker protections into heat action planning.

As a way forward from this research, our team at People's Courage International is currently ideating and implementing a set of pilot initiatives, including parametric insurance models, community cooling centres, and climate-resilient housing solutions. These pilots aim to reduce heat stress, improve worker wellbeing, and strengthen climate adaptation capacities among vulnerable communities. While the focus of this report is on heat, it is also important to underline that multiple other conditions – such as poor air quality (AQI), flooding, droughts, unpredictable rains – are also intensifying and compounding workers' vulnerability.

Urban resilience cannot be achieved without protecting the workers who keep cities running. This report is a step toward ensuring that those most exposed to the harsh conditions unleashed by climate change are no longer excluded from the solutions.

Ashif Shaikh
Chief Executive Officer
People's Courage International

Executive Summary

In 2024, we released our flagship research, *'Coping with Climate: How extreme weather is already impacting internal migrants'*.[1] A key finding from the research – which was based on approximately 24,000 internal migrant surveys, focus group discussions, and expert interviews – was that rising heat is having a profound effect on internal migrant workers in cities. Strikingly, 70% of respondents reported that extreme heat had significantly affected their lives and livelihoods. This is especially alarming given the projections for increased temperatures and increased internal migration in the coming years.[2] These findings became the catalyst for the research presented in this report.

Extreme heat is often overlooked compared to rapid-onset hazards, yet data shows a steady increase in global heat-related mortality attributable to climate change from 1990-2020,[3] [4] with extreme hot temperatures already more frequent.[5] The World Meteorological Organization's director warns that it is *"the deadliest of all climate-related hazards"*.[6] Informal workers, already living in precarious conditions, face heightened risks as rising temperatures push cities into unprecedented extremes. And, as a major labour force within cities, informal workers are critical for driving urban development and economic growth and building climate resilience – governments need to ensure their safety and security. Despite these realities, the lack of legally binding policies to protect informal workers and heat action targeted at building the heat resilience of these workers is a significant gap. Lacking action, informal workers, who already live at the fringes of society, will continue to be pushed by extreme heat to the brink of survival.

This study is critical for shrinking the gap between urban heat governance and the needs of vulnerable populations. It provides a view of what heat vulnerability and resilience of informal workers looks like across five cities in South and Southeast Asia — Delhi, Kathmandu, Dhaka, Jakarta, and Quezon City. It also identifies recommendations for addressing the overarching heat challenges and impacts experienced in these cities. **This study is based on 25 focus group discussions and 50 follow-up in-depth interviews with 251 workers, 50 key informant interviews, desk review, and findings from our previous survey of informal workers[ii] in these cities.**

[ii] We consider data from 2252 internal migrants, who are the subset of the 24,000 migrants surveyed that live in the five cities.

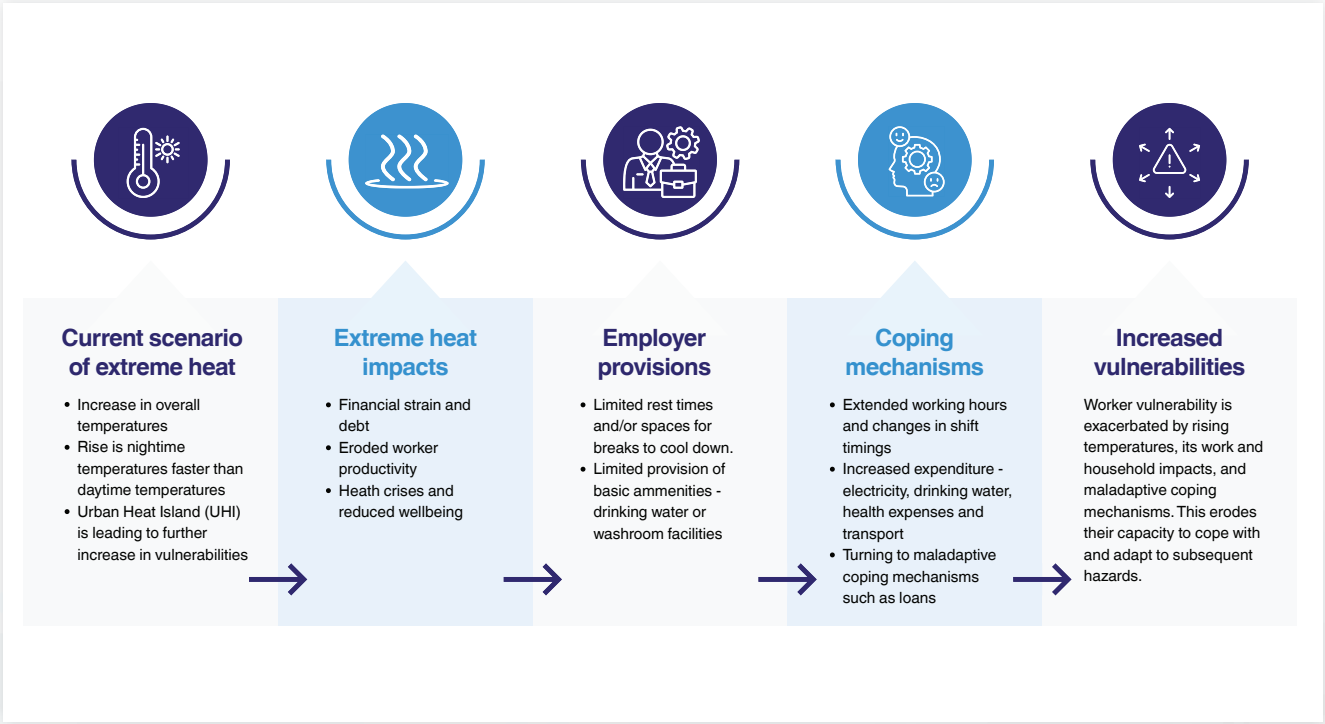


Figure 1: Extreme heat increases vulnerabilities of informal workers

Key Takeaways

Rising urban heat—exacerbated by hotter nights and the urban heat island (UHI) effect—is stripping vulnerable communities of recovery time and intensifying health risks in South and Southeast Asian cities.

- In many regions, nighttime temperatures are rising even faster than daytime temperatures. As nights become increasingly warm, compromising sleep, they are eroding essential recovery periods, increasing health risks, and compounding the strain on vulnerable communities.
- The UHI effect, combined with the urban vulnerability context in South Asian and Southeast Asian cities — unplanned growth, poor housing, unventilated and crowded workplaces, limited services — means that the most vulnerable groups face the most significant impacts.

Heat is already one of the most significant climate threats facing informal workers and internal migrants in Asian cities. 95% of migrants we surveyed report negative impacts on their lives and livelihoods in cities.

- In our *Coping with Climate* survey, heat was the top-ranked weather event impacting internal migrants in Delhi (90%), Jakarta (100%) and Quezon City (84%). In Kathmandu (46%), it was second, and third in Dhaka (74%). More than half of surveyed migrants in most cities reported being negatively affected by increasing temperatures, an astounding proportion.

Coping with extreme heat is driving informal workers into financial strain and debt, undermining resilience and long-term adaptive capacity.

- Increased heat-related expenses, such as healthcare costs, increased electricity usage for fans and paid drinking water intake, quickly drain household budgets already stretched by food, rent, and school.
- Cascading failures at home raise costs: water and power interruptions from load-shedding increase heat exposure, dehydration risk, and household expenses.
- Limited finances reduce capacity to adapt, leading to maladaptive choices such as taking loans, skipping meals, and delaying care, which deepen vulnerability.

Extreme heat is eroding worker productivity and recovery, trapping informal workers in a cycle of long work hours with inadequate protections and in unsafe working conditions.

- Constant heat exposure at home, during commutes, and at work reduces output and can lead to unpaid days, pushing workers to extend shifts and cutting into rest.
- Employers rarely provide basic protections such as shade, cooling facilities, cool drinking water, or adequate rest. Poor hydration and lack of restroom access are persistent pain points.
- When daytime exposure combines with hot homes at night, workers begin each shift with a recovery deficit.

Rising heat is severely impacting informal worker households, leading to health crises and reducing well-being.

- Health issues due to heat exposure are widespread and costly, including spending on medicines, clinic visits, and sometimes hospitalisation.
- Hot, poorly ventilated dwellings plus water and power interruptions increase heat exposure and the potential for dehydration.
- Across all sites except Kathmandu, workers cited health problems as the most impactful secondary challenge from extreme weather (reported range 43%–90%). Extreme heat in particular exacerbates respiratory illnesses for workers and other vulnerable groups, leading to an increase in heatstroke.

Despite growing recognition of extreme heat, heat action remains limited, top-down, reactive, and insufficiently inclusive of vulnerable groups, leaving cities unprepared for intensifying heat events.

- Global and national recognition of heat is increasing, and countries and cities—such as Bangladesh, India, Nepal, and soon Quezon City—are developing explicit plans addressing extreme heat and heatwaves.
- However, limited awareness of heat risks and adaptation strategies within governments and communities remain. Unlike sudden disasters like floods or earthquakes, the health, economic, and social impacts of heat accumulate gradually and often go unnoticed until they reach severe levels, leaving populations and systems unprepared.
- Never-before experienced heat events are outpacing current adaptation strategies, revealing that continuing to treat heat as a nuisance poses risks of catastrophic failure. Urgent technical expertise is needed to integrate heat projections and extreme heat scenarios into cross-sectoral planning and long-term adaptation strategies.
- Even though there is a growing awareness to include marginalised groups, especially informal workers in heat policies, they remain largely invisible in policies and frameworks due to top-down decision-making that often overlooks community knowledge and needs.

Recommendations

For detailed stakeholder-wise recommendations, see Chapter 7

Recognise heat as a hazard.

Heat remains understood primarily as a problem for individuals, and is not understood as a chronic issue across all sectors and scales. Furthermore, government, employers, and informal workers have limited awareness and capacity to sufficiently address heat. Officially recognising heat as a hazard is the first step to initiating an all-of-society approach to minimising and addressing heat impacts.

Extend social protection during extreme heat.

Most countries have social protection mechanisms that support vulnerable and poor populations. Enabling existing mechanisms to trigger during heat events can support vulnerable and poor populations to access much needed relief (i.e income protection, food relief, and health support) during extreme heat events that result in wage loss and other cascading impacts.

Include informal workers in social protection programs.

This is necessary for heat, but extends beyond just heat adaptation. It is fundamental for uplifting informal workers given that they face compounding vulnerabilities due to climate change, social and cultural barriers and discrimination, financial and social instability/insecurity, and lack of political representation.

Engage in long-term heat action planning.

Heat plans, policies, and discourses need to go beyond reactive and response-related measures that primarily support coping to also include long-term measures that mitigate heat risk and enable adaptation both in the workplace and household.

Develop inclusive, community-centric heat action.

Ensure heat plans, policies, and discourses are inclusive of those most exposed and vulnerable to heat through community-centred approaches. This requires engaging with the range of heat vulnerable populations in cities to develop culturally appropriate strategies and solutions that respond to their specific challenges and reduce vulnerabilities.

Engage in multi-scalar and cross-sectoral heat action.

Currently, heat planning is so siloed that, unless government departments are directly involved, they have limited awareness of existing heat policies, plans, and discourses. This, in turn, has implications for the enforceability, monitoring, and effectiveness of these plans. Heat is an all-of-society issue and as such it necessitates an all-of-society approach.

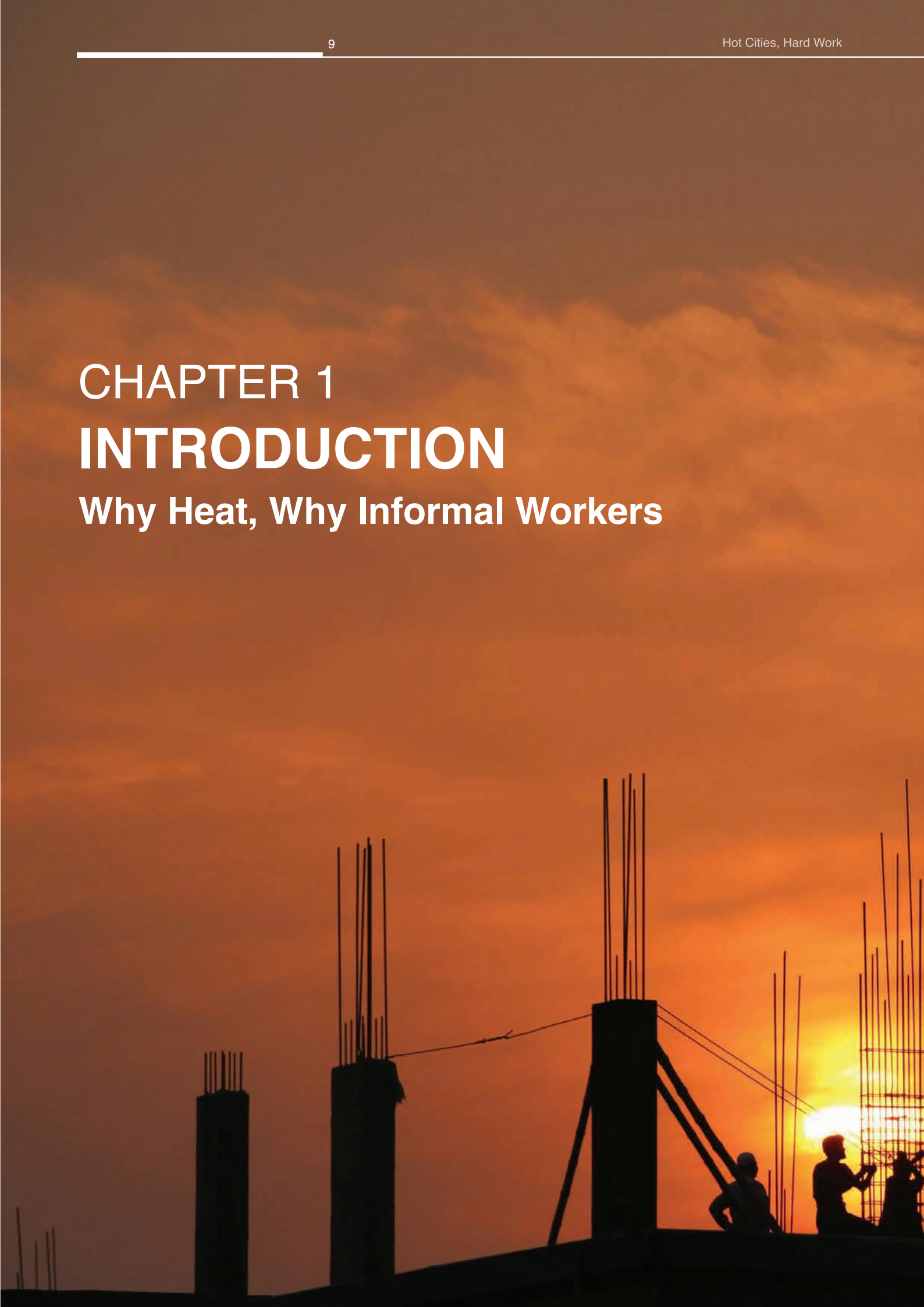
Integrate worker protections into heat policies.

Heat presents a unique challenge to workers in heat-exposed industries. Without wage protection, the threat of income loss due to reduced productivity is a harsh reality that many workers must face during extreme heat events. In addition, many workers continue to work through unbearable conditions because stopping work, or seeking relief through rest or water breaks, are not feasible options; they risk reductions in income and/or a loss of employment opportunities.

Enable research on developing heat solutions.

Invest in, and conduct, research on developing heat solutions. There is a need to further understand the differential needs, risks, and vulnerabilities to heat within informal worker populations. Assessments of impact and effectiveness of pilots and solutions focused on addressing heat are also needed to enable scaling and sustainability. Investment and research go hand in hand to ensure purpose-driven solutions that are actually implemented and usable.

CHAPTER 1
INTRODUCTION
Why Heat, Why Informal Workers



Recent hot seasons in South and Southeast Asian cities have brought record heat, rising night-time temperatures, and high humidity, increasing physiological strain and disrupting health, livelihoods, and essential services.[7] [8]

For outdoor and low-income indoor workers, heat risk is driven by exposure to sun and radiant heat, crowded or poorly ventilated housing and workspaces, limited rest and cooling options, thin safety nets, and the sheer effort of physical work, amongst other things.[9] [10] These factors increase the likelihood of heat illness, injuries, impairment, and knock-on effects such as income loss. [11] [12] [13]

Heat is often sidelined compared with rapid-onset hazards like floods and typhoons, yet small increases in average temperature are pushing cities into more frequent and harmful extremes.[14] This study centres the lived realities of informal workers, whose lives are already precarious and for whom increasing heat exposure is adding to that precarity. Treating heat as merely an annoyance increasingly conflicts with people's lived experiences and is no longer tenable.

The goal of this report is to:

- Share the lived reality of informal workers in Dhaka, Delhi, Jakarta, Kathmandu, and Quezon City and how the precarity of their lives and livelihoods is being dangerously intensified due to heat;
- Identify near-term entry points based on this learning, to move the global discourses on heat in ways that are more supportive of informal workers; and
- Support cities and governments to start addressing heat in tangible and sustainable ways that support the informal workers their economies depend on.

National and global actors, including government, donors, private sector, and civil society, can support building heat resilience through financing, guidance, incentives, and standards that make heat-safe practice the default.

1.1 Heat, a growing issue

Heat is increasingly becoming a serious issue, with a large number of deaths over the last decades attributable to it.[15] However, the impacts of extreme heat are underreported, with some estimates indicating that mortality is potentially 30 times previously suggested.[16] Populations who are particularly vulnerable to the impacts of extreme heat, namely adults older than 65 years and infants younger than one year, were exposed to twice as many health-threatening hot days in 2020 than they would have been from 1986-2005.[17] Common health impacts arising from heat exposure include dehydration and headaches, rashes, physical fatigue, excessive sweating, fainting, cardiovascular strain, loss of concentration, heat cramps, heat oedema, heat stroke, and adverse mental health impacts, all of which significantly affect peoples' overall well-being and productivity.[18] [19] Sustained exposure to heat can exacerbate underlying cardiovascular and respiratory conditions, and, paired with limited water intake, can lead to kidney disease and failure.[20]

Despite this, disaster risk management has historically prioritised rapid-onset hazards that cause immediate, visible damage, while heat remains underrepresented in policies and operational guidance.[21] This lack of attention and awareness cannot continue. Our current climate is rapidly getting hotter; heat is moving toward unprecedented temperatures and durations. Unlike many recurring natural hazards (e.g. floods) for which there is some experience from the household to national policy scale, projected heat exceeds anything seen before in human history. For these unprecedented events, we need to prepare now.

Across South and Southeast Asia, dangerous heatwaves in the pre-monsoon (South Asia) and late-spring (Southeast Asia) seasons are intensifying and occurring more often. While the rate of mean warming varies by location, extremes are rising faster than seasonal averages.[22] Humidity further amplifies heat risk, as does the urban heat island (UHI) effect.[23] The 2022, 2023, and 2024 pre-monsoon heatwaves in South and Southeast Asia resulted in fatalities, heat stroke, melted roads, power blackouts due to surging energy demands, school closures, and crop loss.[iii]

According to analyses by *World Weather Attribution*, climate change has made these heatwaves 30 times more likely.[24] In practical terms, this means that an event that occurred once every 90 years could now happen every 3 years. What were previously considered once-in-a-lifetime extremes are now becoming alarmingly frequent.

These changes are why this study is focused on heat: extreme heat and heatwaves are rapidly becoming the new normal. We need to adapt to this new world where weather that we currently label 'heatwaves' happens more frequently and potentially lasts for weeks.

[iii] Many news outlets have reported on this, including, for example, The Guardian and The Hindustan Times.

1.2 On heat's front lines: informal workers

Informal workers are on the front lines of heat. Many already cope with highly precarious livelihoods, inadequate housing, exclusion from existing social protection schemes, limited access to formal health services, and limited social acceptance; they are now also increasingly facing and trying to survive extreme heat conditions given their participation in highly heat-exposed sectors such as waste collection, street vending, construction, digital platform work and manufacturing. Importantly, dangerous heat is a slow-onset, "creeping" hazard: it builds day by day, is hard to pin to a single moment, and rarely triggers the alarms used for sudden disasters like floods. The additional burden posed by this heat, however, is mostly invisible and risks remaining so, until it hits a tipping point into catastrophe.

Despite growing pressure, responses have been uneven. In particular, initial efforts have been inadequate for marginalised populations, even though they are most exposed and vulnerable to extreme heat. These gaps already have consequences. There is a sense among informal worker populations that heat is something they have to deal with — *"we just go through it"* — particularly because they cannot afford to not work through heat events. Thus, extreme heat is undermining health, job security, and household finances, deepening the vulnerability of informal workers. As heat becomes more severe and frequent, the costs will escalate to the point that *"just working through it"* is no longer viable.

Experience from urban heat governance shows that informal worker invisibility can be overcome. Nepalgunj, Nepal, for example, introduced cooling centres at daily wage labour pickup sites and bus stations, "water ATMs" and tanker deliveries in markets, and ward-level training for street vendors, hawkers, rickshaw drivers, and women's groups to recognise and respond to heat illness.[25] However, though these reactive responses are vital to supporting informal workers during heat events, they are not enough. They also need to be complemented with proactive, targeted, and systemic action that reduces the exposure of informal workers and builds their security, as climate change will make heat events more frequent, longer-lasting, and more severe. Such action needs to target: both formal and informal employers to improve the working conditions of informal workers; informal workers to support behavioural shifts towards adaptation; governments to improve the provision of social safety nets, critical infrastructural services, and labour protections; and, cities to engage in solutions that reduce UHI.

Without this, informal workers will remain one heat event away from disaster (See Box 3 for a list of systemic and less systemic but important heat adaptation strategies).

Governments must lead on both tracks. In the near term, cities should institutionalise heat-safety basics where informal workers actually are — markets, depots, construction corridors, and transport hubs – with guaranteed water, shade, timed rest breaks, first-aid training, clear alerts, pop-up/mobile cooling stations, and clinic surge protocols (covering staffing, services, expanded hours, and mobile clinics). In parallel, efforts should be proactive and systemic: cooling homes and worksites through building code reform that covers heat adaptive architecture styles (often based on local traditional design) and reflective roofs, trees, and ventilation; workplace standards that cover informal settings; portable benefits or income protection so people can pause on extreme days; reliable neighbourhood power and water to sustain cooling; and a formal role for worker associations in planning and budgeting. Pairing these tracks reduces baseline exposure and helps keep households from being pushed over the edge as heat seasons intensify.

However, governments need to work with impacted communities to identify appropriate solutions for each population and location and to make sure the most vulnerable are being reached. Already we are seeing that what few efforts are being made fail to reach those who most need support. To truly make a difference, solutions need to be shaped by and responsive to bottom-up needs, and effectively delivered from the top down.

1.3 Report objectives

In this report, **we provide a picture of how informal workers experience heat in order to highlight adaptation gaps.** This report also highlights opportunities for the global community to shrink the gap between urban heat governance and the needs of vulnerable populations. It provides a view of what heat vulnerability and resilience of informal workers look like across five cities in South and Southeast Asia — Dhaka, Delhi, Jakarta, Kathmandu, and Quezon City.

