Impact of extreme heat on migrant workers and MSMEs in Delhi-NCR

December 2023

MSC
MicroSave Consulting

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Project introduction and background

Heat stress and heatwaves in India have increased drastically over the past decade

South Asia is generally very hot, and people have built coping mechanisms to deal with the heat. However, climate change is set to push temperatures higher and increase heatwaves in the near future.

34% more people died in India due to heatwaves between 2003-2012 and 2013-2022, as per the IMD.

By 2030, the **wet-bulb*** temperatures in the hottest regions of India may start to **exceed 34°C**.

"Urban heat islands" can make cities 2°C to 9°C warmer than other areas.

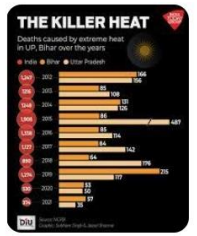
- As per a World Bank (2022) report, India could become one of the first places to experience heatwaves that surpass the survivability limit for a healthy human being resting in the shade.
- Climate change has made the occurrence of extreme heat 30 times more likely in India.
- Lancet (2023) recently reported that India's vulnerability to extreme heat increased by more than 15% from 1990 to 2019. The five warmest years ever recorded in India have all been in the past decade.


India heatwave: 96 people dead reportedly from heat-aggravated conditions

Questions raised about death toll after more than half of the fatalities reported in a single district in Uttar Pradesh

People queue to register at the district hospital in Ballia, Uttar Pradesh, on Monday.
Photograph: Rajesh Kumar Singh/AP

The Times of India
Kerala: Heatwave, sunburn, sun...



India Today
In numbers: Heat st...

ForumIAS Blog
Heat strokes in India: R...

* Wet-bulb temperature is an important indicator of heat stress and human comfort. The indicator combines air temperature and relative humidity and provides a more accurate measure of heat stress on the human body than air temperature alone.

Heat stress in India has surged drastically, which has adversely affected livelihoods, health, and infrastructure

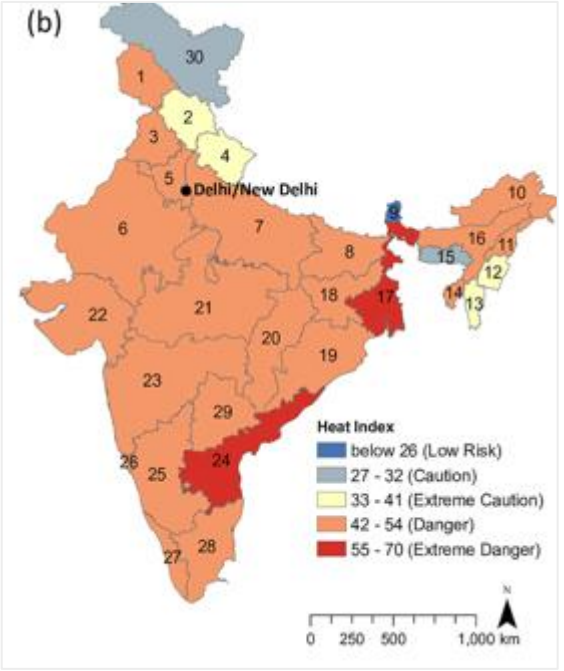
Up to 75% of India's workforce, or 380 million people, depend on heat-exposed labor and at times work in potentially life-threatening temperatures.

Livelihood

- Lost productivity from heat stress at work, particularly in developing countries, is expected to reach a staggering **USD 4.2 trillion per year by 2030.**
- By 2030, India may account **for 34 million** of the projected 80 million global job losses from productivity decline due to heat stress.
- Heat stress impacts the productivity, livelihoods, and socioeconomic wellbeing of climate-sensitive professions, such as farmers, construction laborers, and informal workers. With an additional 1 to 2 degree warming, the labor productivity losses go up to 156 and 230 billion hours, respectively, for India.

Health

- An alarming projection, by 2100, an estimated 1.5 million additional lives in India may be lost annually due to climate-driven extreme heat—an impact equivalent to the populations of Agra (India) or Philadelphia (USA), says a study conducted by the Climate Impact Lab in collaboration with the Tata Centre for Development at UChicago.
- Heatwaves can lead to heat-related illnesses, including heat exhaustion, heatstroke, dehydration, vector-borne diseases that endanger lives. From 1998 to 2017, more than 166,000 people died due to heatwaves.
- Extreme heat causes illness and death, with long-term health impacts, such as respiratory, cardiovascular, diabetes, and kidney diseases. It affects mental health and poses risks to the health service delivery system.
- The impact is particularly high on vulnerable population segments, such as older adults, infants, pregnant women, poor people, outdoor workers, and those who live in urban areas.