The information we provide is designed for:

- Practitioners and civil society actors working in urban areas and with/for vulnerable populations, in support of their urban resilience and social protection efforts.
- Decision-makers considering how to best address heat and setting up policy, strategies, and guidance on how heat should be addressed from the local to national levels.
- Global decision-makers who are currently driving efforts to develop global policies and tools which will then shape the efforts of national and sub-national policy making and implementation.
- Private sector stakeholders (both international and local), to inform their understanding of the experiences of workers during extreme heat and efforts to improve workplace safety, conditions, and regulations.
- Donors, to support decision-making on prioritising the types of solutions that need investment, including promising initial pilots that need additional support to bring to scale.

The information in this report is critical to ensuring that the bottom-up voices and realities of invisible populations like informal workers are integrated into the design and implementation of programs, policies, and tools that advance action on extreme heat.

1.4 Building on previous work

In 2024, we conducted and released our *Coping with climate: How extreme weather is already impacting internal migrants*[26] study and companion volume of case studies, *Voices of Resilience: Stories of internal migrants coping with climate change*.[27] This study was designed to establish a baseline of the weather-related impacts experienced by internal migrants in India, Nepal, Bangladesh, Indonesia, and The Philippines. It explored who internal migrants are, why they migrate and what challenges they face, how extreme weather and climate change are influencing this, and what support would better enable them to thrive amongst changing conditions.

Survey data was collected from source (migrant home villages) and destination (typically, though not solely, urban) locations. In total, 23,915 migrants — including 8,598 (36%) at destination — participated in the survey. Survey data was complemented by focus group discussions with internal migrants at source and destination locations to develop a nuanced understanding of their experiences with and vulnerabilities to extreme weather and climate change (see Table 1.1 for the number of internal migrants we surveyed at destination locations in Dhaka, Delhi, Jakarta, Kathmandu, and Quezon City). We also conducted a series of key informant interviews with civil society organisations, subject matter experts, and government officials to deepen our understanding of the internal migration landscape in each country, its interlinkages with climate change, and potential solutions.

In 2024, **90% of the internal migrants we interviewed reported being affected by extreme weather,** either at their place of origin, the destination, or both. In addition, **heat was ranked as one of the top three weather impacts faced by internal migrants, particularly at destination.** The internal migrants we surveyed and spoke with, widely relayed receiving little to no support during and after extreme events. That so many migrants were already experiencing the adverse effects of extreme weather served as a stark reminder: as climate change leads to more intense and frequent extreme weather events, current migrants will likely face even greater challenges.

These findings from 2024 were the impetus for this current study to further examine the specific effects of heat on informal and migrant workers, its implications on their lives and livelihoods, and potential areas of support for these communities.

Table 1.1: Sample of internal migrants at destination in our five target cities from 2024 study

City	No. of migrants surveyed in the city
Dhaka, Bangladesh	251
Delhi, India	353
Jakarta, Indonesia	201
Kathmandu, Nepal	305
Quezon City, The Philippines	1142
Total sample size	2252

1.5 Report structure

This report is divided into the following sections:

1 INTRODUCTION

Provides an overview of goals, heat as a growing issue, its correlation to informal workers, the objectives guiding this study and lastly, the motive behind looking at heat and its impact on workers more closely based on our previous research.

2 METHODOLOGY

Provides an overview of where, how, and with whom we collected our data, and our data analysis process;

3 URBAN VULNERABILITY TO EXTREME EVENTS

Provides a cross-cutting overview of the climate change context, the policy landscape, and vulnerability of informal workers to identify the systemic gaps in urban heat governance and contextualises heat impacts experienced by informal workers and the coping mechanisms they rely on;

4 IMPACTS OF HEAT ON INFORMAL WORKERS

Provides a cross-city narrative on the impacts faced by informal workers from heat exposure at home and at work, the short-term coping mechanisms used by informal workers during extreme heat, many of which may be maladaptive in the context of intensifying heat and extreme events;

5 COUNTRY CASE STUDIES

Provides a deeper look into the stories of informal workers affected by heat and the barriers they face in coping with and adapting to heat in each of the five cities;

6 RECOMMENDATIONS

Provides a forward look for developing an urban heat governance system that is inclusive of the informal workers that cities depend on. To make these recommendations more tangible, we have provided best practice examples from around the world that the global community, donors, and governments can mobilise around and apply to their own respective heat action;

7 CONCLUSIONS

Concludes this report with a call to action that informal workers need to be at the centre of policy decisions and actions when addressing extreme heat.

CHAPTER 2
METHODOLOGY

2.1 Country and city selection

This research draws on the insights and experiences of informal workers and internal migrants across five cities: Dhaka, Bangladesh; Delhi and National Capital Region, India; Jakarta and Greater Jakarta area, Indonesia; Kathmandu, Nepal; and Quezon City, The Philippines. These cities and countries were a part of our 2024 study. They were chosen based on their population size, migration intensity[iv] and high proportion of informal worker and internal migrant populations, global risk index ranking[28], challenges with extreme weather events, and study feasibility. In these cities, informal employment dominates the labour market, with internal migrants comprising a significant portion of the workforce. Although some are informally employed within the formal sector, the majority work in the informal economy.

2.2 Data collection and analysis

For the purpose of this research, four different methods were used to collect data: desk review, focus group discussions (FGDs), in-depth interviews (IDIs), key informant interviews (KIIs), and findings from our survey conducted in 2024 with migrants. The 2024 report data, though it does not encompass informal workers at large, is still a useful proxy for understanding this population's vulnerability to and experience with and during extreme events. Indeed, our FGD sampling, even though agnostic of internal migrants as a key criteria for this report, was composed primarily of internal migrants, suggesting that they make up a disproportionate percentage of informal workers.

The research was conducted in partnership with the following grassroots and research organisations working on climate and/or with internal migrants or informal workers across the five countries:

- Ovibashi Karmi Unnayan Program (OKUP), Bangladesh;
- Migrants Resilience Collaborative, India;
- PT Mitra Inovasi Saraswati (Saraswati), Indonesia;
- Centre for Social Change (CSC), Nepal; and
- The Initiatives for Dialogue and Empowerment Through Alternative Legal Services (IDEALS), Inc, Philippines.

Each of these organisations was engaged in respondent selection, question guide contextualisation, location selection, and qualitative data collection.

2.2.1 Desk review

A desk review of existing literature was conducted around our existing thematic areas – climate change, increasing heat, and informal workers and internal migrants for each sample city in South and Southeast Asia.

Further, for each city, we reviewed policies focused on extreme weather, increasing heat, and vulnerable communities such as informal workers and/or internal migrants.

[iv] The number of internal migrants out of the total population that wants to move

2.2.2 Focus Group Discussions

A total of 25 FGDs were conducted with informal workers and internal migrants across the five cities (see Table 2.1).

Table 2.1: Total number of FGDs conducted and respondents across sample cities

City	No. of FGDs	No. of FGD participants
Dhaka, Bangladesh	5	50
Delhi, India	5	41
Jakarta, Indonesia	5	38
Kathmandu, Nepal	5	47
Quezon City, The Philippines	5	25
Total sample size	**25**	**201**

To ensure diversity of responses and an accurate representation of the breadth of experiences faced during extreme heat, criteria were applied in selecting and organising each of the focus groups.

- **Gender, age, length of migration, marital status**: In each city, two FGDs were conducted with women, two with men, and one with a mixed group. This was done to ensure the unique experiences of men and women were separately represented, while giving each the freedom to speak openly.

  For male respondents, further criteria of age and length of migration were used to draw out the unique experiences of each of these sub-groups. One group was for younger respondents between the ages of 18 to 30 years, and the other for older/middle-aged men, 30 years and above. Groups also included both long-term and short-term migrants.

  For female respondents, a further criterion of marital status, i.e. single or married, was used, as single and married women have very different lives, opportunities, and experiences, especially in South Asia.

- **Employment sector (Table 2.2)**: Different employment sectors were considered during FGD respondent selection, based on survey data and in recognition of the differing heat challenges posed by outdoor and indoor work. Men and women also typically participate in different employment sectors.

Table 2.2: Employment sector selection for FGD participants

City	Sectors selected
Dhaka, Bangladesh	Factory work (Ready-made garment), construction work, domestic work
Delhi, India	Construction work and factory work
Jakarta, Indonesia	Construction work, factory work, street vending, and domestic work
Kathmandu, Nepal	Construction work, transport, domestic work, home-based workers and vendors
Quezon City, The Philippines	Factory work and street vending

FGDs were facilitated by two experienced facilitators from each partner organisation. They were conducted in closed-group settings in community areas and meeting rooms to avoid disturbances.

Facilitators followed an open discussion format for FGDs with some pre-determined questions designed to probe specific topics. Questions focused on understanding the challenges that informal workers and migrants faced in the city related to their work, the particular weather challenges they faced, their vulnerabilities, and specific impacts and coping mechanisms they adopted during extreme heat situations.

All names in the FGD quotes used in the report are pseudonyms to maintain the anonymity of respondents.

2.2.3 In-depth interviews

A total of 50 IDIs were conducted with informal workers and internal migrants across the five cities, with 10 in each city. The goal of the IDIs was to understand the stories of individual internal migrants and informal workers in cities, including their migration, their life in the city, and how they are affected by climate in general and heat specifically. Interviewees were selected from the FGD participants by the facilitators. Five women and five men were interviewed in each city.

IDIs were run by just one or two interviewers to foster a more conversational, private interaction. Interviews were conducted immediately following the FGDs, once the other participants had left the venue. Similar to the FGDs, interviews followed an open discussion format; they were lightly structured with a few pre-determined questions designed to explore their stories more deeply, which were shared in the FGD.

All names used in the IDI quotes and case studies used in the report are pseudonyms to maintain the anonymity of respondents.

2.2.4 Key informant interviews

A total of 50 KIIs were conducted across the five cities, 10 in each city. KIIs were conducted to understand the context and status of heat action in the cities, the unique challenges that informal workers and migrants face, and the policy landscape around climate and heat.

KIIs were semi-structured. Interviewees were selected to represent a range of CSOs, subject matter experts, and government officials. The key informants either had previous experience working on and/or knowledge of extreme heat, climate change, informal workers, or internal migration.

KIIs were conducted following the FGDs and IDIs and were structured to address key gaps identified in the discussions with workers.

2.2.5 Data analysis

This study relied on qualitative data analysis. FGD and KII transcripts were analysed on ATLAS.ti using code books to identify patterns and common themes across the cities and to develop a nuanced understanding of the heat-related vulnerabilities, impacts, coping strategies, and barriers to coping experienced by informal workers. The coding for all five countries was conducted by one group of researchers for consistency of data interpretation. Key findings were triangulated with partner organisations to ensure accuracy of data interpretation and synthesis.

A final draft of the report was also shared with partner organisations and interviewees to further ensure accuracy in the presentation of data, key findings, and recommendations.

2.3 Study limitations

Breadth versus depth

As a study spanning five cities and a predominantly interview-based qualitative data collection methodology, this report presents a bird's eye view of how and why extreme heat affects informal workers and the underlying heat policy and action landscape. Even though we spoke with over 250 informal workers during FGDs and IDIs, we did not span every sector that informal workers are engaged in. Similarly, while we spoke to several government stakeholders in each city, the silos between government offices and ministries mean that the interviews often provided a partial picture of ongoing government discourses and decision-making on heat action. As a result, we paired our field-based data collection with desk review.

Furthermore, because the field-based data collection was conducted by different partner organisations in each city, the focus of the data collected in each city was different and based on the partner organisation's expertise, interests, and network. Coding the data using common codebooks supported developing a broader understanding of heat vulnerability, impacts, and coping mechanisms. It also brought the data under a unified narrative. However, this report does not provide a deeper, comparative analysis of gaps and trends across the cities studied or in depth, city-specific recommendations. Therefore, this report should be used as a primer for a broad understanding of the issues faced by informal workers across South and Southeast Asian cities, alongside common entry points for action.

Perceptions of heat

2024 – an El Niño year – saw unprecedented temperatures. In 2025, during our field work, initial comparisons by workers were exclusively to the previous year. While understandable, given the extreme nature of 2024 temperatures, heat trends are best understood across longer periods of time. Thus, facilitators repeatedly worked with participants to reframe their thinking by emphasising the importance of considering heat trends over the past decade, not just the previous year, when discussing perceptions of temperature. However, it is crucial to underscore that extreme temperatures like those in 2024 are likely to become increasingly common in the years ahead.

Shifting our focus from internal migrants to informal workers

Our 2024 study was focused more narrowly on internal migrants. For this study, we expanded our focus to informal workers as most vulnerable internal migrants are informal workers, and urban heat governance is more likely to focus on informal workers at large than on internal migrants. Additionally, there is a need to work with both internal migrants and receiving/destination communities in parallel since they face similar issues and working together can increase social cohesion and address potential tensions associated with migration.

CHAPTER 3
URBAN VULNERABILITY TO EXTREME HEAT

Key takeaways

- Heat is rising due to climate change. Small changes to average annual temperature are already resulting in big increases in problematically hot weather and unprecedented heat.
- In most parts of the world, nighttime temperatures are rising even faster than daytime temperatures. This limits peoples' ability to recover from daytime heat exposure and allows heat stress to build rapidly, significantly increasing the risk of serious health impacts.
- This increase in heat is pushing Asian cities, already hot from the urban heat island effect, past health and infrastructure thresholds more often, especially at night and during pre-monsoon/late-spring periods.
- Asian countries and cities are beginning to mobilise around heat – they have begun heat policy discourses and developing heat action plans. At the global level, a heat framework is being developed, and it may help governments to frame and prioritise heat discourses and policies.
- Despite promising initial decision-making efforts, heat is not being treated as the long-term and systemic issue that it is. Decision-making is siloed and policy and plan enforcement is limited due to low local government capacity and poor cross-sectoral coordination. Plans also prioritise short-term and responsive heat action versus long-term adaptation that fundamentally reduces heat risk.
- Informal workers are highly vulnerable to extreme events and bear the brunt of heat impacts as they live in highly heat-exposed informal settlements and houses and work in heat-exposed industries and sectors. Yet, heat plans and policies typically do not mention or target vulnerable groups, let alone the informal workers who are critical for urban development and resilience.
- The ability of informal workers to adapt to heat is limited by the very nature of informality — their invisibility in society and decision-making, lack of access to critical services and social protections, poor housing, poor labour conditions, and constant exposure to extreme events. Add heat to the equation and the negative impact of these factors on workers' health and wellbeing is amplified.
- Left unaddressed, the impacts of heat on informal workers will negatively affect businesses, economies, and society in unignorable ways.

3.1 Climate change and heat

Heat is rising due to climate change. The last ten years, 2015-2024, were the ten warmest years on record; as of 2024, long-term global warming was about 1.3°C above the 1850-1900 (preindustrial) baseline.[29] 2024 was the warmest year, with a global average temperature anomaly of ~1.55 °C above the 1850-1900 (preindustrial) baseline.[30] This trend is continuing.[31]

This statistic alone can be misleading. For most people, a 1.3 °C increase is barely noticeable. Yet on a global scale, this seemingly small shift is significant. Even modest increases in the global average temperature can dramatically raise the frequency, intensity, and duration of extreme heat events. It signals disruptions in climate systems that fuel extreme weather.

Figures 3.1a and 3.1b illustrate how a rise in average temperature affects the frequency of extreme heat. As shown, an increase in the average shifts the entire distribution of temperatures to the right. As a result, weather that is currently considered “too hot” (light red) and “dangerously hot” (medium red) becomes much more common. In addition, unprecedented heat begins to appear (indicated by the darkest red area falling outside the limits of the grey box that indicates current climate).

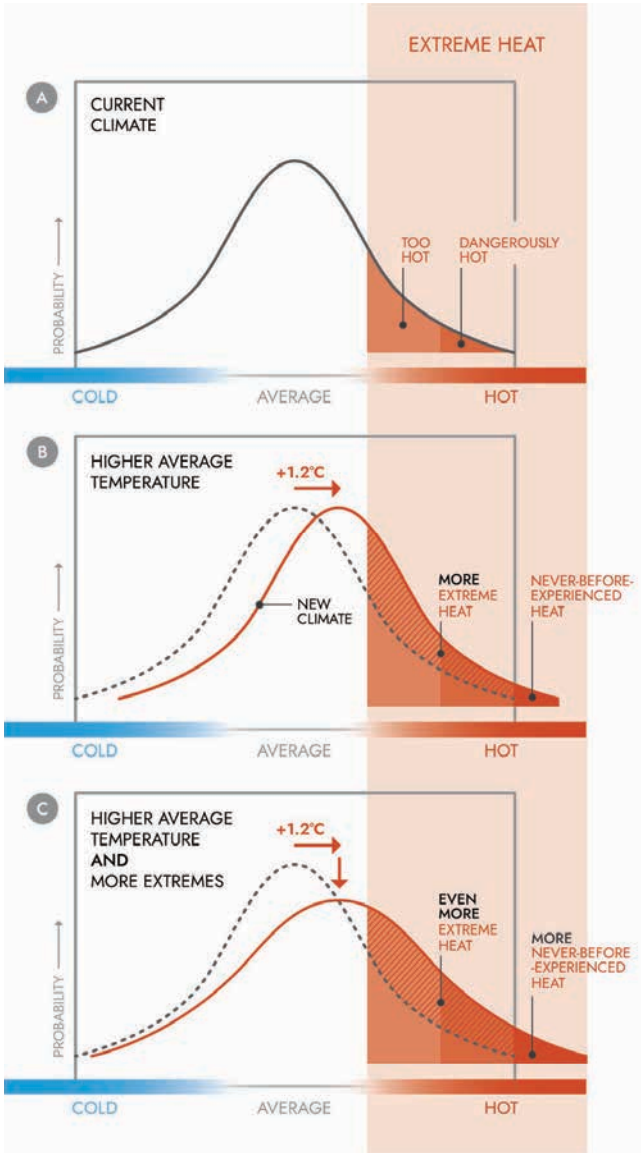


Figure 3.1[32] Climate change and extreme heat:

a) The distribution of historical temperatures - what is considered 'normal' conditions based on what humans have experienced in the past. Weather that is 'too hot' is shown in light red, and the much rarer 'dangerously hot' weather is shown in darker red. Where the thresholds for 'too hot' and 'dangerously hot' lie vary based on location and also vary for different populations, but they are typically rare. The amount of area that is shaded reflects how often these temperatures are experienced.

b) A climate 1.2 °C warmer than in the past, assuming there is no change to the shape of the curve and that the curve is just shifted to the right where temperatures are warmer. Using the same cutoff point as used in a, this figure now shows how much more of the new, shifted curve is shaded red. This illustrates how much more often problematically hot weather will be experienced. It also illustrates that temperatures will move beyond the current grey bounding box; in the shifted curve, we begin to see never-before-experienced heat, shown in darkest red.

c) This figure shows what many locations are already experiencing, both an increase in average temperature - the temperature curve shifting to the right - and an increase in temperature variability - the entire temperature curve flattening. The combination results in much more of the area under the curve being shaded red, indicating a much higher frequency of too hot, dangerously hot, and never-before-seen hot weather than we have historically experienced.

The potential impacts revealed in Figure 3.1a and b are concerning on their own. Unfortunately, the actual changes we are already seeing are even more alarming. Figure 3.1c illustrates how the combination of observed increases in average temperatures (our temperature curve is shifting to the right), combined with an observed increase in temperature variability (the temperature curve flattening and widening) creates a warming shift that moves the centre of the curve to the right and broadens its shape. In other words, the combination further increases both the overall prevalence of hot weather and the frequency and severity of unprecedented heat extremes.

These temperature increases affect more than just peak daytime heat. In most parts of the world, nighttime temperatures are rising even faster than daytime temperatures. This adds another layer to the heat challenge. Populations adapted to historical heat may be able to tolerate more frequent hot days, even those exceeding past extremes, by relying on cooler nights for recovery. However, when nighttime temperatures also increase, the body's ability to recover is compromised. As a result, heat stress can build rapidly, significantly increasing the risk of serious health impacts.

In cities, there is yet a third challenge — the Urban Heat Island (UHI) effect. Urban areas often experience significantly higher temperatures than their rural surroundings due to heat-absorbing surfaces (e.g., asphalt, buildings, etc.), limited vegetation, loss of evaporative cooling from vegetation and bare soils, and heat emissions from machines like cars and air conditioners. UHI effects increase both daytime and nighttime temperatures, often by many degrees, and can significantly increase heat risk. UHI effects are typically not taken into consideration in weather forecasts and heat warnings; as a result, areas with high UHI effects can be at significantly greater risk than the forecast would suggest.

The UHI effect, combined with the urban vulnerability context in South Asian and Southeast Asian cities — characterised by unplanned growth, poor housing, limited services — means that the most vulnerable groups face the most significant impacts.[33] Some people in a city are protected from and can avoid the heat; people with access to cooling, desk jobs, comfortable homes, and air conditioned vehicles for travel, can be unaware a heatwave is even happening. However, for informal workers and low-income neighbourhoods, outdoor exposure, crowded housing, limited cooling, and fragile power and water systems compound risk, turning seasonal heat into a regular threat.

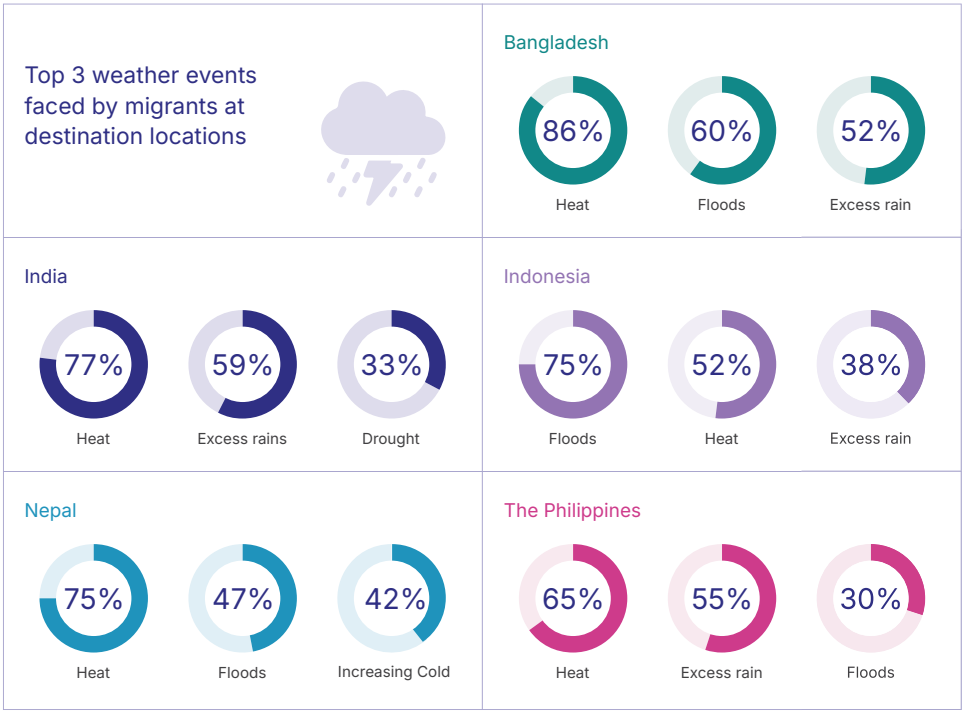


Figure 3.2: Top 3 weather events faced by migrants at destination locations[v] [36]

[v] This data from our previous study is based on a sample size of 4,517 which is inclusive of other destination locations as well, apart from the ones we have narrowed down on for this research study.

Overall, these factors explain why a 1.3 °C increase in average global temperature is already driving record-breaking heatwaves, higher nighttime temperatures, and increased pressure on power, health, and water systems. Mid-range emissions scenarios project an additional 0.3 °C of warming by 2040. Though this increase may seem small, it is likely to have a profound effect on the frequency and severity of extreme heat.

As a result designing heat-resilient infrastructure, housing, and working conditions is a near-term necessity, not a distant climate ambition.

These challenges of increasing heat are particularly apparent in South and Southeast Asia, where average temperatures have climbed and hot extremes are becoming more common and disruptive. Cities in this region, already hotter due to the UHI effect, are being pushed past health and infrastructure thresholds more often, especially at night and during pre-monsoon/late-spring periods. Evidence of these trends, published in recent studies and reports, are provided in Annex A.

This heat is already impacting informal workers, and these impacts will increase. Internal migrants at destination locations in cities that we talked with for the 2024 *Coping With Climate Change*[34] study listed heat as one of their top three climate challenges; in India, Nepal, Bangladesh and The Philippines, it was listed as the primary weather-related challenge.[35] Left unaddressed, these impacts will demand attention due to their negative effects on businesses, economies, and society.

A closer look at the 2024 survey data filtered for just the five target cities in our present study shows that heat is a substantial challenge for respondents (Table 3.1). In Delhi, Jakarta, and Quezon City, heat was the top-ranked weather event impacting internal migrants. In Kathmandu, it was second. It was third in Dhaka, a location where floods and excess rains caused even more distress for the migrant worker community. Regardless, more than half of surveyed migrants in most cities reported being negatively impacted by increasing temperatures - an astounding proportion.

Table 3.1: Percentage of internal migrants impacted by heat in surveyed cities

City	Percentage of respondents negatively impacted by heat in the city
Dhaka, Bangladesh	74%
Delhi, India	90%
Jakarta, Indonesia	100%
Kathmandu, Nepal	46%
Quezon City, The Philippines	84%

3.2 The policy landscape for heat

In recent years, despite widespread recognition that heat is a growing problem that needs to be addressed, adaptation to heat has been hindered by the lack of a whole-of-society approach to action. As a result, and especially in low-to-middle income countries, adaptation to extreme heat has primarily been implemented by individuals and communities, and focused on coping and response.[37] Indeed, in our conversations with informal workers, it was apparent that they consider heat as something that they have to 'deal' with. Additionally, heat has widely been treated as an acute issue despite increasing economic impacts[38] and the experiences of people and climate projections suggesting that heat is increasingly a chronic issue.

This is slowly changing, with efforts at the global level to mobilise governmental action on heat and efforts at the sub-national-to-national levels to develop heat action and heat health plans.

3.2.1 The global community is starting to mobilise on heat

In 2024, the UN Secretary General called for urgent, coordinated action around extreme heat, and explicitly identified the importance of protecting workers across sectors.[39] In response, in November 2025, the Global Heat Health Information Network, the UN Office for Disaster Risk Reduction, the World Meteorological Organization, and Duke University's Nicholas Institute for Energy, Environment & Sustainability published the Extreme Heat Risk Governance Framework and Toolkit[40] to facilitate the integration of extreme heat into disaster risk reduction (see Box 1).

In the Framework, effective heat governance is defined as:

> **"… a coordinated and inclusive process through which actors (e.g. government officials, communities, business owners, workers, investors and funders, civil society, international organizations, etc.), institutions (e.g. ministries, utilities, the health sector, worker coalitions, etc.), and assets (e.g. data systems, cooling centres, urban planning tools, critical infrastructure, basic services, etc.) work together across multiple timescales to guide, coordinate, implement and oversee the reduction of heat-related risks and related areas of policy, investment and action."** [41]

The framework emphasises the importance of taking an inclusive, long-term, and whole of society approach that is centred around people and ecosystems and is also evidence-informed. The framework recognises that *"[heat's] impacts are shaped by geography, inequality, gender and local contexts"*[42] and that informality is a key driver of heat vulnerability and impacts. In particular, it recognises that informal workers live in poorly built informal settlements, often work in heat-exposed sectors, lack access to critical services, and may experience income loss during heat events, all of which exacerbate their vulnerability to heat and constrain their ability to adapt. Thus, the framework calls explicitly for efforts to reduce extreme heat risk for people working or living in informal settings and identifies representatives of informal populations as key stakeholders to involve in planning and action on heat.

Box 1: Extreme Heat Risk Governance Framework and Toolkit

In November 2025, the Global Heat Health Information Network, United Nations Office for Disaster Risk Reduction, World Meteorological Organization, and Duke University published the Extreme Heat Risk Governance Framework and Toolkit. This document is intended to support decision makers to understand and strengthen extreme heat risk governance such that resulting heat policies and plans are multi-sector, multi-scalar, long-term, evidence-based, and sufficiently funded.

It provides

(1) a comprehensive analysis of the challenges underlying extreme heat risk governance and the drivers of vulnerability to extreme heat and adaptation to heat,
(2) a set of core principles underlying extreme heat risk governance, and
(3) a flexible toolkit for assessing, operationalising, and planning for extreme heat risk governance.

It identifies the following principles underlying extreme heat risk governance:

1. **People-centered**
2. **Holistic and interconnected**
3. **Equitable and just**
4. **Inclusive**
5. **Agile**
6. **Collaborative**
7. **Proactive**
8. **Whole-system**
9. **Evidence-based**
10. **Diversified and sufficient resources**

Though similar global policy mechanisms and frameworks such as the Sendai Framework for Disaster Risk Reduction have come under scrutiny for their effectiveness in truly shifting development and governance paradigms, they have also been instrumental in bringing new ideas into and helping frame policy discourses and decision-making.[43] To this end, a global heat framework is a critical first step to moving towards disaster and climate governance that includes heat. Even if it is non-binding and difficult to enforce, such a framework could help set the tone of and prioritise government heat discourses.

We are also beginning to see sector-related movement on heat governance. A key example comes from the International Accord for Health and Safety in the Garment and Textile Industry, which, in December 2025, agreed to develop a Protocol on Heat Stress to strengthen climate-related protections for workers working in the fashion industry. This protocol would result in binding and enforceable protections for workers against extreme heat.[44]

3.2.2 Countries are engaging on heat response

With increasing attention on heat, national and sub-national governments have started new discourses on addressing heat (i.e. via new policy making processes and annual conferences focused on heat). They have also developed heat advisories/ plans, and/or are integrating heat into national disaster and climate policies and plans.

Most of the five countries included in this study do mention heat or rising temperatures in their National Adaptation Plans (NAPs), showing broad recognition of heat as a climate hazard. Furthermore, NAPs identified the need to integrate heat management into other sectors.National level recognition of heat has paved the way for the countries and cities to more explicitly plan for heat.

Nepal developed a Plan of Action for Risk Reduction and Response on Measures for Protection from Heatwave (2024), which includes measures such as spreading heat awareness, preventing dehydration and overheating, building cooler homes, and flexible work hours.[45] Delhi's Heat Action Plans (for 2024-2025 and 2025) focused on reducing the health risk posed by extreme heat. They contain provisions for improving access to drinking water for informal workers, improving access to health services in informal settlements, establishing cool rest and shade areas, and rescheduling outdoor work hours to cooler times of the day.[46]

In some key informant interviews, we learnt Bangladesh and Quezon City are in the process of developing similar plans. Indonesia is in the midst of policy discussions aimed at intentionally addressing heat at the national level.

3.2.3 Decision-making on heat is siloed

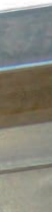
However, key informants noted that despite broad recognition of heat as a risk, it is still not receiving significant government focus and resources. Many key informants attributed this to a lack of awareness on heat and heat adaptation within government and communities.

Indeed, unlike floods or typhoons, heat does not appear as an immediate or visually catastrophic disaster. The health, economic, and social impacts of heat often build up slowly and go unnoticed until they become severe.

"The challenge, however, lies in the nature of heat itself. The slow onset of heat-related illnesses, coupled with the fact that heat is not as visually catastrophic as, say, flooding or an earthquake, means our response tends to be primarily reactive. First, we are mostly just responding; and second, we are not fully considering how this can lead to severe long-term health impacts. This is an issue we need to pay more attention to and actively focus on."

Apekshita Varshney
Founder, HeatWatch, India

The lack of focus on heat is visible in practice. Heat-related decision-making typically occurs in siloes. Heat plans and policies are often developed by sector-based government departments or spearheaded by national UN offices or CSOs rather than through central planning agencies. For example, some heat action plans are sector-specific – such as Bangladesh's National Guideline on Heat-Related Illness or Indonesia's National Cooling Plan, focused on sustainable cooling through the energy sector – rather than being a part of a broader urban heat management approach. The heat action plans we reviewed were also non-binding. Furthermore, heat is not routinely integrated into existing, relevant policies, such as labour and social protection policies. Employers have little guidance or incentive



to provide shade, hydration, or rest periods. Low local government capacity and awareness of heat exacerbate siloed decision-making, making it difficult to coordinate across government to effect a coherent, grounded, multi-sectoral urban heat management strategy or enforce new regulations. Thus, heat is not treated as the long-term systemic issue that it is.

Bangladesh and the Philippines have made critical first steps towards limiting siloed decision-making through the creation of new government structures tasked with coordinating and mainstreaming heat management. North Dhaka, Bangladesh (with support from the Arsht-Rockefeller Foundation) appointed a Chief Heat Officer from 2023-2024 to raise heat awareness, explore nature-based solutions, and facilitate municipal climate action planning. The Philippines created a new division with the Department of Health – the Division of Health and Climate Change Office – to integrate climate considerations into health-related decision-making. The impact of these newer initiatives has yet to be seen by stakeholders on the ground.

"If we talk about heat, that is an area that I think we are still sorely lacking in terms of policy interventions and programs. Because aside from just class suspension, not even work suspension, there is no other mechanism, at least that I know of, being done – both at national government and local government. Usually, these are just catered to communications awareness, "Hey! This is what you need to do when there's a heatwave." But there's no actual service, no actual mechanism. So, long story short, I think they are minimal… there are already response mechanisms to address the climate crisis, but they are not tailored towards addressing the needs of informal workers directly."

Kessica Bersamin
City Advisor, C40 Cities, The Philippines

3.2.4 Decision-making on heat is short-term and reactive

To date, heat plans and policies have largely emphasised response. Though these measures are essential, including core safeguards for water, shade, and rest at worksites; neighbourhood alerting and outreach; and financing that enables wage protection or brief paid pauses when conditions become unsafe, on their own they are not enough. They overlook many hidden consequences of heat (productivity decline, wage loss, job insecurity, and long-term health effects) and keep heat management backward looking, reliant on ad hoc, short-term, reactive strategies instead of climate-informed, proactive risk reduction and systemic change.

With never-before-seen heat emerging now and projected to intensify, the 'heat as an annoyance' mindset and associated strategies, though necessary, will not be enough. They will likely fail catastrophically as temperatures rise. This underscores the need for investment in research, pilots, and the technical expertise to develop and scale long-term adaptation options and to integrate heat projections and extreme heat scenarios into decision-making.

To this end, Delhi's Heat Action Plans (2024-2025 and 2025)[47] can be considered a good practice example of sub-national heat planning, despite the challenges with enforcement and implementation conveyed by key informants. They contain long-term measures and strategies to reduce heat risk, including: the improvement of building practices and standards; initiating heat early warning systems and ensuring that heat alerts reach vulnerable groups; building shelter locations for slum dwellers and the urban poor; raising awareness and capacity-strengthening on heat and managing its impacts; promoting green infrastructure and other nature-based solutions; and so on.

3.2.5 Decision-making does not sufficiently consider vulnerable people

Finally and fundamentally, while the need to address heat is gaining traction, the inclusion of marginalised groups in heat frameworks, policies, and discussions is limited at best. The exclusion of informal workers and vulnerable groups is a function of traditionally technocratic, top-down decision-making processes that result from government mindsets, tools, and methods that do not promote community-scale agency, leverage community-scale knowledge, or incorporate community-scale needs and priorities.

As a result, heat policies and plans fail to target informal workers and vulnerable groups more broadly with tailored measures, instead relying on generic approaches. Therefore, available funds and programs often fail to reach those who need them the most.

At the national and sub-national levels, the invisibility of informal workers in heat policies and plans is exacerbated by their lack of government recognition and poor data on the differential vulnerabilities of these groups and their experience with heat. For example, in Nepal, informal workers are highly stigmatised, they are rarely included in climate and labour policies and government services. Additionally, the invisibility of informal workers has made it difficult for trade unions and the CSO sector to represent their interests in their advocacy. The Delhi Heat Action Plans (2024-2025 and 2025)[48] show better consideration of informal workers and those living in informal settlements, with provisions for improving access to shade, water, and health services. However, there is potential to extend more services and protections (e.g. on wage loss) for informal workers to support their ability to cope with and adapt to heat.

The overall limited recognition of informal workers has resulted in very real issues. For example, short-term measures such as generating and disseminating heat-related alerts are often not designed with vulnerable populations in mind; for example, vulnerable populations may lack access to the technology needed to receive such warnings. In Indonesia, informal workers and internal migrants cannot access the otherwise strong worker protection system. This is due to limited access to information, arbitrary scheme criteria leading to constant rejections and residency documentation affecting access to services for migrants. BPJS Kesehatan,[vi] Indonesia's national health insurance programme, operates through residency-linked registration and contribution categories. Employer-mediated enrollment missed or late premium payments, and criteria on portability across districts can interrupt or delay benefits, even when people are nominally covered.

With limited policy protections and provisions to cope with and adapt to heat, the responsibility and cost of coping with heat largely falls on informal workers themselves. However, recent global policy efforts that explicitly recognise the importance of prioritising vulnerable groups, and especially informal workers, in heat policy and action may set the tone for more inclusive national and sub-national heat policies and plans moving forward. In particular, the Extreme Heat Risk Governance Framework and Toolkit,[49] which calls for efforts to reduce extreme heat risk for people working or living in informal settings and including representatives of informal populations in decision-making, will likely be a key document that governments use to structure their heat planning. It remains to be seen how this effort moves the needle on inclusive heat action policy and planning.

3.3 The precarity of informality in extreme heat

Informal workers are critical to the economies of many urban hubs,[50] making up the labour base for essential industries and sectors. Yet, informal workers exist at the fringes of urban society. Based on our desk review and discussions with informal workers and key informants, informal workers often live in poorly constructed settlements and housing, lack access to critical services, experience highly exploitative and poor labour conditions, and are often excluded from key policies or processes that might help to reduce their exposure and vulnerability.[51] In particular, informal workers experience the brunt of heat impacts, and yet are invisible from decision-making processes that are pertinent to them and the services those processes provide.

Internal migrants make up a significant proportion of the informal worker population across the sample cities. Surveys with internal migrants point to low wages, underemployment, and few opportunities in origin areas as key push factors. Pull factors include the prospect of steadier daily income, proximity to markets, and established family or village networks that help with first jobs and shared housing. Many migrants also cite the need to send remittances and repay debts, which locks them into urban labour markets even when conditions are poor. Destination locations present an unfamiliar hazardscape and administrative landscape, both challenging to adapt to. Migrants also may lack access to social networks, public safety nets, and social protection, especially if they are short-term migrants or new to the location. Often, they are considered outsiders and are socially excluded by many in the receiving community.[52]

Their legal status and existence outside formal systems deepen their vulnerability as their migrant status compounds barriers to public services. For example, in Indonesia, those registered at their village or source locations for the health insurance scheme instead of Jakarta faced arbitrary criteria such as only three hospital visits outside their registration location.[53] Housing, permits, and childcare are commonly mediated by landlords or employers, increasing dependency. Their inability to access the support needed to help them cope with disruptions from extreme events, coupled with the health impacts of heat, only furthers their vulnerabilities, pushing them to the limits of human endurance.

[vi] BPJS Kesehatan is a mandatory, government-run health insurance scheme in Indonesia for all citizens and residents.

Indeed, the very nature of informal work and, unfortunately, many workers' living situations, magnify the impacts of heat. Low skill requirements keep labour supply high and workers easily replaceable, which depresses wages and bargaining power. Most jobs lack written contracts, benefits, or guaranteed hours; payment is often daily or piece rate, with penalties for absence and unpaid "trial" days reported in some sectors. Subcontracting adds layers between workers and final employers, diluting accountability. The Omnibus Law in Indonesia has eased firings in the formal sector, yet workers describe a spillover of insecurity into casualised arrangements.[54]

Informal workers and internal migrants face exceptionally high vulnerability to extreme weather. In our survey, 87% migrants in these cities mentioned being impacted negatively by different extreme weather events, as shown in Table 3.2.

Table 3.2: Migrants impacted negatively by extreme weather events in cities

City	Migrants Impacted negatively by extreme weather	Not impacted
Dhaka	100%	0%
Delhi	97%	3%
Jakarta	100%	0%
Kathmandu	100%	0%
Quezon City	91%	9%
Total	95%	5%

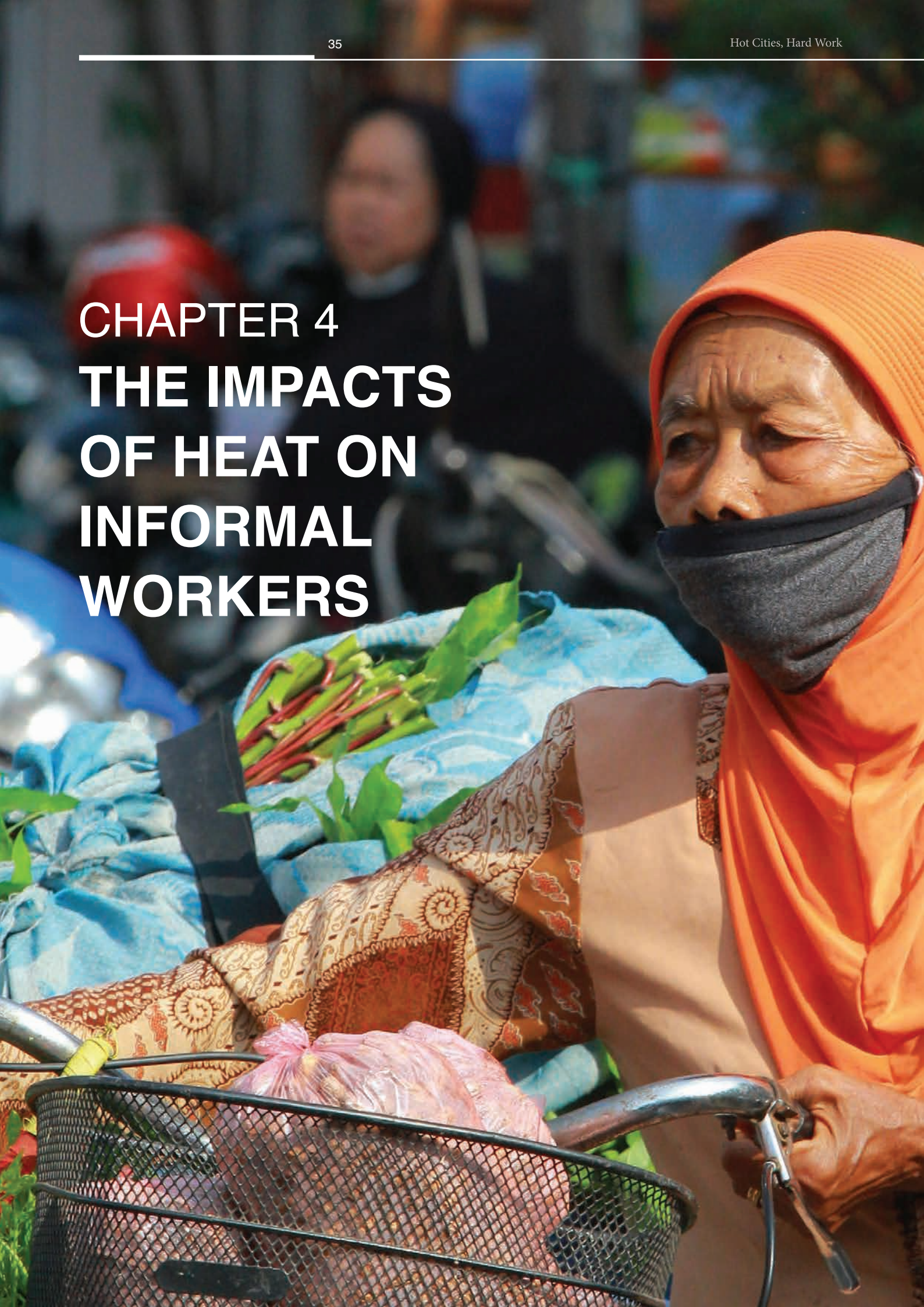
Figure 3.3: Top household impacts faced by internal migrants due to extreme weather events in cities

Those surveyed also mentioned living in either rented accommodations and/or employer housing which left little scope for their own improvements to adapt their homes to high temperatures; others lacked the means to make improvements. Respondents also reported health issues, food insecurity, and limited access to water and sanitation services as the result of extreme weather events in these cities (Fig 3.3).

Much informal work is physically demanding. Piece rate systems, where workers are paid based on each “piece” of work they complete rather than by the hour, incentivise skipping breaks and hydration. Basic protective equipment is often purchased by workers themselves. Poor infrastructure, low wages, lack of breaks, unpaid overtime, limited access to social protection services, and inadequate access to hydration and/or restroom facilities create a highly precarious environment.

Gender dynamics further constrain adaptation. Women report unsafe commutes or late hours, concentration in lower paid sectors such as domestic work and petty trade, and limited access to capital or collateral for business upgrades. Care responsibilities at home reduce recovery time and restrict the ability to seek better opportunities.

Add heat to the equation and the impact of these factors on workers’ health and wellbeing is amplified. With heat getting more extreme, impacts will escalate in ways that push workers to the brink of survival and result in tipping points with no return.



CHAPTER 4
THE IMPACTS OF HEAT ON INFORMAL WORKERS

Key takeaways

- Heat exposure is constant - it is at work, at home, and in-between.
- Heat exposure at home means that informal workers are not able to recover from acute heat exposure from work.
- Heat exposure at work is causing significant health impacts and productivity loss. Employers often address productivity loss punitively.
- Employers typically do not have provisions or facilities in place to reduce the impacts of heat such as access to drinking water, cooling, and rest.
- Lacking government, employer, and broader societal support, the burden and cost of coping with heat falls on informal workers themselves.
- Coping measures prioritise short-term ability to work and earn money, however the resulting financial and health implications are maladaptive and will reduce long-term adaptation and increase vulnerability to heat and other hazards.
- Both improved short-term coping measures and longer-term societal strategies to support workers in adapting to or coping with heat are urgently needed.

Our conversations with informal workers in Dhaka, Delhi, Jakarta, Kathmandu, and Quezon City paint similar pictures of the impacts of heat on worker health and their lives at home and work. At the outset of these conversations, participants often identified the impacts of floods as a larger problem. However, digging deeper revealed the degree to which heat silently erodes the wellbeing and ability to work of the very people that cities depend on, for their development and economic vitality.

For informal workers in these cities, exposure to extreme heat is not a momentary event but a constant, cyclical reality.

The danger is present where they live, where they work, and everywhere in between, with specific groups like migrants and new arrivals often facing the most severe conditions. This relentless exposure erodes their capacity to rest and recover, creating a compounding threat to their health and livelihoods. Given widespread perceptions, by the workers themselves and by society around them, that heat just needs to be 'dealt with', informal workers are turning to costly and sometimes maladaptive options to cope with the impacts of heat.

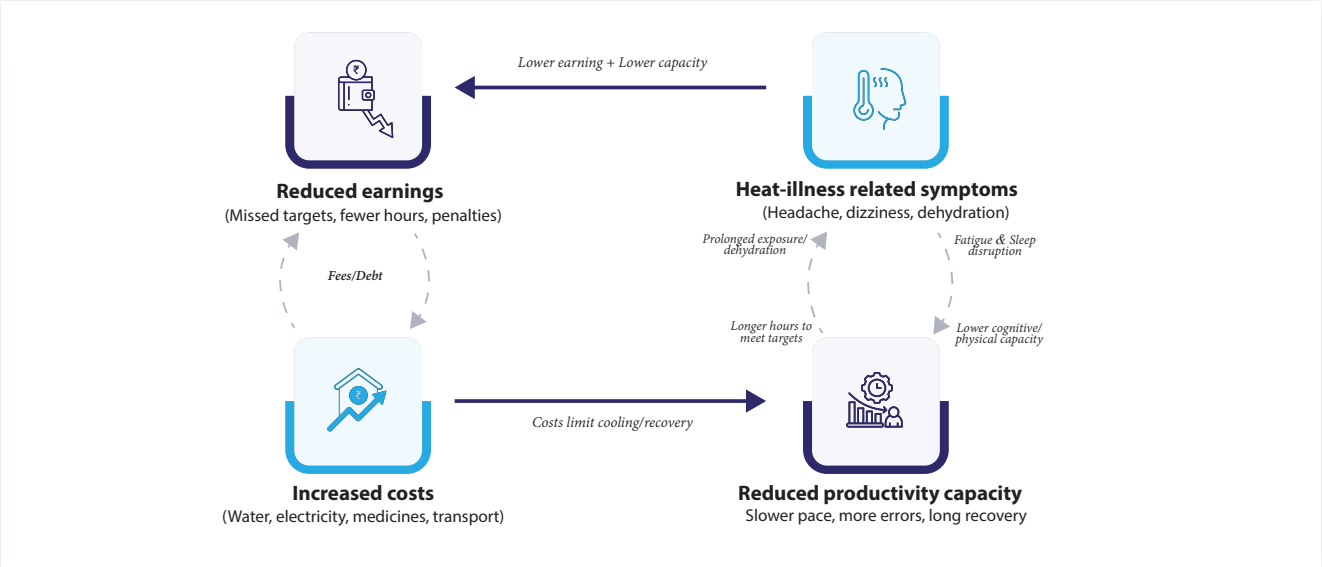


Figure 4.1: The interlinkages between the financial and physiological impacts from heat exacerbate vulnerability

4.1 Home is not a place of respite and recovery

The home, traditionally a place of rest, offers little relief from the heat. Both newly arrived and long-term migrant families often live in densely built informal settlements with unreliable services. These settlements are often built on marginal lands with limited green spaces providing shade. Housing here is not designed for high temperatures; single-room dwellings with thin, heat-absorbing roofs and poor ventilation trap warmth during the day. These dwellings become "ovens," pushing families outdoors until late in the evening and offering minimal comfort at night, while exposing them to vector-borne diseases. Families describe nights where rooms remain hot until dawn, leaving them fatigued and irritable. The people we spoke with noted that heat exposure at home disproportionately impacts vulnerable household members such as children and the elderly, with the caregiving burden falling on women (see Box 2).

In Delhi and Dhaka, frequent power cuts combined with rising electricity costs due to surging demand add to the heat burden. In Dhaka, newcomers often share a single room with five to eight people with intermittent electricity, water, and sanitation services. One worker put it simply:

> ***"Many times, there's no electricity for an hour, even one and a half to two hours… The combination of scorching temperatures outside, trapped heat inside the house, and frequent power outages makes life very uncomfortable… After a long day of work, I come home hoping to rest, only to find there's no electricity due to load-shedding. The intense heat becomes unbearable."***
>
> Abdul
> construction worker, Dhaka

In Kathmandu, cement-block room housing with low ceilings was originally built for a cooler climate. It now traps heat. Most homes lack fans or cooling systems. Those with fans try to avoid using them because of high electricity costs. Residents describe frequent sleep disruptions. As one resident said, *"The house turns into a sauna"*. Many sit outside at night, hoping for a breeze.

In Jakarta, homes built with thin walls or asbestos sheets[vii] stay hot long after sunset. Families say their rooms remain hot until dawn. People are exhausted before the day begins and are pushed to respond by spending more on fans, coolers, bottled water, and basic medicines.

In Quezon City, the dense urban layout and lack of green space worsen heat exposure. Residents describe living in a "concrete jungle" where poor ventilation and substandard housing mean the home offers little escape. Sleep is often disrupted, which reduces productivity the next day. Children, the elderly, and outdoor workers are especially affected.

The challenges posed by trying to live and sleep in hot dwellings are often compounded by cascading failures. Water and power interruptions, frequently caused by load-shedding, make things worse, increasing both heat exposure, the potential for dehydration, and household expenses. If refrigerators stop running, food spoils quickly, which adds to daily costs and increases the risk of food-borne illness.

Workers engaged in this study spoke extensively about the impacts of heat on their health. They reported: more frequent fevers; gastric distress; respiratory complaints (heat often exacerbates poor air quality); and, anxiety and aggression stemming from sleeplessness, fatigue, and stress. Other reported conditions included elevated blood pressure and a rise in vector-borne diseases such as dengue; the link between dengue and heat has been confirmed in peer-reviewed literature.[55] [56] An increase in health issues is accompanied by increased costs due to both lost wages and the direct cost of care including medicines, medical consultations, and sometimes hospitalisation.

Heat and climate-related health risks reduce availability or productivity of workers, leading to adverse economic consequences. These impact employers and companies too globally. Projections suggest between 2025-2050, losses of $570B in worker-availability in the construction sector alone.[57]

Across cities, one pattern repeats: people cannot recover overnight. When nights stay hot and power is unreliable, the body cannot recover from the stress of the day. People wake already depleted. This "recovery deficit" is especially pronounced in parts of South Asia, where the electricity supply is more fragile, widening the gap between heat stress and recovery.

4.2 Heat makes it difficult to work

Work is a primary site of intense heat exposure. Many roles require long periods of standing and lifting, outdoor exposure without adequate shade, indoor activities in stifling rooms without water, and limited safety measures. In Delhi, construction workers wear heavy safety gear while working in unfinished spaces without fans— in "suffocating conditions". In Dhaka, factory floors can be brutal, badly ventilated spaces with no cooling. Domestic workers in Dhaka reported dizziness and fainting at hot stoves. In Bekasi, within Greater Jakarta, workers describe "air that feels stagnant and heavy" in cramped workshops where breaks are short or discouraged. Vendors in Jakarta and Quezon City sometimes earn more in hotter months by selling cold items, but only by standing for long hours in direct sun, increasing their cumulative heat load and leading to dizziness, heat rashes, and other health risks. In Kathmandu, construction workers who do physically demanding work such as picking up and transporting heavy loads, reported experiencing dizziness, fainting, and headaches in high temperatures.

Seasonal production cycles make things worse. A Dhaka worker noted that in summer "work production pressure can increase significantly," cutting into rest and water time. With production targets rising just as temperatures peak, people working at piece rates push through dizziness, headaches, and rashes to keep pay coming.

[vii] Asbestos is a known carcinogen. It is heat resistant, but asbestos fibres can be released into the air when it is integrated into materials that crack due to high heat or humidity, endangering not only inhabitants but those downwind as well. This underscores the importance of a systems approach to adapting to heat. See: https://safe-environment.co.uk/news/asbestos-exposure-risks/#:~:text=Rising%20temperatures%20and%20increased%20humidity%20can%20accelerate,who%20live%20or%20work%20in%20these%20buildings.

Even commutes offer no respite. Crowded, unshaded journeys further compound the heat exposure on both sides of a work shift. In Jakarta, domestic workers describe traveling during peak heat in packed public transport as a major physical strain. Tasks that fall between home and work also add to the heat burden. Errands across town are often delayed or skipped when the sun is high. This pushes people toward more expensive, nearby alternatives and sometimes postpones important needs like medical care.

Focus group participants reported widespread productivity loss due to the constant heat exposure at home, work, and in between and resulting health effects. In Delhi, when heat slows output and targets are missed, workers risk being sent home without pay. This aligns with our findings from the 2024 survey which shows that wage loss and wage cuts are a widespread impact of rising temperatures and extreme weather events more broadly (see Fig 4.2).

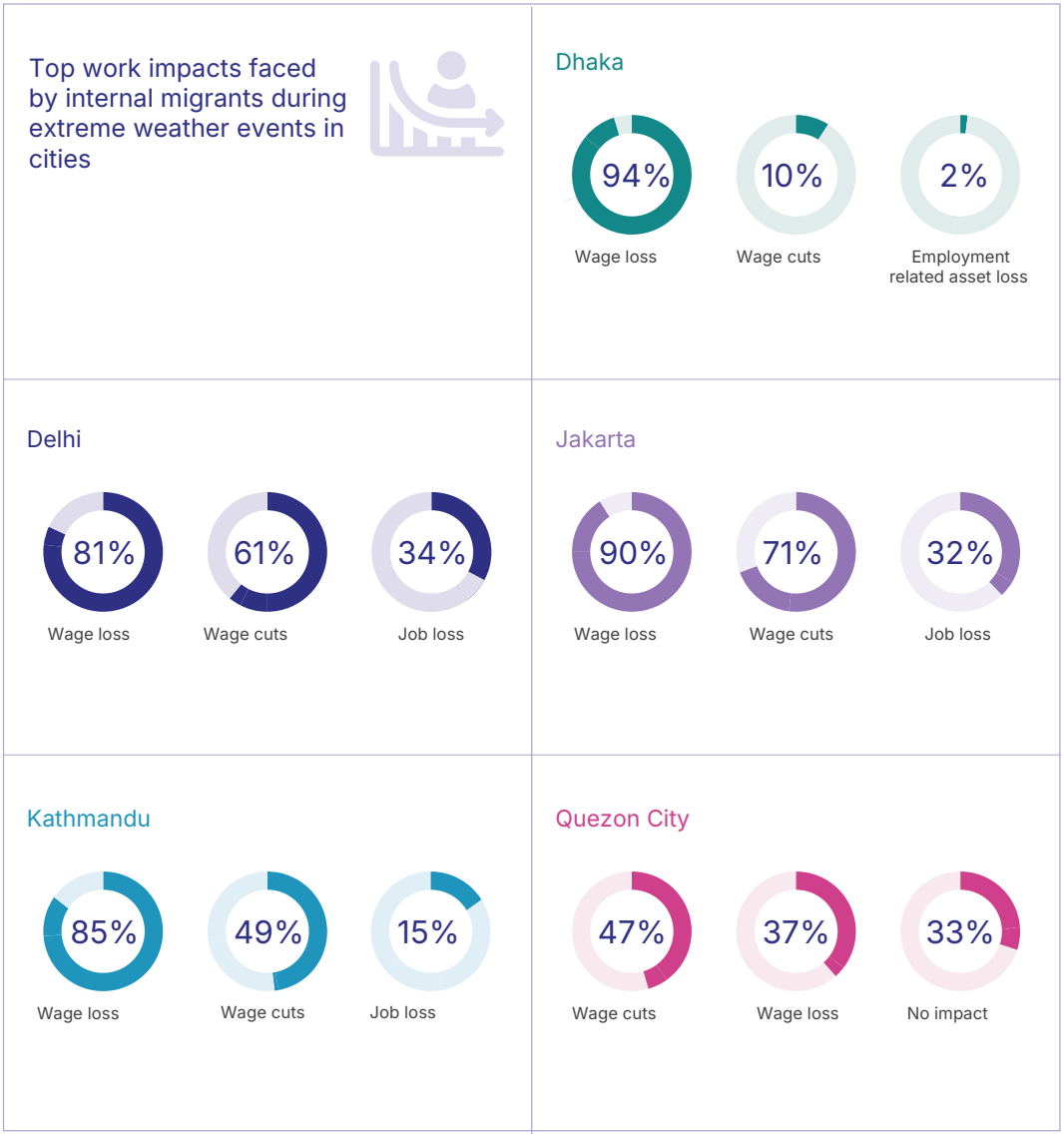


Figure 4.2: Top work impacts faced by internal migrants due to extreme weather events in cities

To make up for their lost productivity, workers reported having to work longer shifts, which in turn cut into their rest time, thus ensuring that the vicious cycle of hot, long hours in the heat without sufficient recovery continues. An informal worker in Kathmandu shared,

[viii] A tier system is used in manufacturing to describe the proximity of a supplier to the final product manufacturer. In the ready-made garment industry, a **Tier 1** is a Cut-Make-Trim (CMT) factory that delivers finished garments to brands. **Tier 2** refers to a factory that makes materials, such as spinning/knitting/weaving, dyeing/finishing, and trims (zippers, buttons, labels). **Tier 3** are the raw-material producers: cotton farms/ginneries, polyester/viscose chip & pulp/chemicals feeding Tier 2.

"Either it gets very hot or very cold. In such [conditions], one can't really work. So, in order to complete the assignment, we must increase our work hours. On the one hand, we are required to increase our work hours, and on the other hand, we remain sick due to these weather changes."

Sunita
construction worker, Kathmandu

Employers rarely provide basic protections — shade, cooling facilities, cool drinking water, or adequate rest. Across sites, the "[rare] provision of drinking water" and discouraged and sometimes monitored bathroom access create a perverse incentive to drink less to avoid penalties. Some workers limit water intake to avoid monitored trips, heightening dehydration risk and pushing them to exhaustion.

In Dhaka, one expert's snapshot of Tier-3[viii] factories captures the indoor risks:

"Sub-contracting or 'Tier-3' factories… are typically small, overcrowded and poorly ventilated… Workers are highly vulnerable to heat-related illnesses… [and] often faint from suffocation due to the cramped, hot conditions."

Sunzida Sultana
Executive Director,
Karmojibi Nari (KN), Bangladesh

In Delhi, one of many informal workers relayed their fear of taking much needed breaks:

"Our supervisors do not let us drink water. They say, if you drink water, then you will have to go to the bathroom, then it will take you 5-10 minutes to go to the bathroom. They just push us for work, and we do it out of fear."

Aarti
factory worker, Delhi

Even the better employers expressed limitations in their ability to address the heat impacts faced by workers due to the lost revenue resulting from lower worker productivity and infrastructural challenges (i.e. load-shedding) during extreme heat events.

When heat exposure during the day is combined with hot homes at night, workers develop a recovery deficit. Workers wake up depleted and more vulnerable to the heat of both the commute and the shift ahead, starting the next day at a disadvantage.

[viii] A tier system is used in manufacturing to describe the proximity of a supplier to the final product manufacturer. In the ready-made garment industry, a **Tier 1** is a Cut-Make-Trim (CMT) factory that delivers finished garments to brands. **Tier 2** refers to a factory that makes materials, such as spinning/knitting/weaving, dyeing/finishing, and trims (zippers, buttons, labels). **Tier 3** are the raw-material producers: cotton farms/ginneries, polyester/viscose chip & pulp/chemicals feeding Tier 2.

4.3 Coping and Trade-offs

Informal workers do not receive external support during heat events

In spite of the grave and increasing challenges that workers and internal migrants face due to heat, external support is limited. Most of the workers we spoke with for this study, indicated they had limited access to emergency protections or assistance during these extreme weather events. This aligns with and reinforces the survey results from our 2024 study (see Fig 4.3). Limited or no assistance during extreme heat events often leads to workers or internal migrants coping on their own, straining their already overburdened capacity (see Fig 4.4).

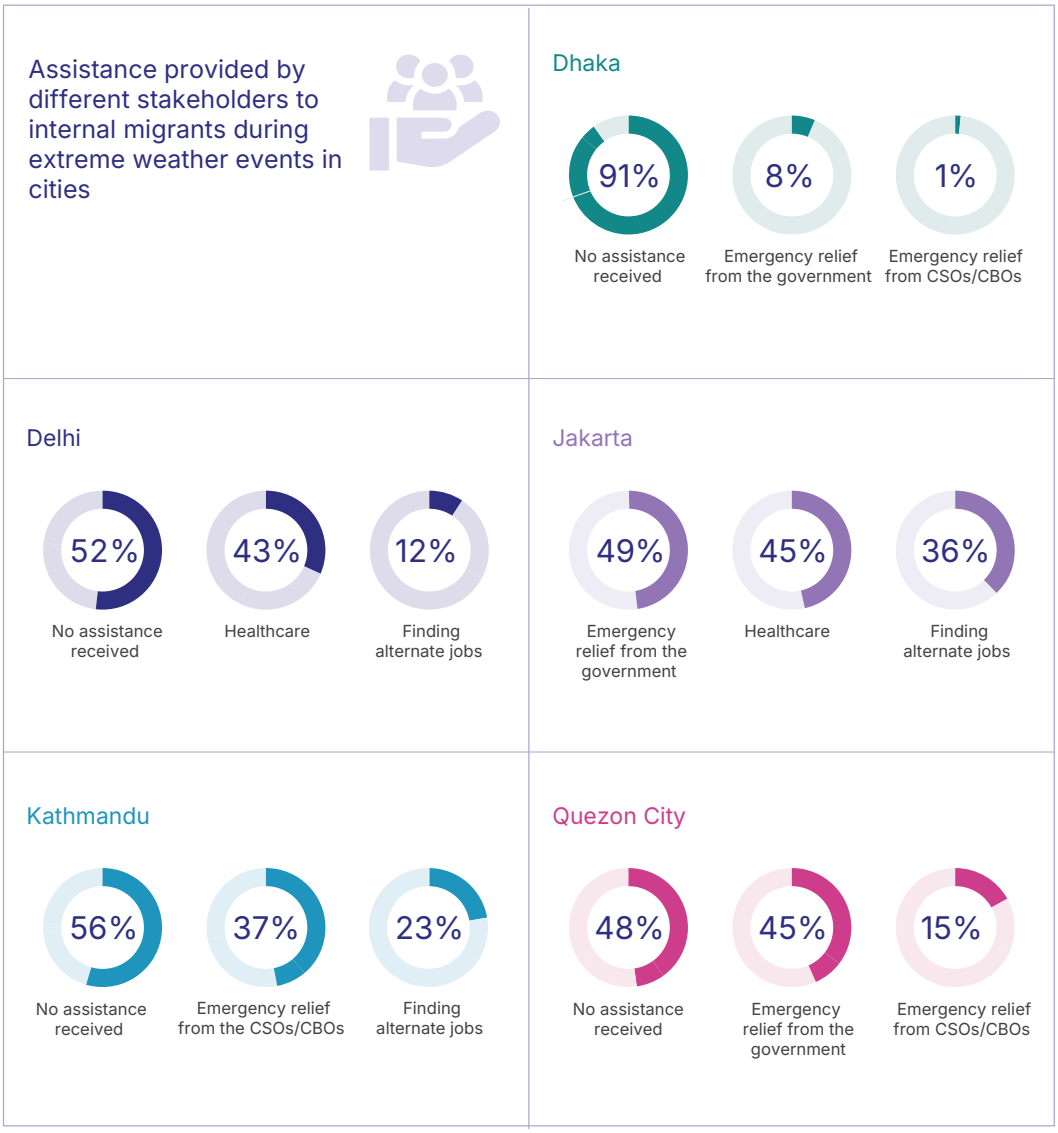


Figure 4.3: Assistance provided by different stakeholders to internal migrants during extreme weather events in cities

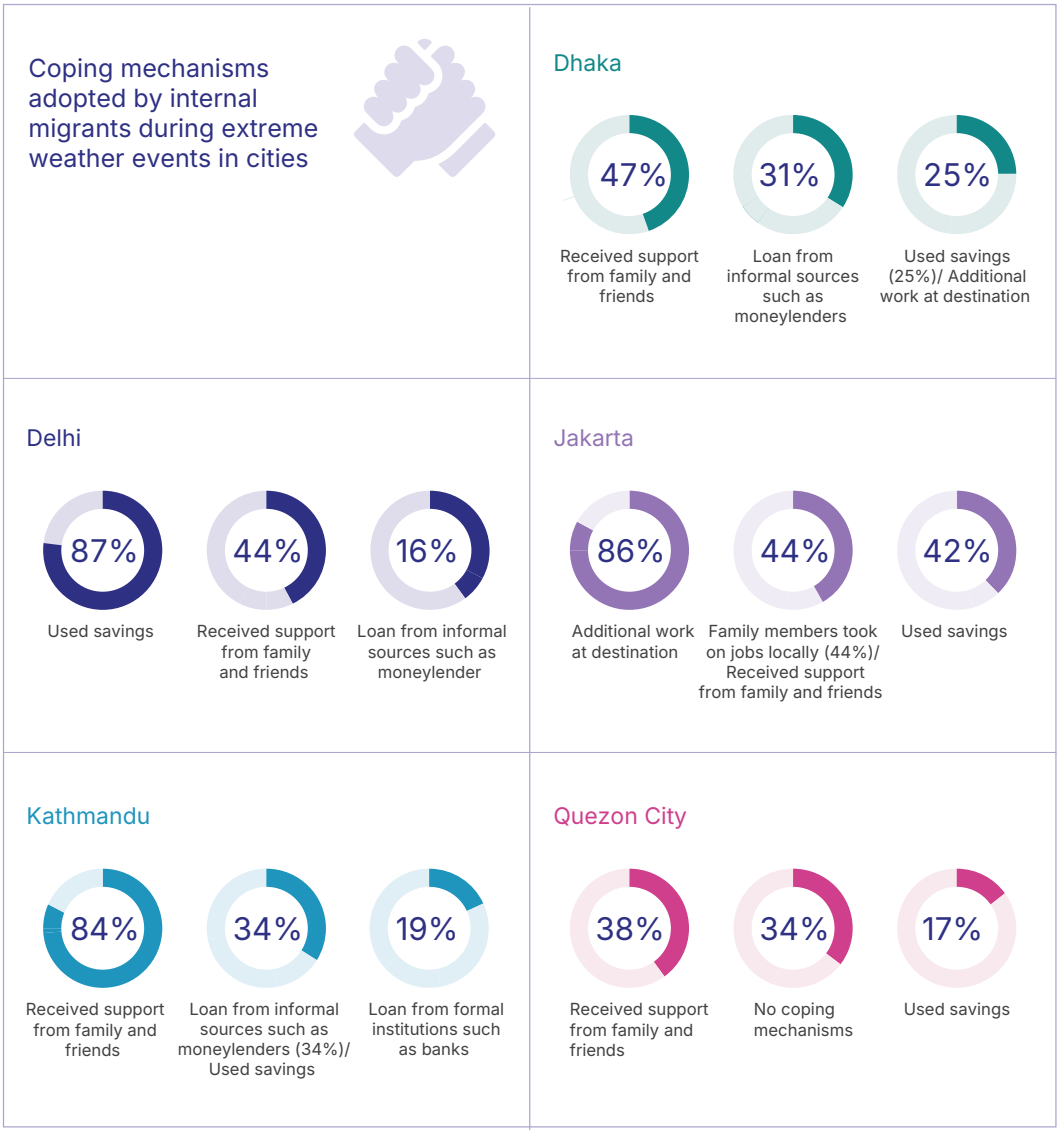


Figure 4.4: Coping mechanisms adopted by internal migrants during extreme weather events in cities

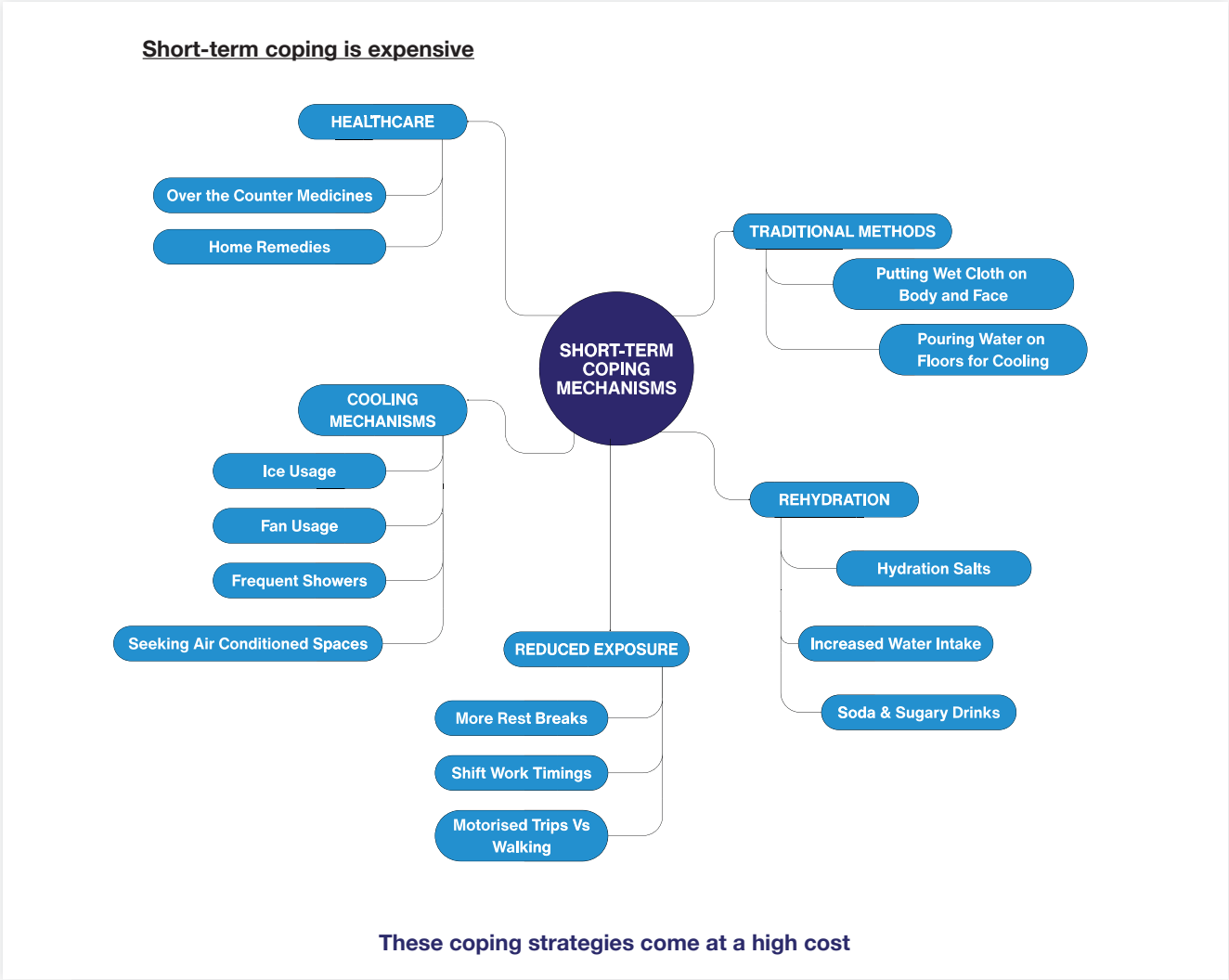


Figure 4.5: Short-term coping mechanisms adopted by informal workers

Informal workers often rely on short-term, simple, and reactive measures to cope with heat, but these come at a monetary cost. They cool themselves using fans and ice and take frequent showers; try to prevent dehydration by increasing their water intake and using rehydration salts; reduce heat exposure by paying for short motorised trips rather than walking, shifting their working hours if they can, and/or spending time in air conditioned facilities like shopping malls and restaurants; and try to recover by rotating sleeping spots at night. For example, taxi drivers in Nepal mentioned the cost of constant air conditioning usage in the summer months; however, the alternative, accepting fewer rides and using restaurants instead of their vehicles to recover, decreases their income. A few workers mentioned taking longer breaks at work, risking conflict with employers over reduced productivity. More frequently, workers noted simply enduring the conditions rather than missing a day's wage.

Over time, purchasing expensive bottled water and medicines, using more electricity and water, and risking reduced wages quickly drains household budgets already stretched by food, rent, and school costs. Participants explain the trade offs posed by these short-term coping mechanisms:

> ***"Heat indirectly increases our expenditure. For example, when we go to crowded markets, I might save around 100 taka by shopping at a large market and spending 1,000 taka. But due to the extreme heat and overcrowding, we often avoid those markets. Instead, we choose to shop at nearby local stores, even though prices are higher. The heat makes it difficult to travel far or put in extra effort, so we settle for convenience, even if it costs more."***
>
> Salim
> RMG factory worker, Dhaka

Health takes a back seat

Many workers mentioned not understanding the consequences of long-term heat exposure.

> ***"When we go for work, we have to do it thinking it as our own. We cannot skip the work, citing the scorching sun or rain, one shouldn't cheat. If it rains, we work even while being wet in the rain until we can. One must work when we go for work. We don't get paid by just sitting as such we have to work in any conditions. Since we work amid such hardship, the contractors or employers should also think that they shouldn't let us suffer. That they should think of us. But they don't. If we fail to do the work on time or if we miss some hours of our work due to rain or similar conditions, our wages are cut."***
>
> Sunil
> construction worker, Kathmandu

> ***"When it's hot… you just have to use an electric fan, because… it's really hard to work without it. Regarding the heat… Well, it's something we have to live with. We just have to find ways to deal with it."***
>
> Sarah
> street vendor, Quezon city

This, combined with a lack of access to healthcare, have led informal workers to make maladaptive or even dangerous health choices. In Jakarta, queues, paperwork, and migrant status hurdles to accessing Indonesia's national health insurance scheme, BPJS Kesehatan, mean many avoid clinics until illnesses become severe or end up returning to their source locations to access these services. In Delhi, government hospitals are crowded and difficult to navigate without the right documents, and private clinics are very expensive. Clinic hours and travel costs further limit access for people on long shifts. In Dhaka, informal workers working long hours and without residency delay care and raise risks. They rely on neighbourhood shops or unlicensed providers for inexpensive medicines or home remedies, as medical clinics are inaccessible without the right documents and close at 5:00 pm. This can create a negative feedback loop, with low-quality care contributing to worse health outcomes necessitating higher out-of-pocket health costs and lost wages.

Maladaptation is pushing people further into vulnerability

Given their exclusion from worker and social protection policies, heat policies and plans, and society more broadly, informal workers have to rely on themselves to cope with heat impacts. Their choices are circumscribed by their immediate need to continue earning wages. Their only option is to endure tough conditions to support themselves and their families. The problem is, these short-term coping mechanisms have maladaptive aspects that will exacerbate their vulnerability to heat and other hazards.

With declining health and limited financial resources, informal workers, who are already stretched thin, have fewer options to adapt to heat and other hazards over the long-term. They are further pushed into vulnerability. Informal workers have already reported instances of this. In Delhi, some families noted cutting food quantity or quality to manage bills, which worsens health and resilience. They also borrow money from neighbours or take small loans to cover higher electricity, water, food, and medical costs, increasing debt, reducing future earnings, and undermining their long-term ability to adapt.

Box 2: Rising temperatures, increasing heat and the double burden of work for female informal workers

The lives of women across South and Southeast Asia are more precarious than their male counterparts, both in the workplace and within their homes. In all study countries, labour force surveys and informal settlement assessments suggest that a large proportion of women work in the informal sector. For instance, in Bangladesh, 96.6% of employed women are in the informal sector.[58] Similar scenarios exist in India,[59] Indonesia,[60] Nepal,[61] and the Philippines.[62 63 64] Women's roles as workers and contributors to economies are often invisible, and therefore labour laws or policies in most cases do not recognise or address the complexities they face in the workplace. During focus group discussions, women reported barriers to continuing their work such as unsafe commutes due to late working hours, access only to low-paying jobs, and limited access to capital. Men commonly get paid more than women working in similar jobs, especially in construction. This is justified to women who are told, *"[Men] are the primary breadwinners [and] need to take care of their households".*

Heat impacts women too, but the gendered impacts of heat exacerbate women's vulnerability. At the workplace, they have to continue to work at the same pace but with further limitations on coping mechanisms which could support them. For example, in Delhi and to a smaller degree in the other cities, women reported limiting their water intake to reduce additional trips to the bathroom. Trips to the bathroom often led to unwarranted criticism from employers; but limiting water intake increases the risk of dehydration and more severe heat impacts. In Delhi, a woman factory worker mentioned:

"They [employer] don't let us drink water often. If they see us going to drink water, they say — You're just passing time. If we go to the washroom, they say the same — you're just wasting time, you've come here to work, not to keep going to the washroom again and again. That's what they say."

Another mentioned about the heightened surveillance on them to monitor breaks and work was finished on time:

"There [factory] are cameras everywhere—in the kitchens, in the halls, even near bathrooms. We're being watched all the time. Even on the 6th floor, there are cameras around the bathroom. The women workers have to be careful."

In the home, women are typically responsible for all aspects of the household, including cooking, cleaning, childcare, household errands, and family management. This double burden means they are managing their households after they come home from work outside of the home. These domestic responsibilities, cultural norms, and confinement to poorly-ventilated homes limit their ability to cope with heat. Errands are harder to run in the heat, and the challenges of poor infrastructure compounds with heat. A key informant in Bangladesh mentions, *"[Women] often sleep only three to four hours per night as they are primarily responsible for household tasks such as cooking, cleaning, and childcare. Load shedding and heatwave conditions exacerbate the situation. For instance, when there is lack of water access during heatwaves, they are unable to pump water for household use, leaving them awake to complete this essential task."* Afsara Binte Mirza, Research officer, International Centre for Climate Change and Development (ICCAD), Bangladesh

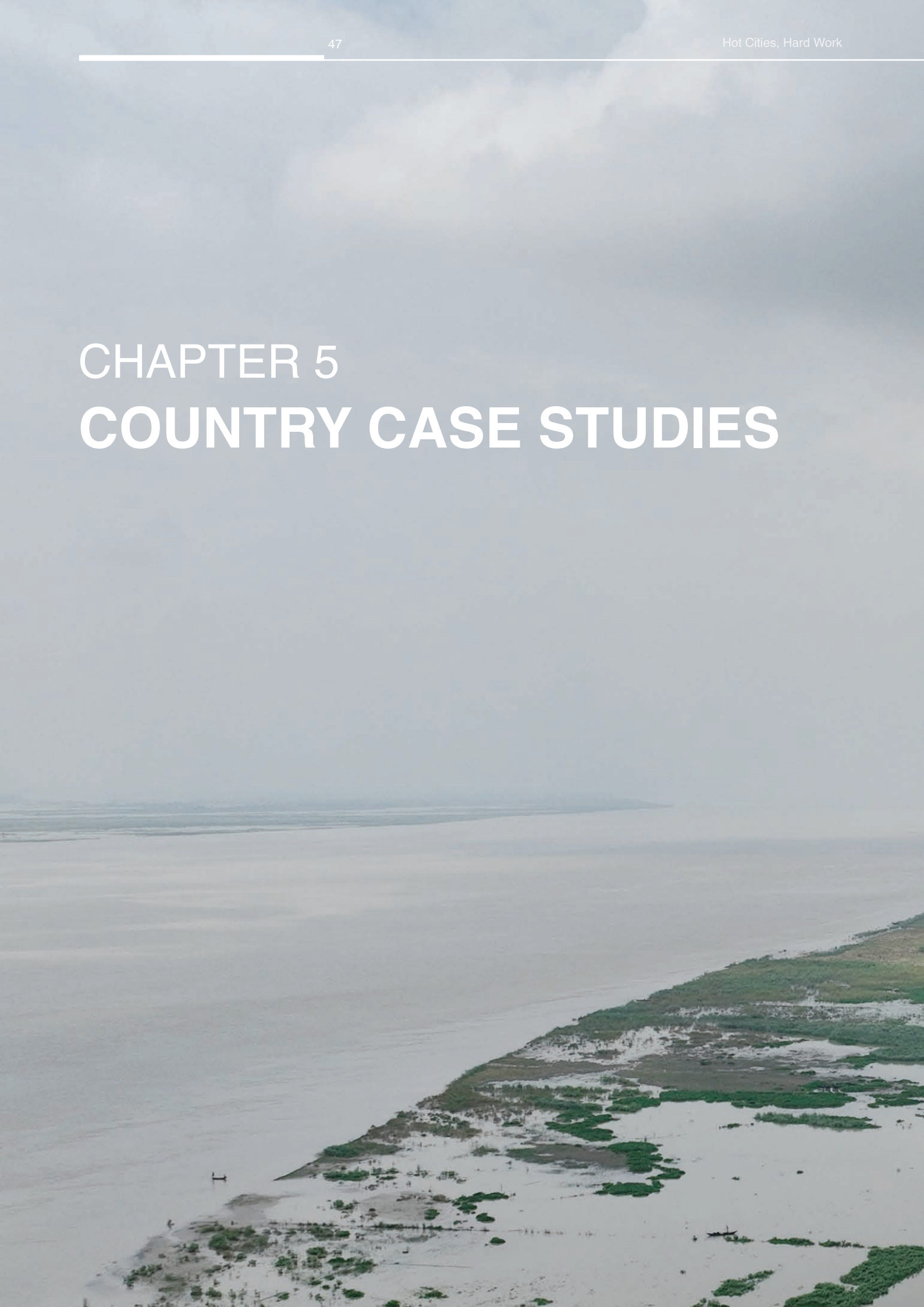
Homes are hot and poorly-ventilated, and everyone in the house is irritable and tired - and women are expected to manage despite this. During discussions, some women mentioned facing increased agitation due to the heat. In Quezon City, a female worker says, “You just get hot-headed during the heat. You can’t do anything.” Emotional outbursts are often combined with the added burdens of caring for sick family members, perhaps due to heat. Women with the burden of care are often themselves facing sleep disruptions and health issues, while also working outside the home during the day.

In some cases, women cope with these additional burdens maladaptively. For example, there have been reported instances of women quitting their jobs in Bangladesh’s Ready-Made Garment (RMG) sector, a sector predominantly driven by a large female workforce. A key informant mentioned,

“The first issue is that due to heatwaves or other climate-related problems, a large number of workers are actually leaving their jobs. They’re quitting, primarily because they simply can’t cope, especially female workers. For example, in the garments sector, a few years back, we used to say that 85% of the workforce were female. But now it’s around 52-53%. So, there’s been a roughly 30% drop. One of the major reasons behind this is climate vulnerability.”

Sunzida Sultan,
Executive Director, Karmojibi Nari (KN), Bangladesh

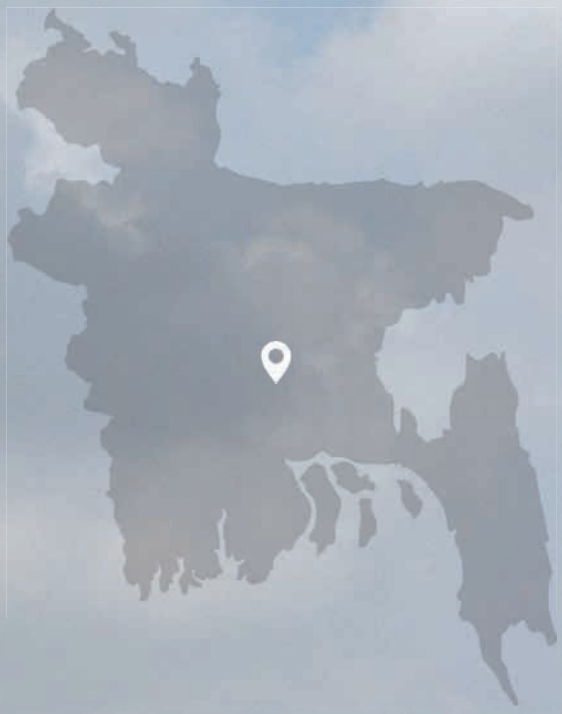
If these unique challenges faced by women due to extreme heat are not addressed, we could see the emergence of even more maladaptive coping strategies - with the bulk of the negative impact falling on women.



CHAPTER 5
COUNTRY CASE STUDIES

5.1 Dhaka, Bangladesh

Dhaka's workers tell a simple story of heat. Nights do not cool. Tin roofs trap heat, turning homes into "ovens". One fan for six people cannot move enough air. After a long shift, power cuts leave rooms hot and still. People choose between buying drinking water and saving for school fees. These heat challenges create havoc in the lives of informal workers and internal migrants.



A recent Labour Force survey in Bangladesh (2022) indicated that close to 60 million individuals, 84.9% of the total working population in Bangladesh, are employed in the informal sector.[65] A large proportion of these informal workers are internal migrants; a 2023 survey by the Bangladesh Bureau of Statistics indicated that over 11 million people in Dhaka alone were considered internal in-migrants.[66] [67] They move due to economic reasons and livelihood challenges, both of which are in part driven by climate change (Figure 5.1).

Figure 5.1: Reasons for moving by migrants in Dhaka

The two case studies below illustrate how two workers, Akram and Razia, are impacted by rising temperatures and the limited means they have to cope. They work in highly exposed, vulnerable sectors and live in densely populated informal settlements.

CASE STUDY

Akram, 28 years old, is the primary earner within his family. A migrant worker, employed in a garment factory in Dhaka, Bangladesh, mentions that during the summer months, heat becomes unbearable. The infrastructure of the factory only makes it worse.

At the factory, Akram says,

"In the cutting section where I work, the situation is even worse. We work with fabric, and the area is closed from all sides, making it incredibly hot. The fabric we handle is hot and the sewing machines release heat from their copper motors. Additionally, imagine 200 people working together in a closed space, that body heat adds up. The heat is unbearable."

The factory sees constant power cuts during the summer, usually due to load shedding. During these periods, with no fans or cooling mechanisms, it becomes impossible for Akram and his fellow workers to stay on the factory floor. They're forced to step outside near the fire hydrant or stand by the stairwell corner for some relief. In spite of these challenges, he mentions,

"The company does nothing. Even if there's no power for 1.5 to 3 hours, they don't give us leave. We just sit and wait."

Akram noted health issues are rampant during the summer months especially within the workplace. He spoke about his fellow workers vomiting, experiencing high blood pressure, or feeling dizzy due to the heat. He recalled,

"I remember a tragic incident from a year or two ago. A boy, around my age came to work, climbed the stairs, drank water, and suddenly collapsed from heatstroke. The doctor wasn't called immediately. When they finally took him to Al-Baraka Hospital, they couldn't admit him and then referred him to Dhaka Medical. He died before reaching there. Everyone cried—around 200 workers from our sample department. I believe he died because of the delay and poor medical judgment."

With no protection mechanisms or support from employers to reduce distress caused to workers during the summer months, the heat will only become further unbearable for workers like Akram.

CASE STUDY

Razia, a 25-year-old domestic worker, moved to Dhaka about 9 years ago, eventually found a home in the city, married, and settled down. During the initial years of her marriage, she took care of the household; however, in 2018, decided to seek employment to cope with the growing financial challenges within the family due to her husband's frequent illnesses.

Razia mentions that heat during the summer months has gotten worse over the past few years. Her work, which requires constant movement, and life at home in a tin-roofed household, make it extremely challenging during the summer. She mentions,

"when I mop the floor, I have to bend down, and it becomes very hot. I have to turn off the fan while sweeping, which makes it even worse. After cleaning one house, when I go outside, the sun feels scorching. Then I head to the next house and have to climb stairs in the heat. It's exhausting."

Razia works part-time in multiple houses, completing tasks such as cooking, cleaning, etc. Additional restrictions placed on workers like Razia make their work even more unbearable. She talked about domestic staff in residential areas not being allowed to use lifts which meant that after entering the building from the scorching sun, she had to climb 5-6 flights of stairs to reach her employer's house. The exhaustion and reduced productivity due to this, significantly impact her ability to work.

To cope with these increasing temperatures, Razia and her family use electric fans to keep themselves cool at home. However, this often leads to extremely high electricity bills and additional financial costs for a family already struggling financially. Razia feels that some support from the government during the period would take her family a long way to cope with these yearly impacts.

"I feel that if they provide some assistance, we could live better, eat better, and generally do better, like if there was rice, lentils, etc., that would be good."

The struggle of Dhaka's workers across sectors who are directly or indirectly heat-exposed require urgent attention and action, as policies continue to ignore their needs. Most informal workers we spoke with, had similar stories such as Akram and Razia and reported receiving no direct support during heat events. While there are a few national policies in Bangladesh that touch on heat and support social protection, their coordination and enforcement tend to be weak, with services often not extended to informal workers.

5.2 Delhi, India

In Delhi, the story of vulnerability to heat and its impacts for those living in the fringes of society is clear. Informal workers' homes, usually a single room in informal settlements, are barely ventilated. In the hot summer months, they are like furnaces. Most informal workers work in outdoor jobs such as construction or in poorly ventilated factories. They suffer wage losses or cuts if they are unable to finish work, even during the unbearable heat, increasing their financial burden.

A 2022 study by the organisation Women in Informal Employment: Globalizing and Organizing estimated there are 4.92 million informal workers in Delhi, making up 80% of the total workforce within the city.[68] A megacity, Delhi is seen as a city of opportunity with most migrants moving for better economic opportunities and wages, as confirmed by our 2024 survey (Figure 5.2). Indeed, over the past few decades the city has experienced a major inflow of internal migrants and in the last Indian census was a key destination for almost 8 million in-migrants[69] most working in the informal sector.[70]

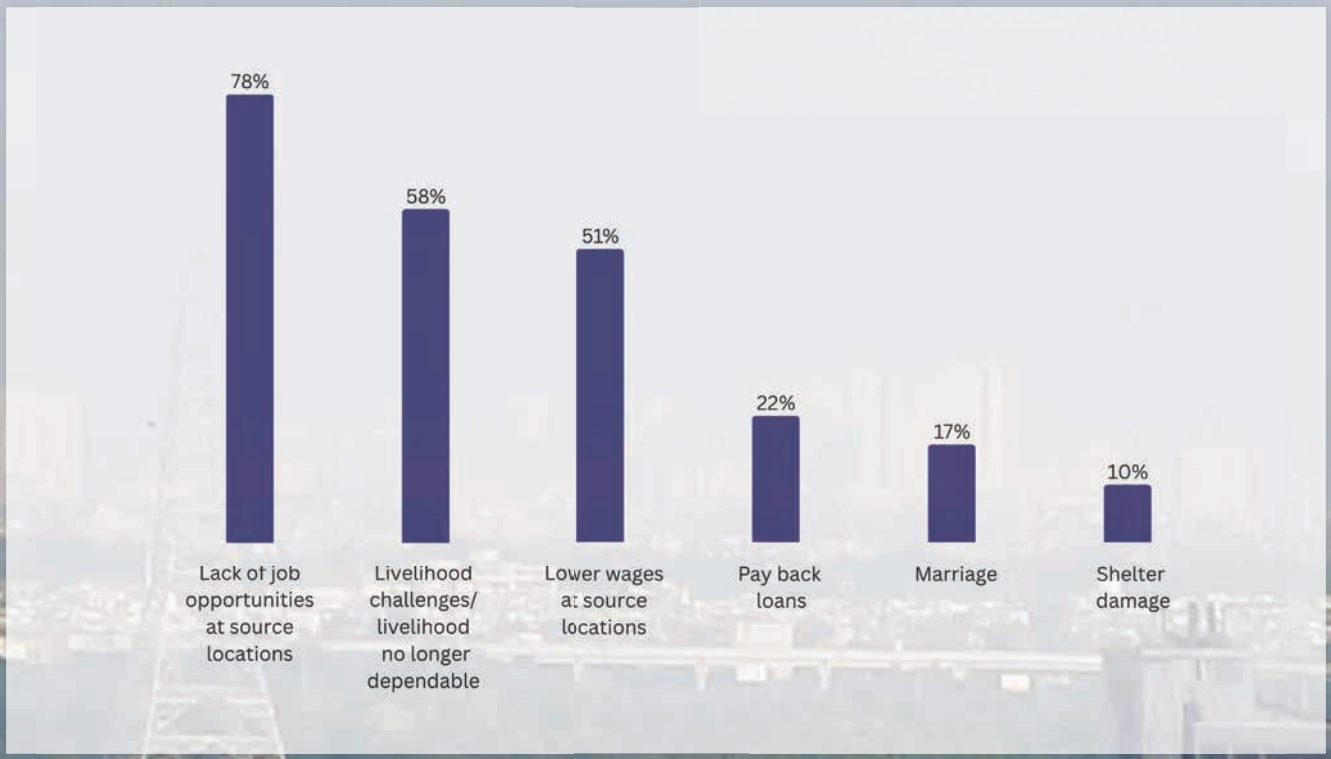


Figure 5.2: Reasons for moving by migrants in Delhi

The stories of Seema and Mukesh shared below speak to the complexities, challenges, and impacts of extreme heat in Delhi. Worker's exposure to heat at the workplace, inability to challenge working conditions in a labour surplus economy, and low wages that prevent them from accessing adequate nutrition and health services. These factors together interact to create significant livelihood and personal impacts for these workers.

CASE STUDY

Seema moved to Delhi with her father over two decades ago, settled down in the city, and got married. Prior to giving birth, she had a stable factory job but eventually quit to take care of her child. However, over time, her family's financial distress increased and Seema found another job, this time as a daily wage worker for different factories.

At the workplace, Seema faces terrible working conditions which worsen during extreme heat. She says,

"It gets very hot. When we pick up the pieces, it feels hotter. We feel dizzy and go to drink water. The supervisor tells us, 'You're not working, then leave. So, we have to go home." Working conditions, coupled with a lack of rest time during long shifts, are brutal, "When we go to the factory, they don't give us enough time. We have to work at least eight hours, but even then there's no drinking water. When we go to drink water, they tell us to hurry up. If we go to the bathroom, they call us back. Earlier we could sit while working, but now they make us stand the whole time — standing 12 hours is very hard."

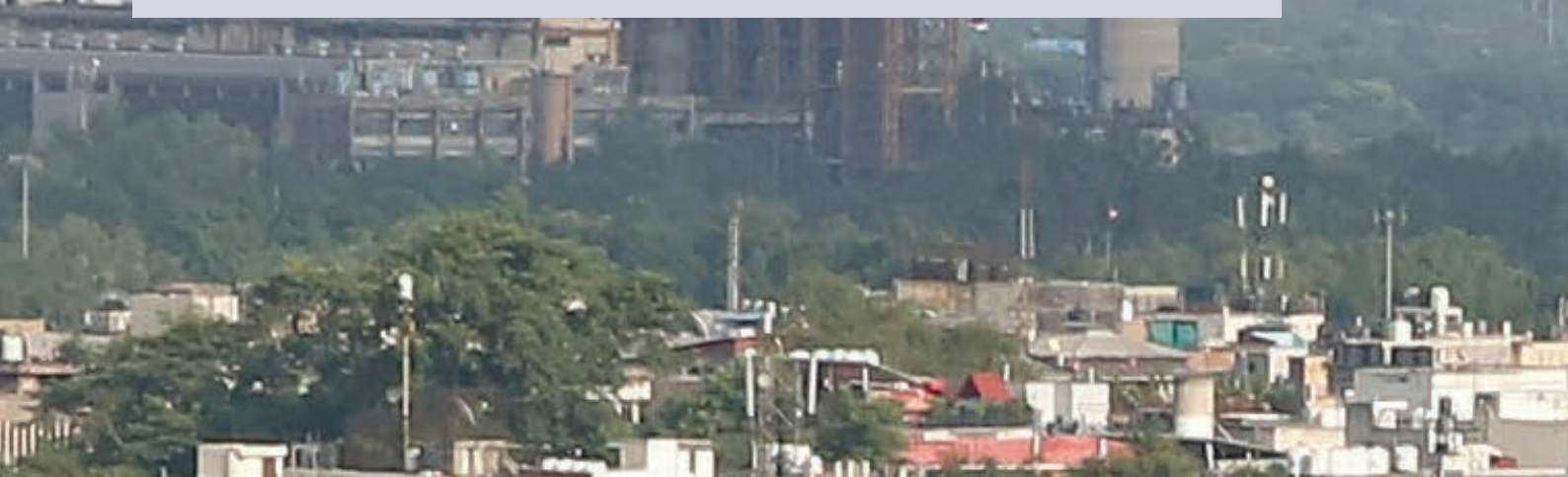
Yet Seema avoids complaining or demanding too much from her employers – there are limited job opportunities available.

Seema and her family's challenges further intensify at home with health issues and compromised nutrition during extreme heat. She mentioned that the food she cooks often spoils during the summers, as her family cannot afford a refrigerator. Health issues are rampant which often lead to increased financial burdens on the household. She explains,

"Everything gets worse in the heat. Headache, piles, everything is because of heat. But we don't have much money. If we go to a private hospital, it's Rs. 500-700 just to see a doctor - even more at some places. If you go to quacks, then there is risk of more infection. If I don't get treatment at the government hospital, I buy medicine from a medical shop. If I don't have money, I borrow from neighbours."

These impacts cause havoc in the lives of workers like Seema who already face extreme financial insecurity. She barely has any ways to cope without increasing her family's financial challenges. She concludes,

"We can't change the weather. But if we earned more, we could buy better food: curd, milk, vegetables, things that help in the heat. Right now, even a half-litre of milk costs Rs. 35. If we earned better, life would improve. If we earn well, we eat well, and then we can handle the weather better."



CASE STUDY

Jai Singh, 45 years old, moved to Delhi more than two decades ago from Rajasthan. Faced with abject poverty back at home, he came to the city in search of economic opportunities. Since his arrival, Jai has worked in the construction sector as a labourer, barely supporting his three dependents.

Construction work, whether outdoors or indoors, creates dual challenges for Jai Singh.

"When we get work, it's both outdoors and indoors. Outdoors become challenging – it's because of the direct sun exposure. However, even indoors work, we have problems as there's usually no fan. Especially if it's a new construction site, then who will put a fan for us? Even indoors, we feel the heat. It feels suffocating. Sometimes we feel choked, we feel trapped. When we feel thirsty, there's no water nearby. If we want to relieve ourselves, there's no proper place. They tell us, 'don't do it here,' but where else can we go? So we have no choice."

Jai Singh shared that health issues due to this type of work, such as headaches, dizziness and fainting, are rampant. This adds a burden on his income:

"Income has a double effect. Suppose I work today and fall sick tomorrow. Then I can't go to work and earn and still have to spend money on treatment." He recalled a health issue that he faced during extreme heat that he did not have the means to address. "Earlier I worked in Dharampur, I had a blood clot from working in extreme heat. They told me to have cold drinks, water, and coconut water. But coconut water costs Rs. 50. I couldn't afford that."

In the absence of social protections for workers like Jai Singh, they lack any means to cope with the increasing heat. Jai Singh mentioned that income support by the government would really help his family during this period,

"If we could also get some unemployment allowance (berozgari ka bhatta), that would really help."

The heat in the past few years in Delhi has been most brutal on informal workers and internal migrants who are already marginalised. Even so, there is growing momentum around addressing heat, with many guidelines now in place, and heat action plans in the city. National bodies in India such as the National Disaster Management Authority (NDMA) and India Meteorological Department (IMD), along with others, are also issuing advisories and holding annual conferences to discuss heat-related challenges. However, these policies largely remain unenforceable with short-term measures and limited coordination between departments.

5.3 Jakarta, Indonesia

Jakarta's informal workers describe long, humid days and nights that are never cool enough. In *kampung* neighbourhoods, small rooms with asbestos or metal roofs trap heat; a single fan only moves hot air. Vendors, construction workers, and delivery riders stand for hours on sun-baked streets. Poorly -ventilated factory floors are hot and getting hotter. Domestic workers commute in the heat to cook in front of hot stoves. Water and electricity bills climb in the hot season, disrupting already unstable incomes.

Jakarta, Indonesia's economic and political centre, attracts a significant proportion of Indonesia's estimated 27 million internal migrants,[71] who primarily seek better economic opportunities (Figure 5.3). An estimated 1.85 million people, or 36.3% of the city's workforce[72], work in the informal economy; most informal workers are also internal migrants.

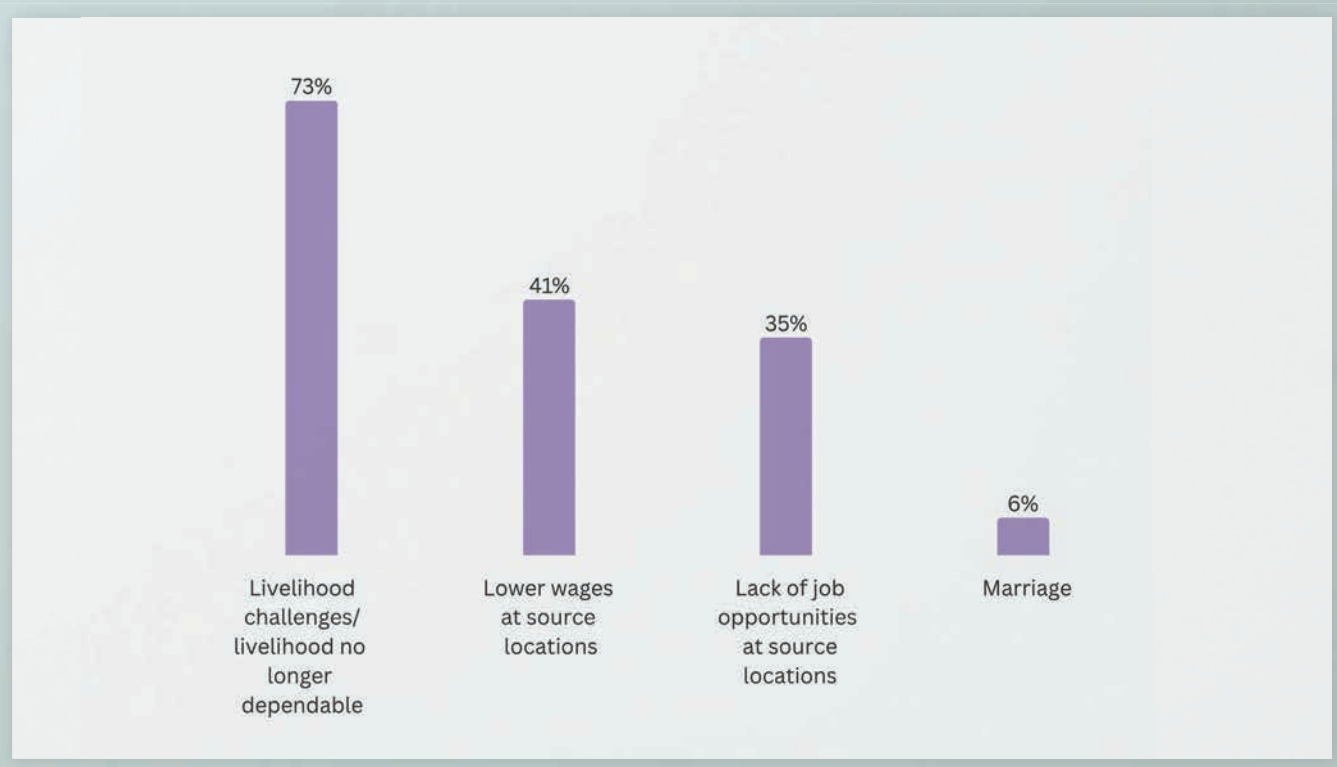


Figure 5.3: Reasons for moving by migrants in Jakarta

Rising temperatures create significant challenges for informal workers and migrants such as Jae and Ayu, as we see in the two case studies below.

CASE STUDY

Jae, a 21-year-old, migrated from Bandung to Bekasi in the Jakarta greater area a few months back to try his luck at better opportunities in the big city. The combination of the Bandung area being located at a higher altitude (around 700 -1200 metres above sea level) and Jae working in hotels airconditioned to 18-19°C, made the heat more bearable. In Bekasi, he is employed in factories with poor ventilation and no cooling, making the heat intolerable. While Bandung and Bekasi are both major urban centres in Indonesia, they both exhibit increasing urban heat island (UHI) effects and intensity; however, Bekasi, known as a satellite city for Jakarta, has experienced a more significant increase in land-surface temperature than Bandung, due to industrialisation and urban expansion.[73]

Jae mentions that at his factory in Bekasi, the production room is big but has crowded production halls filled with machines and people which increase the heat. On hot days, the work leaves him weak and dehydrated. He recalls,

"There was a time when I had to work in a really cramped room. It was so small you could only fit one person inside. I was fixing a component in the machine and almost fainted because it was so cramped and lacked oxygen, it was hot in that room."

There is barely any support from factory management or owners, however.

Like most factory workers, Jae lives in the informal settlement areas of Bekasi, where housing is poor and ventilation often non-existent. To cope with high temperatures, he uses a fan or increases his drinking water intake. However, these lead to additional electricity and water expenses. Drinking water, a basic need, must typically be purchased in bottles, as water direct from a tap is not potable.

Jae remarks that even though the weather was better in other areas he has lived in the past; it is almost the same everywhere now: hot and humid. The intense heat, in Jakarta and other cities where economic opportunities exist, continues to create hardship for migrants.

CASE STUDY

38-year-old Ayu is the sole breadwinner for her husband and two children. Originally from Central Java, she migrated 14 years ago to join her husband in Jakarta. Over the years, Ayu's husband has struggled to find a stable job, and as he grows older, his chances of securing employment have narrowed. With financial responsibilities mounting, Ayu has to work multiple jobs under the set minimum wage to support her family.

Ayu primarily works as a street food vendor, spending hours under the sun cooking in front of an open flame. To reduce expenses, and in some instances the unavailability of public transport, she ends up walking to her workplace. The nature of her work drains her energy so much that her health and productivity are affected. Moreover, her relentless schedule leaves her with very little time to rest. On average, she works for about 18 hours a day, with work starting as early as 3 in the morning. She explains,

"I come home from work late in the evening and get to cleaning. Then I cook for my husband and children. After finishing up all the work, I go to bed at 10 PM. I have to wake up at 1 AM to wash up and get ready for work. I have to manage my time very precisely. Working and taking care of the kids is not easy."

Ayu has noticed that in recent years, the heat in Jakarta has gone from bad to worse. However, despite headaches, dizziness and other heat-related issues, she continues working, as missing work leads to income losses. The informal nature of her work guarantees her no leaves or benefits.

Due to the poor state of their finances, Ayu and her husband often have to borrow money for basic needs like school fees and electricity bills. When asked about other coping mechanisms, she replies,

"As long as my health is not impacted, I have to deal with the increasing heat on my own. All I can do is drink water or iced drinks to tolerate it. I am used to it now."

Ayu did not mention any form of aid from the government or external agents in dealing with heat impacts. The only benefit she receives from the government is for her children's education. With worsening heat in Jakarta and gaps in safety nets, Ayu and her family remain extremely vulnerable to heat-related shocks while their financial challenges continue to build.

Informal workers and internal migrants such as Jae and Ayu remain largely invisible in labour and climate adaptation policies. Climate, disaster, and mitigation agendas are siloed, and extreme heat is not consistently tracked as a priority risk, so attention skews to policies focused on reducing emissions. With no means of recourse, these workers, often the most vulnerable in urban settings, bear the brunt of the heat.

5.4 Kathmandu, Nepal

Even though heat is unbearable for workers in Kathmandu, they "*power through*" to finish their work so that they can collect their wages to support their households and families. Heat is a growing challenge for workers in the city; most long-term migrants mention how the weather has drastically changed in the past decade, with the generally cool breeze in the valley area becoming extremely hot in recent years.

Informal workers make up a huge part of the country's population; in Nepal, 84.6% of all workers are in informal employment, representing close to 6 million people.[74] Many of these informal workers are internal, rural-to-urban migrants.[75] Migration in the country is driven by the prospects of better economic opportunities, and because their rural livelihoods are no longer dependable (Figure 5.4).

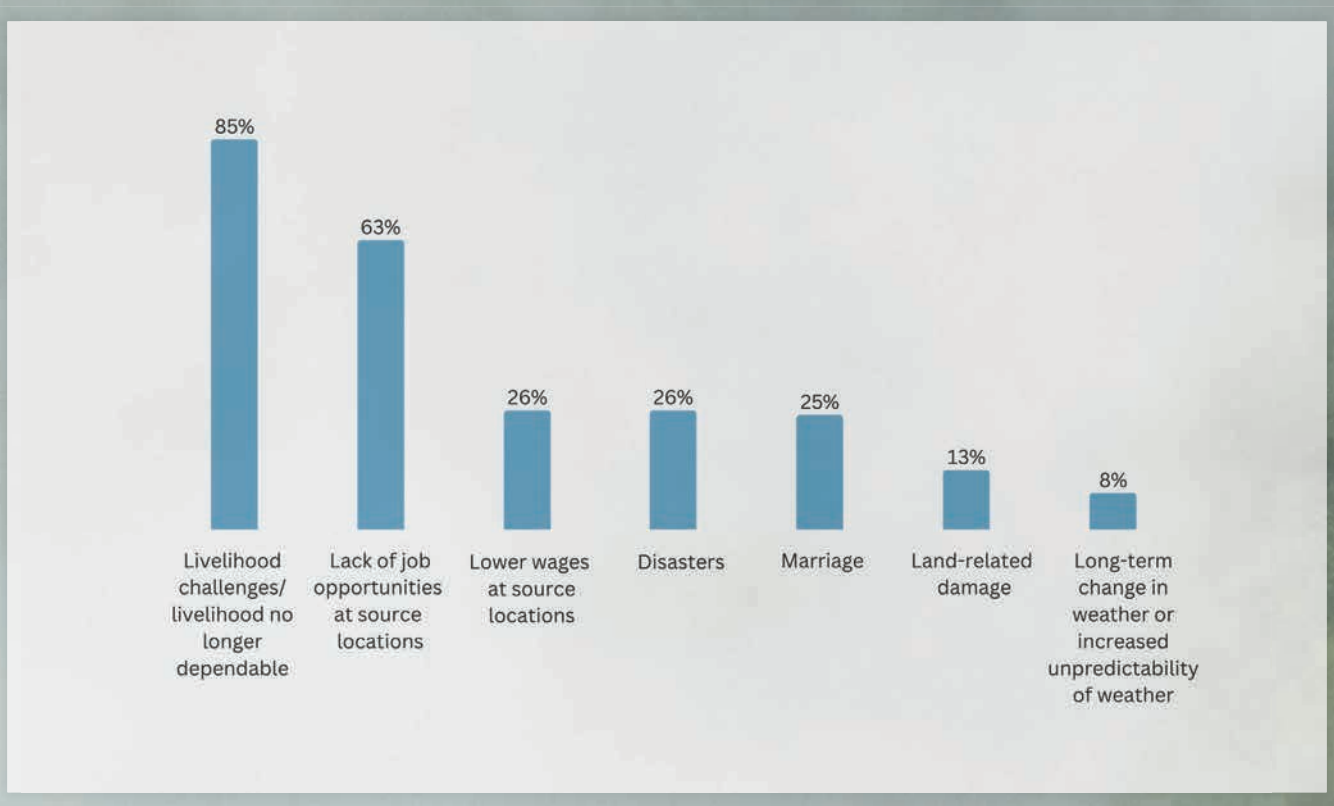


Figure 5.4: Reasons for moving by migrants in Kathmandu

The stories of Sunita and Prakash and the distress they face due to increasing heat in Kathmandu is not very different from other workers in the city, apart from the complex work-related challenges. Both have been living in the city permanently since they migrated. However, their access to basic protections such as relief are often impeded since officially, they are considered temporary residents. This makes dealing with the increasing impacts of heat even more difficult.

CASE STUDY

Sunita, a construction worker and internal migrant, lives in Kathmandu with her husband and two children. When Sunita first moved to Kathmandu more than 15 years ago, the rainfall used to be on time and the seasons occurred as expected. She mentions now everything has changed,

"it rains any time, it's generally hot and drought has increased which burns everything. There is a lot of difference. Time is not good now."

As an outdoor construction worker, Sunita faces the impacts of extreme weather both at her workplace and at home. With job precarity and limited means to support her family, she also has limited means to cope with the heat. During work hours, she and her co-workers try to find shade from the scorching sun, but on an outdoor construction site with the risk of losing wages for work not completed, their time in shade is limited. At home, she faces threats like dengue. Illness could lead to added expenses for Sunita and her family, who are barely managing. She mentions,

"We get mosquitoes here [in the settlement]. The mosquitoes with long legs which were usually seen in Terai are seen here nowadays. There are many in number nowadays. These are the mosquitoes which bring dengue."

To protect themselves, they buy mosquito coils; there is no government intervention.

In the absence of outside support, Sunita has searched for work as a domestic worker: it pays less, but it is indoors. She says,

"I thought I would search for other types of work like domestic work. Then I wouldn't even need to work in extreme heat or rain. I searched a lot for domestic work where I can work inside a house which is comparatively easier. However, I have not been able to find such work. I went to areas like Bhaisepati, Nakkhu which are a bit away from where I live but there isn't domestic work available there as well. It is really difficult to get work in Kathmandu."

CASE STUDY

Prakash, a temporary resident of Kathmandu, has been living in the city for over 40 years. He moved to the capital with his parents when he was just 2-3 years old and left his education in 10th grade to support his family as the primary breadwinner due to his father's untimely demise. Currently, he works as an airport taxi driver ferrying passengers across the city. The lack of fixed rates for taxis in Kathmandu makes Prakash's income extremely volatile.

As a taxi driver, tourism is Prakash's biggest source of earning. Tourists have historically travelled to Kathmandu for its pleasant weather, but with increasing heat and potential heatwaves in the city, this could shift. His current situation at work requires him to constantly be moving, including searching for passengers at the airport,

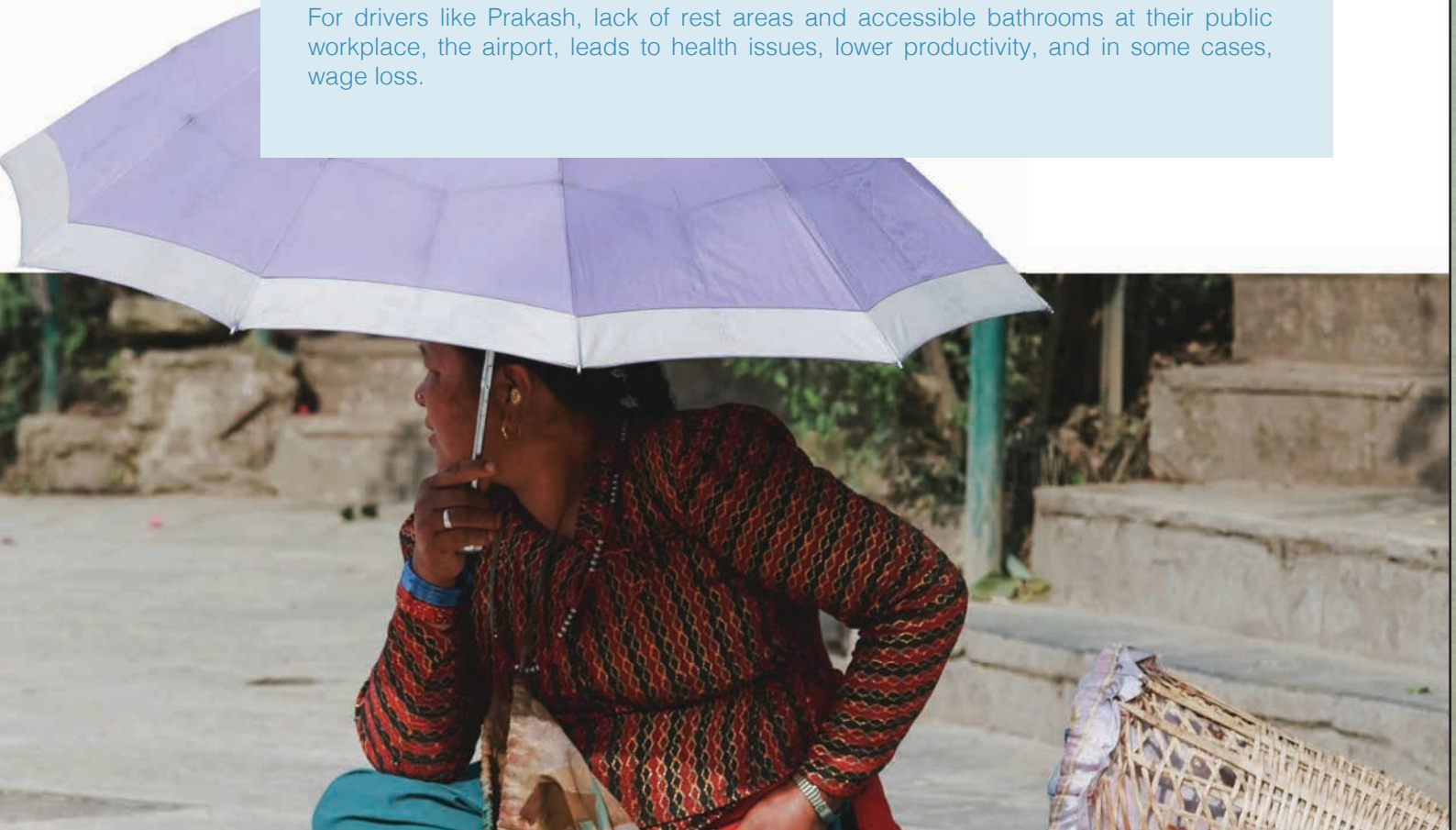
"It is very difficult to work when the hot wind blows. We normally have to go and look for passengers in the airport. When we go in search of them, the body gets heated during hotter days. It gets very difficult to work. One, two of our friends had fainted earlier while working in the heat. We took them to the hospital when they fainted. It is difficult to work on such days when there is a heat wave."

To help drivers like Prakash cope with these conditions, the company provides a tank of free and accessible drinking water where they can fill bottles. There is also a mandate by higher company officials that they should be hydrated to avoid health issues. However, Prakash mentions,

"If we drink a lot of water, we face problems – we need to go to the restroom which isn't easily accessible in the airport areas. We face dual challenges – problems if we drink less water and [problems if] we don't find a toilet if we drink enough water."

Another coping mechanism that Prakash mentions is sitting in air-conditioned restaurants during extreme heat; however, this means fewer passengers and therefore lower wages for the day.

For drivers like Prakash, lack of rest areas and accessible bathrooms at their public workplace, the airport, leads to health issues, lower productivity, and in some cases, wage loss.



5.5 Quezon City, The Philippines

The story of heat in Quezon City is one of disrupted sleep, suffocating workplaces, heat-absorptive concrete infrastructure, and limited accessibility to water. The heat is unrelenting, and when coupled with sweltering work conditions and limited respite, the conclusion is one of enduring terrible conditions, in order to earn the bare minimum.

Informal workers make up a significant portion of the labour force in the Philippines. A 2018 survey revealed that the informal sector employs 15.68 million people in the Philippines, 38% of the working population.[76] More recent data is difficult to find, as employment data is no longer disaggregated by formality. However, a 2024 estimate from Filipino socioeconomic policy organization IBON estimates that about 42% of the total employed population are informal workers.[77] Regardless of the specific numbers, informal workers are understood to be responsible for significant contributions to the country's expanding economy. While Quezon City does not have specific estimates for informal workers or internal migrants currently residing in the city, the city government has attributed its high average population growth rate to a continuous stream of migrants.[78] Migration to Quezon City is primarily driven by economic and social factors; however, for a small percentage, disasters and unpredictable weather play a role (Figure 5.5).

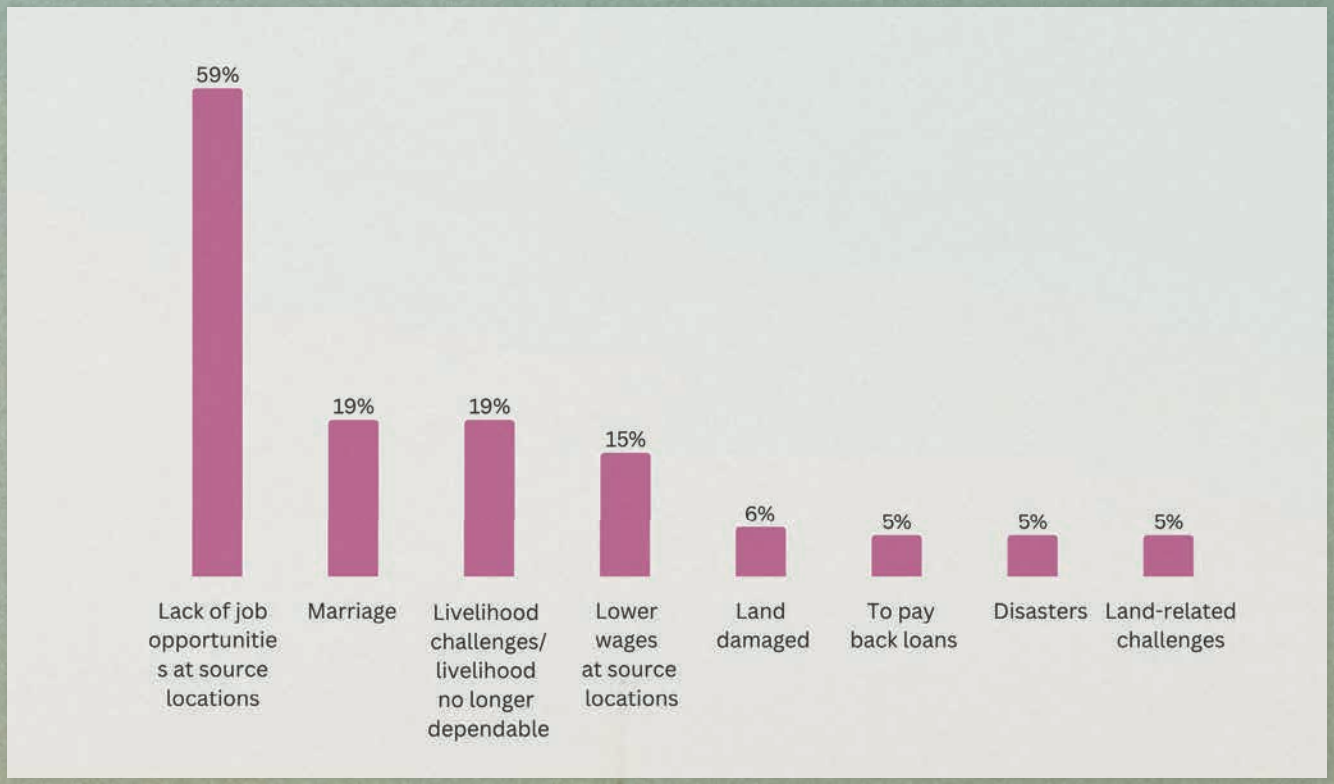


Figure 5.5: Reasons for moving by migrants in Quezon City

Workers such as Erwin and Gloria live at the margins – working in low paying jobs with no job or income security, extreme heat disrupts their livelihoods and households. However, with no means to cope, they feel the need to just "bear with the heat and go on with their work", as we see in the two stories below.

CASE STUDY

Erwin has lived in Quezon City for over 30 years, employed in multiple jobs due to the volatility of the informal sector. Most recently, he worked in a plastic factory; he lost that job when the factory shut down as a result of the plastic ban in Quezon City. Currently, he looks for odd jobs to support his family.

During Erwin's time at the factory, he experienced intense heat on hot days due to poor ventilation and a lack of ceiling fans. He recalls, *"It was extremely hot because it was full of machines."* He mentions that even electric fans were prohibited at the factory, leading to them not having any respite from the heat within the factory building,

"Ah, electric fans weren't allowed. This was because, in production, during cutting, the fan might blow away the cut outs." At home, he can see the impacts of extreme heat on his children, "my child gets prickly heat rashes. We bathe them."

Erwin mentioned there was minimal support to help workers cope with heat in the factory. His employers had installed a water fountain with cold water which helped, but the lack of fans was distressing, as was the prohibition on portable fans. With the loss of Erwin's job, he faces new livelihood challenges and the possibility of different heat challenges in other occupations.

CASE STUDY

Gloria, 50 years old, came to Quezon City over 20 years ago for better economic opportunities. She started work as a domestic worker and eventually found work in a garment factory where she still works, though the quantity of work has reduced over time.

In the past 20 years, she thinks the climate in Quezon City has significantly changed and become extremely unpredictable;

"It seems hotter now. I don't know, it's just worse than before. As for the rain, you can't tell when it's coming. But when it looks like rain, we go, 'Okay, time to pack things up!'

With the increasing heat in Quezon City, Gloria talks about the unbearable conditions that heat is creating at her workplace. She says,

"It affects us. With just a little movement, you're drenched in sweat. Like me, when I sweat, I get itchy. I can't even work properly because of the heat."

Even though the factory has fans, they are often switched off by the management during break times leading to reduced rest quality. They receive arbitrary reasons for this action by the management;

"They said the fans might overheat. So, we just follow".

At home, even though her family is at risk of different heat -related health issues, she claims there isn't much to do to help them or herself.

Gloria and her fellow workers understand the injustice that they face at the factory during extreme heat. She exclaims,

"You really can't take it. When you nap, you're sweating buckets. Meanwhile, they have air conditioning in the office?" She has often tried to reason with her supervisor saying "Sir, the heat is unbearable. We might get dehydrated."

However, her pleas have so far been unsuccessful.

Workers such as Gloria need to be protected and supported by employers during such times rather than needing to fight for basic necessities.

Quezon City has recently seen some policy efforts to address heat. However, heat has not been a central issue, being the focus of only a few awareness campaigns. Further, informal workers are often not accounted for within climate adaptation policies. Fortunately, a new heat action plan is in the making; however, it is essential that such policies look at the heat-related vulnerabilities that informal workers like Gloria and Erwin face at work and at home.

CHAPTER 6
RECOMMENDATIONS & GOOD PRACTICE EXAMPLES

In this section, we provide recommendations and stakeholder-specific suggestions for implementing these recommendations. Our recommendations are not exhaustive; indeed, addressing heat holistically in ways that serve the most vulnerable people is an area ripe for innovation and learning. Nonetheless, our recommendations identify important entry points for governments, civil society, non-profits, employers, and funders to engage on, as they grapple with how to address and build resilience to extreme heat.

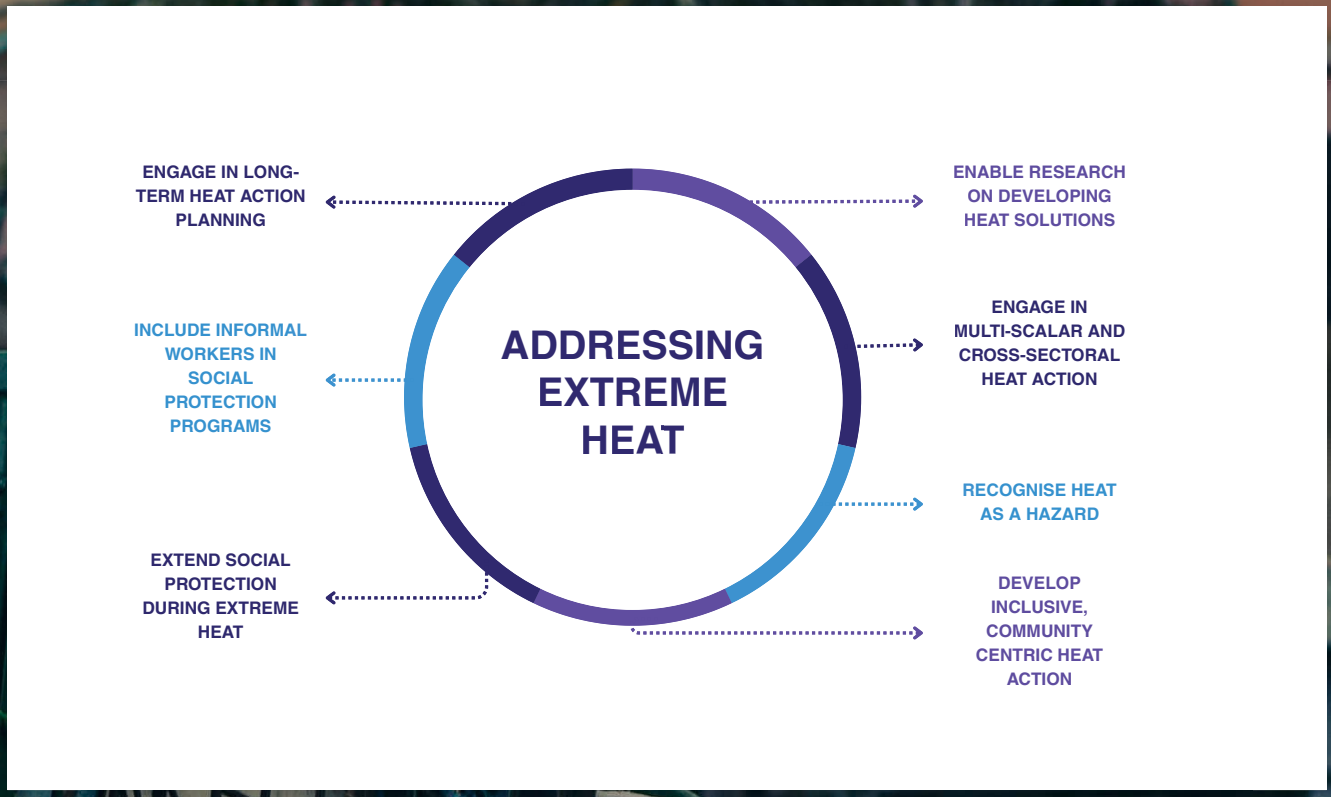


Figure 6.1: Overview of recommendations

Recommendation 1
Recognise heat as a hazard

Make heat visible as an all-of-society issue, especially officially recognising heat as a hazard. Heat remains understood primarily as a problem for individuals, and is not understood as a chronic issue across all sectors and scales. Furthermore, government, employers, and informal workers have limited awareness and capacity to sufficiently address heat. Officially recognising heat as a hazard is the first step to initiating an all-of-society approach to minimising and addressing heat impacts.

Governments may consider officially recognise heat as a hazard. This will enable (a) financial commitments to address extreme heat, (b) disaster declarations, (c) flow of resources and coordination on planning, response, and recovery, and (d) the collection of data on heat vulnerabilities, losses, deaths, etc.

Local-to-national governments should increase their knowledge of heat impacts on different sectors and populations. They should also share existing and planned policies/plans/mandates across sectors, and regularly share solutions to support bringing them to scale. This should be complemented with building capacity and technical skills on extreme heat impacts, projections, and solutions, including long-term heat adaptation efforts, to enable informed and effective action.

Civil society and governments should build community awareness of heat issues, impacts, and response strategies. A key target population is informal workers. Awareness-raising should be paired with worker training on heat issues, shared dialogue spaces for discussing and identifying current and future challenges, and/or through empowering community-based groups.

Employers need to enhance their understanding of heat issues particular to their employee base. This includes the compounding impacts of heat on worker health and productivity, heat policies and worker protections, and concrete actions they can take to reduce impacts to their workers and their business.

Good practice examples:
Making heat visible

Ahmedabad Heat Action Plan[79]

Following the devastating heatwave of 2010 which led to over 1,344 deaths, Ahmedabad, India launched its first heat action plan in 2013. It became the first city in South Asia to recognise heat as a serious public health hazard and a threat to the city's development. A 2018 study estimated that 1,190 deaths have been avoided since the plan's launch.[80]

The heat action plan includes a suite of awareness-raising, emergency response, and long-term and risk reduction interventions such as a heat early warning system and cool roofs. The plan's messaging encourages the population to avoid heat exposure, maintain appropriate levels of hydration, and outlines strategies for cooling when becoming overheated. Heat warnings trigger activities, such as pre-positioning medical and emergency resources and staff.

Raising awareness through the Heat Relief 4 LA Campaign[81]

Launched in 2022, Los Angeles' Heat Relief 4 LA Campaign aims to raise awareness on the health impacts of extreme heat. In addition to an interactive map of cool spots, a group of government partners in the city of Los Angeles shares heat resources, information, maps, tools, and alerts, with some materials available in 15 languages. The reach of this campaign since its launch in 2022 has increased significantly along with social media engagement; however, its impact on behavioural change and preventing illnesses due to heat isn't clear yet.

Recommendation 2
Extend social protection during extreme heat

Extend existing social protection mechanisms to trigger during extreme heat and ensure ease of access. Most countries have social protection mechanisms that support vulnerable and poor populations. Enabling existing mechanisms to trigger during heat events can support vulnerable and poor populations to access much-needed relief (i.e income protection, food relief, and health support) during extreme heat events that result in wage loss and other cascading impacts.

Governments should identify what services vulnerable populations need during extreme heat events and map their existing social protection mechanisms onto those needs to identify gaps. Where there are gaps in existing social protection mechanisms, governments should consider rolling out relevant new policies and programmes; these can be modelled off best practices documented globally.

Governments should identify and implement heat thresholds for triggering social protection mechanisms. Heat parametric insurance schemes are being piloted in many locations across the globe which provide a model for how to identify heat thresholds and support vulnerable communities. Learning from these pilots and approaches can support governments to identify what level of heat is a problem and what kinds of services are needed at various thresholds. In addition, governments should explore scaling these existing pilots at subsidised rates as doing so would provide greater coverage and support to workers.

Civil society and local governments must work together to educate the public about existing social protection mechanisms and how and under what heat conditions they can be accessed.

Employers need to be aware of social security schemes that are relevant to informal workers and their ability to work. This would enable them to communicate available support options to informal workers as needs arise or become evident.

Good practice examples:
Social protection mechanisms that address extreme heat impacts

Income Protection

In 2025, Spain's Ministry of Labour issued legislation that allows employees to take up to four days off with pay if it is unsafe to work during extreme weather events such as heatwaves. This provision is triggered when emergency authorities issue an alert for extreme weather. The provision also allows extensions for extended periods of extreme weather.[82]

Healthcare support

Ayushman Bharat, a government program in India, provides a critical safety net for informal workers exposed to heat. It offers a health benefit package for heatstroke that ensures that workers such as street vendors and labourers can access immediate, quality hospital care without the financial burden.[83]

Recommendation 3
Include informal workers in social protection programs

Officially recognise informal workers as a vulnerable group eligible for social protection programs. This is necessary for heat but extends beyond just heat adaptation. It is fundamental for uplifting informal workers given they face compounding vulnerabilities due to climate change, social and cultural barriers and discrimination, financial and social instability/insecurity, and lack of political representation. Internal migrants must be specifically identified as a subset of this group that face differential vulnerabilities, needs, and issues without access to services and relief.

Governments should officially recognise informal workers as a group eligible for social protection. This will enable informal workers to access and use key safety nets during extreme heat events.

Governments should include categories of informal workers and their sectors of work in national census exercises in order to understand the needs of informal workers and to inform resource allocation towards social protection programs.

Civil society should work with local governments to identify informal workers and raise awareness of the social protection mechanisms that are available to them and work on improving last-mile delivery of these schemes during extreme heat events. This will be an ongoing effort given the transience and invisibility of informal workers (and especially internal migrants).

Good practice examples:
Existing social protection programs accounting for informal workers

In 2017, the Labour Ministry of Thailand extended protections to informal workers under Article 40 of the Labour Protection Act, enabling them to access the national savings fund and employment programmes such as emergency employment and skills development programs.[84]

The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), 2005 provides protection to informal workers who lack job security, providing at least 100 days of wage employment per financial year to every rural household that participates in unpaid manual work. An additional 50 days of wage employment are provided in drought-affected areas or natural calamity areas.[85]

While these programmes are not specific to heat, they are efforts to fundamentally reduce the vulnerability of the most vulnerable. They represent the types of programmes that could be leveraged to provide wage protection during heat events.

Recommendation 4
Engage in long-term heat action planning

Complement existing short-term heat planning and response with long-term strategic heat action. Heat plans, policies, and discourses need to go beyond reactive and response-related measures that primarily support coping to also include long-term measures that mitigate heat risk (see Box 3 for examples) and enable adaptation both in the workplace and household. These long-term measures need to be based on climate projections to ensure adaptation to current and future climate change impacts.

Governments need to develop informed, responsive heat action plans that incorporate both short-term and long-term strategies.

Research institutions should conduct locally-grounded studies to understand heat risk and vulnerability and how projected heat is likely to impact cities, and identify viable long-term heat adaptation options. This research should be used by government decision-makers to develop long-term heat action plans.

Non-profits working with communities, employers who understand heat challenges in the workplace, researchers, and climate and heat adaptation experts who understand the grave future we face, should support governments with capacity building and technical assistance to develop policies and plans that integrate priorities and action for long-term heat adaptation.

Good practice examples:
Combining short-term and long-term measures[86]

The Ahmedabad Heat Action Plan in India successfully complements immediate emergency response with long-term adaptive measures like cool roofs. See good practice example for Recommendation 1 for further details, and Box 3 for additional examples of long-term measures.

Recommendation 5
Develop inclusive, community-centric heat action

Ensure heat plans, policies, and discourses are inclusive of those most exposed and vulnerable to heat through community-centred approaches. This requires engaging with the range of heat vulnerable populations in cities to develop culturally-appropriate strategies and solutions that respond to their specific challenges and reduce vulnerabilities. A key, highly-exposed and impacted population to include is informal workers. They face the brunt of heat impacts, yet cannot afford the loss of wages and productivity and the negative impacts on health caused by extreme heat.

Local governments should facilitate the inclusion of communities, including the most vulnerable given their connection to local populations and knowledge of local issues, and connection to higher levels of government. Civil society can be an effective representative of difficult-to-track groups like informal workers and more specifically, internal migrants.

Local governments should include vulnerable communities not only in decision-making processes, but also in the implementation and monitoring of heat action. Embedding this type of work in communities results in improved community-government relationships and joint implementation, better tracking of community risks, hazards, and needs, and improved sustainability.

Good practice examples: **Inclusive community-centric heat action**

Miami Heat Action Plan[87]

The Miami Heat Action plan was developed using community-centred approaches. In 2021, the Climate and Heat Health Task Force, in partnership with The Miami Foundation, a task force consisting of community members, was set up to guide the development of this plan. They conducted extensive discussions with community members on topics related to outreach, preparedness and response, housing, labour, and research to ensure community-driven heat intervention priorities.

Climate Resilience Measurement for Communities[88]

The Zurich Climate Resilience Alliance uses a community-centred approach and tool called the Climate Resilience Measurement for Communities (CRMC) which helps communities to evaluate and measure how resilient they are to climate hazards. Over the past decade, the CRMC has supported communities around the world in identifying areas of priority, developing strategies, and implementing best practices that resulted in improved flood outcomes. Needs and interventions identified through the CRMC process have also been integrated into local plans and received further funding for scaling from governments and donors. The CRMC is now being applied to heat, tropical storms, and wildfires.

Recommendation 6
Engage in multi-scalar and cross-sectoral heat action

Ensure heat plans, policies, and discourses are cross-sectoral and cross-scalar. Currently, heat planning is so siloed that, unless departments are directly involved, they have limited awareness of existing heat policies, plans, and discourses. This, in turn, has implications for the enforceability, monitoring, and effectiveness of these plans. Heat is an all-of-society issue and as such it necessitates an all-of-society approach: cross-sectoral and multi-scalar collaboration and action is critical to addressing the multi-faceted impacts and risks posed by heat.

- **Government department and ministry leadership from different departments should collaborate** around heat action and encourage mainstreaming heat across sectoral policies.
- **Governments at the national and local levels must closely collaborate on heat planning** to encourage cross-government participation in discourses and in developing heat plans and policies that are grounded in local needs and capacities.
- **Governments should enable cross-sectoral and cross-scalar collaboration and coordination** by leveraging the convening power of government departments and ministry leadership. To this end, governments could consider addressing heat in collaboration with central planning agencies and/or establishing dedicated coordination bodies/positions to encourage cross-government participation in discourses and in developing plans, policies focused on heat action.

Good practice examples:

Chief Heat Officer in Dhaka, Bangladesh for better planning[89]

The position of Chief Heat Officers (CHOs) was developed by the Atlantic Council's Climate Resilience Center to support cities in dealing with the impacts of extreme heat. Their role encompasses strengthening ongoing heat protection efforts and developing new ones to build heat resilience. In 2023, Dhaka North, Bangladesh became the first city in Asia to appoint a CHO.[90]

Recommendation 7
Integrate worker protections into heat policies

Ensure heat policies and discourses contain mandatory provisions for worker protections. Heat presents a unique challenge to workers in heat-exposed industries. Without wage protection, the threat of income loss due to reduced productivity is a harsh reality that many workers must face during extreme heat events. In addition, many workers continue to work through unbearable conditions because stopping work, or seeking relief through rest or water breaks, are not feasible options; they risk reductions in income and/or a loss of employment opportunities.

Governments should ensure provisions to mitigate wage loss caused by loss of productivity and/or health impacts of heat are integrated into heat plans/policies. Mitigation for wage loss can be addressed through innovative solutions such as parametric insurance, anticipatory relief measures, or other dedicated funding mechanisms. Health impacts can be addressed through relatively simple solutions such as mandating that employers provide adequate water and water breaks, provisions for cooling, and possibilities for alternative work schedules.

Governments should consider providing employers with support to bear the financial impacts of heat and introduce incentives for employers to better support their employees through heat events. Governments must play a bigger role in ensuring accountability of employers in implementation of these measures.

Employers should support workers in following provisions outlined in heat action plans.

Good practice examples:
Protecting informal workers via heat policies and plans

The National Disaster Management Authority in India released two advisories for protecting informal workers in June and July 2025.[91] These advisories address the challenges of informal workers, including digital platform workers, during heatwaves or extreme heat conditions, such as overheating, lack of cooling, and wage loss. They advise employers to offer alternative shift hours, cooling stations, and compensation for lost wages during such weather conditions.

In Qatar, outdoor workers in construction, agriculture, and other sectors face high risks of heat stress. To address this, the Ministry of Labour issued Ministerial Decision No. 17 of 2021.[92] This regulation bans outdoor work from 10:00 am to 3:30 pm between 1 June and 15 September,[93] requires heat risk assessments[94], and mandates use of Wet-Bulb Globe Temperature (WBGT) monitoring, with work halted above 32.1 °C.[95] Employers must provide shaded rest areas,[96] free drinking water,[97] breathable clothing,[98] and health check-ups.[99] Worker training,[100] awareness activities,[101] and rights to stop unsafe work are also emphasised.[102] The legislation also allows authorities to partially or fully shut down a workplace in case of non-compliance.[103]

Recommendation 8
Enable research on developing heat solutions

Invest in, and conduct, research on developing heat solutions. There is a need to further understand the differential needs, risks, and vulnerabilities to heat within informal worker populations. Assessments of impact and effectiveness of pilots and solutions focused on addressing heat are also needed to enable scaling and sustainability (Box 3). Investment and research go hand in hand to ensure purpose-driven solutions are actually implemented and usable.

- **Philanthropies and funders must invest in more research on the impacts of heat-vulnerable communities and into piloting practical and adaptive solutions** that protect workers during extreme heat.
- **Non-profits and civil society should pilot solutions, and where relevant, in collaboration with the private sector.** They should generate and disseminate evidence and learning on their successes and failures.
- **Governments must work on uptaking and scaling these piloted solutions to ensure what works is reaching larger populations.**

Box 3: Innovative ideas and strategies to build the resilience of workers to extreme heat

(For more details, please see 'Innovative ideas to make workers more resilient during extreme heat' document)

While institutional changes for improving the resilience of vulnerable communities such as informal workers are important, it is equally critical to look at practical, adaptive measures and ideas which can provide long-term support.

Some of these measures are ideas, while others have already been piloted, either in the study countries or others; and are ready for further refinement and replication to support and protect more workers during extreme heat.

Systemic strategies which fundamentally reduce vulnerability and build resilience

- **Parametric insurance:** Parametric insurance, or insurance tied to a specific, measurable event, can act as an income support measure to support workers when faced with potential wage loss. Organisations such as Migrants Resilience Collaborative[104] and Mahila Housing[105] Trust have piloted heat parametric insurance for vulnerable communities.

- **Heat resilient infrastructure:** Infrastructure in informal settlements and workplaces where informal workers are employed can contribute to temperature-related challenges. Efforts such as green roofs can help to address some of these challenges. NGOs in India, Bangladesh, and Indonesia, for example, are working to create better conditions for workers through affordable cool and green roofing solutions for informal settlements[106] and workplaces.[107]

- **Community-led early warning systems:** Early warning systems can help communities prepare and take protective actions during extreme weather events. In existing systems, accessibility can be a challenge for vulnerable groups depending on how messages are shared (for e.g., languages they don't understand or via mobile phones which may not possess). Community-led early warning systems significantly improve accessibility. An example of a successful pilot is the heat alert boards in Delhi by the IMD and Greenpeace India.[108]

- **Greener jobs:** Greener jobs are jobs that help to reduce greenhouse gas emissions (GHG) while also providing a stable income and safe working environment. Efforts led by C40 cities across countries have focused on informal worker communities. For example, Quezon City, The Philippines, has focused on programmes for waste management workers.[109]

- **Creating greener spaces and bio-corridors:** The UHI effect or amplified and trapped heat as a result of insufficient green spaces and bio-corridors and many heat absorbent surfaces in cities, is one of the reasons for extreme heat in cities. These measures can reduce the UHI effect and create valuable habitat and mitigate stormwater surge. The Cities4Forests program by WRI Indonesia in Jakarta[110] and nature-based solutions projects in Kenya and Argentina[111] exemplify how urban greening and nature-based solutions can help cool urban areas.

Less systemic but important strategies

- **Forecast-based financing or anticipatory action:** Financing for anticipatory action before a predicted heatwave or extreme heat can help pre-empt potential impacts and support workers. A pilot run by a consortium of organisations in Dhaka provided multi-purpose cash grants in advance of a heatwave to individuals in informal settlements, who reported that it helped them to deal with heatwave impacts.[112]

- **Access to water/alleviating heat-induced water stress:** Water is a basic amenity which should be available to all. However, in most of the cities where this study was conducted, availability of free drinking water was limited. Most workers relied on buying drinking water during the summer, which increased their expenses. Projects in North India[113] and Dhaka[114] have contributed to improved access to drinking water for communities.

- **Cooling centres, rest points, and access to air conditioning and shade structures:** Resting points or cooling centres for workers help to provide respite during travel and at work and protect workers during extreme heat. Many workers we spoke with mentioned the lack of rest or shaded rest areas, making work breaks unrestful. Efforts by Migrants Resilience Collaborative[115] in South Asia and Maricopa county[116] in the United States are good examples of these centres.

CHAPTER 7
CONCLUSION

Impacts of heat on informal workers and internal migrants are already severe and will worsen as temperatures rise. Yet, even with new temperature extremes across cities, there is a sense among informal worker populations that the rise in heat is something that they just need to deal with.

Indeed, heat is not taken as seriously as other disasters where the impacts are more visible, despite its erosive impacts on the lives and livelihoods of workers. Overheated dwellings lower the sleep quality of workers, reducing productivity and the ability to recover, and increasing health risks. Informal workers, already facing job precarity, rely on coping strategies that compete with their basic needs. When unable to meet expectations or take leave for heat-related illness, they suffer through wage loss even as they increase spending on essentials and medication, deepening household financial distress and compounding worker vulnerability.

In recent years, global and national policies have seen a much-needed shift towards addressing heat as a growing challenge. Yet, these policies remain siloed, focus only on short-term measures that are difficult to enforce, and fail to represent informal workers and internal migrants. Informal workers and internal migrants are the builders of our cities and the backbones of urban economies but remain completely invisible and therefore unserved by the localities that depend on them.

As heat intensifies, there is an urgent need to create a world where the workers who build and sustain our cities and economies are visible. We need to reimagine urban landscapes to centre the lived realities of informal workers. We need to develop cross-sectoral policies and adaptive coping mechanisms for heat-induced risk that enhance resilience and are inclusive of informal workers and internal migrants. And, we need to invest in practical, scalable measures that improve workers' lives. These are not easy changes, but we have evidence that they are doable ones. And, perhaps most importantly, they are necessary ones: necessary for the health and wellbeing of informal workers, for the systems and people that drive our urban hubs and economies, and for creating a world where we all can thrive even in the hotter world climate change presents to us.

ANNEX
CLIMATE CONTEXT FOR THE FIVE CITIES

City climate context: Dhaka, Bangladesh

Bangladesh is one of the most climate-vulnerable countries in the world, facing a range of extreme weather events such as flooding, cyclones, drought, rising sea levels, and extreme heat. These hazards continue to create widespread disruption across the country. Evidence shows that Bangladesh has already experienced noticeable warming. National datasets indicate a clear increase in average temperatures since the late 20th century, alongside more frequent hot days and warm nights.[117] A recent report noted that between May 2024 and May 2025, the country experienced 44 days of temperature above the 90th percentile.[118]

Near-term and mid-century projections estimate a continued and significant temperature increase. Global climate models suggest persistent warming across all emissions scenarios, with the most pronounced increases expected during the pre-monsoon hot season. National projections for the 2030s and 2050s consistently show a rise in both hot days and hot nights, raising the risk of heat stress and limiting nighttime cooling and recovery.[119]

Dhaka's high population density, unplanned urban development, geographical location, and Bangladesh's low Human Development Index (HDI)[120] exacerbate its vulnerability.[121] These factors, combined with the rise in extreme heat, paint an increasingly alarming picture. A 2024 study by the International Institute for Environment and Development (IIED) found that Dhaka ranks among the cities experiencing the most significant temperature increases worldwide.[122]

Several studies have identified a persistent UHI effect in Dhaka, with temperatures in urban areas rising ~2–3°C higher than nearby rural zones during the day and ~1–2°C at night. These temperature intensities vary by season.[123 124 125]

Heat stress, compounded by humidity, is a critical issue for worker safety in Bangladesh. Humid heat is particularly dangerous, especially for labour-intensive sectors as heat plus humidity means sweating does not help cool the body and therefore the risk of overheating goes up dramatically. A recent national analysis found that the Wet Bulb Globe Temperature (WBGT), a measure of the physiological impact of heat and humidity, has increased since 1979. This trend implies a growing number of hours each year that exceed occupational heat safety thresholds during the hot months.[126] A factory-floor study in Dhaka's ready-made garment sector has similarly documented unsafe indoor heat conditions.[127]

With much of its workforce being mobile and working outdoors, rising temperatures pose significant challenges. The escalating risk of extreme heat threatens to slow Bangladesh's rapid economic growth and hinders its transition to a middle-income country.[128 129]

City climate context: Delhi, India

In India, temperatures have consistently risen over the past few decades. The country has witnessed significant warming, with the annual mean temperature in 2021 registering +0.44°C above the 1981–2010 average. As of 2021 the top four warmest years were 2016 (+0.71°C anomaly), 2009 (+0.55°C), 2017 (+0.54°C), and 2010 (+0.53°C). Shockingly, 11 of the 15 warmest years prior to 2022 occurred within the 2007–2021 period.[130] This does not include the heat of 2023 and 2024, which are the newest two hottest years on record. As a result of these increases, three-fourths of India's population is now at risk of experiencing high to very high heat levels.[131]

North and Central India are particularly prone to extreme heatwave events. In 2024, the country experienced the hottest year ever recorded.[132] Future projections indicate a significant increase in both the frequency and duration of heatwaves. Some studies estimate that by mid-century, summer heatwaves could become 2.5 to 3 times more frequent, with longer durations.[133]

Delhi, India's capital, is among the hottest and most vulnerable cities in India due to its dense population and large low-income communities. A recent study by the Council on Energy, Environment and Water identified Delhi as one of the cities at the highest risk from extreme heat.[134]

A satellite-based study of Delhi's extreme heat event on 26 May 2024 revealed critical insights into the city's thermal dynamics with researchers estimating exceptionally high land surface temperatures reaching up to 56°C in certain hotspots. Taken alongside the India Meteorological Department's recorded air temperatures of 46 °C, the study confirmed a pronounced UHI effect, with urban zones being 2–4°C hotter than surrounding rural or vegetated areas.[135]

Looking ahead, projections indicate a global temperature increase of 1.0-2.4 °C above the 2011–2020 average under the SSP2-4.5 emission scenario (the scenario currently considered to be the most likely that we will follow) by 2080,[136] along with a substantial rise in heatwave frequency and duration in India by the end of the century.[137]

City climate context: Jakarta, Indonesia

Indonesia is ranked in the top third of countries in terms of climate risk, with high exposure to flooding and extreme heat. The intensity of these hazards is expected to grow as the climate changes. Without effective adaptation, population exposure will also rise.[138]

A recent report by Climate Central found that 17% of Indonesia's population (48.6 million people) experienced 30 or more days of "risky heat" — temperatures hotter than 90% of historical norms for their region — between December 2024 and February 2025. They further estimate that for 16% of the population (45.1 million people), risky heat exposure was the result of climate change.[139]

Most projections for Indonesia show warming slightly below the global average. Under SSP2-4.5, the CMIP6 multi-model ensemble indicates ~+1.0 °C of warming by 2040–2059 with a model range of about +0.7 to +1.6 °C, and ~+1.7–1.8 °C by 2080–2099 with a range of about +1.1 to +2.5 °C (nearly uniform across months given Indonesia's weak seasonality).

Starting from present-day monthly means of ~25–26 °C, this implies typical monthly means of roughly 26–27 °C by mid-century and ~27–28.5 °C by late century, which would materially increase the number of days with Tmax > 30 °C. Note that global models have known biases over the Maritime Continent (limited land–sea contrast on smaller islands and convection issues), so inland warming could exceed these national-mean values in higher-resolution or locally calibrated analyses.[140]

Jakarta, Indonesia's megacity of over 10 million people ranks among the top cities globally affected by climate-intensified heat. The rising heat in Jakarta is driven by both global climate change and the local UHI effect. Data from 1994 to 2024 shows a sharp increase in the number of days with temperatures exceeding 35°C — rising from an average of 3 between 1994-2003 to 21 as of 2024.[141]

City climate context: Kathmandu, Nepal

Nepal is highly vulnerable to climate change as a result of both acute and slow-onset, climate-related hazards. Nepal's climate vulnerabilities result from a combination of fragile, mountainous topography and ecosystems, highly variable monsoon-driven hydrology, unplanned settlements, and a lack of resilient infrastructure.[142] [143] Approximately 80% of Nepal's population is at risk from natural and climate-induced hazards, including extreme heat and flooding.[144] Climate extremes are projected to intensify over the 21st century, potentially exacerbating disaster risk levels and putting human life at risk.[145] [146]

Nepal can be divided into different climate zones ranging from the Terai region with an altitude of less than 500 m above sea-level to the High Himalayan region with an altitude of over 5,000m. Average temperatures decline from a peak of over 24°C in the Terai down to sub-zero temperatures in Nepal's highest mountains.[147] However, extreme heat may be a problem for much of the country, because 'extreme' is relative to the local climatological norms.

Long-term temperature trends in Nepal show a clear pattern of warming. Compared to a baseline from 1900-1917, for the 2000-2017 period Nepal is estimated to have warmed between 1.0°C–1.3°C. Future warming is projected to be higher than the global average. Rises in maximum and minimum temperatures are expected to be stronger than the rise in average temperature, and temperature increases are expected to be strongest during the winter months, which may have significant impacts on the hydrologic cycle and water availability.[148]

Kathmandu, the capital and largest metropolitan city in Nepal, faces significant climate vulnerability. Rapid population growth, urbanisation, and development pressures have exacerbated these challenges. The city has experienced a noticeable rise in temperatures. This rise is associated with the expansion of impervious surfaces, high-density construction, and broader regional climate warming.[149] [150] Future projections indicate a continued rise in temperatures across Kathmandu.[151]

City climate context: Quezon City, The Philippines

The Philippines faces some of the highest disaster risk levels in the world, and these are projected to intensify as the climate changes. The country is exposed to tropical cyclones, flooding, and landslides. Sea-level rise in some parts of the Philippines exceeds global average rates; by the end of the century (2070-2100) over one million Filipinos could be exposed to flooding from rising seas.[152]

Against this backdrop of intensifying climate hazards, temperatures are also rising. Temperatures are generally high in the Philippines, particularly in the valleys and plains, averaging 26.6°C throughout the year, with a seasonal variation of about 3°C and minimal spatial temperature variation across the country with the exception of localised elevation-related differences. Humidity levels are also high, ranging between 71% – 85%; this is a result of high rainfall, surrounding warm ocean waters, and warm moist trade winds that flow through the archipelago.[153]

As of 2015, the annual mean temperature in the Philippines has warmed 0.68°C as compared with 1951 when measurements began, and 2024 was the warmest year in the country on record.[154] [155]

Urban areas in the Philippines are especially vulnerable due to population density and land use patterns that intensify the UHI effect.[156] Under RCP 4.5, national-scale projections indicate the Philippines' annual mean temperature will warm by about 0.9–1.9 °C by mid-century (2040–2069) and roughly 1.3–2.5 °C by late century (2080–2099), relative to the 1986–2005 baseline.[157] However, because the Philippines is an island nation, the mixture of land and water surface is difficult for global climate models and thus temperature projections for the Philippines are somewhat less reliable.

As in much of the Philippines, climate change is heightening climate-related risks in Quezon City. Urban form—high density and extensive impervious surfaces—amplifies heat via the UHI effect. In March–April 2025, the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) bulletins placed Quezon City's heat index mostly in the 31–42 °C ('extreme caution') range, with occasional higher values elsewhere in Luzon (the island on which Quezon City is located).[158] Future projections indicate a continued rise in annual mean temperatures, with the most significant impacts expected during the hotter months and the dry season.[159]

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