Heatwave impact in April 2022 estimated from India Meteorological Department (IMD) data. Heatwave impact estimates show that more than 90% of India is in the "extreme caution" or "danger" range.

Source: University of Cambridge Report 2023

Urban MSME workers are among the worst affected during times of extreme heat

Exposure

- MSME workers who work in workshops with heavy machinery, outdoors, or are engaged as gig workers are at a higher risk of heat-related injuries and extreme symptoms.
- Migrant workers who live in informal settlements without access to passive or active cooling solutions are at higher risk of heat stress;
- The conditions are worse in the cities due to the urban heat island effect.

Sensitivity

- MSME workers lack social protection due to informal contracts, which leads to lower incomes and less training than their formal counterparts;
- Productivity losses are higher for MSME workers who earn daily wages;
- Migrant workers are poor, lack social capital, and live precarious lives—often one step away from the next disaster.

150 million

Over 150 million people are employed in MSMEs across the country

34 million

Of the total MSME employees, 23% are women.

30%

MSMEs contribute 30% to the national GDP, yet they are underserved and vulnerable.

MSC undertook a study to understand the impacts of extreme heat on migrant workers and the MSMEs they work in, and policy responses

Situation

- More than 23,900 people have died from heatstroke between 1990 to 2020 in India, as per official figures. 2015 alone had 2,300 deaths.
- The number of heatwave days in India is rising. CMIP5 models project an increase of 12 to 18 days in the duration of heatwaves in India between 2020 and 2064.

Complications

- Climate change has pushed temperatures alarmingly higher, and India could be one of the first places to break the human survivability limit.
- Increased heat has already had direct impacts on health, mortality, and labor productivity.
- The impacts of heat are disproportionate on people living in poverty due to personal, occupational, and societal risk factors.
- Policy responses remain largely reactive (after the hazard), not well targeted on the most underserved, weakly funded, and legally weak.

Questions

- What are the impacts of extreme heat on informal workers and MSMEs? How does gender influence their vulnerability to extreme heat?
- What are their coping strategies? How do gender norms and power dynamics affect these strategies?
- What barriers do they face when they try to access safe drinking water, adequate sanitation, and hygiene during periods of extreme heat?
- What has been the response from the state at the municipal and local levels?

Answers

- This study seeks to understand the vulnerabilities and challenges informal workers and MSMEs face with regard to extreme heat.

Our framework to assess the impact of extreme heat on migrant workers and MSMEs in the NCR region

We analyzed the impact, coping strategies, and challenges to coping along the three critical areas of health, livelihoods, and infrastructure.

Extreme heat in the NCR region

1

Impacts of extreme heat

- Health
- Livelihood and economic impact
- Infrastructure

2

Existing coping strategies

- Health
- Livelihood and economic impact
- Infrastructure

3

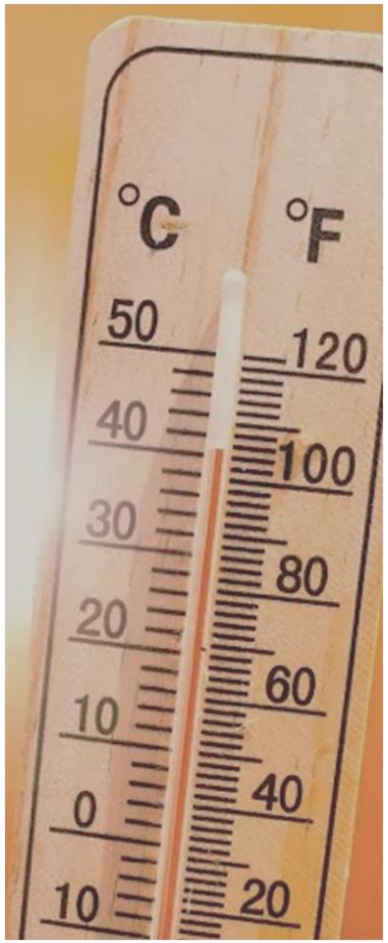
Challenges to coping strategies

- Health
- Livelihood and economic impact
- Infrastructure

4

Government response at the local level

- Preparedness and capacity building
- Heat action plans
- Existing efforts at the central government level



Key insights

Impact of heat stress: Study reveals critical gaps in understanding and addressing heat stress impact on MSMEs and its workers

There is poor awareness of heat stress implications on livelihood and health, differentiated impacts based on gender, and a lack of local information to push for action

1 Perception of heat risk

Workers and employers do not understand the impacts of heat on health and livelihoods. Evaluations are needed to understand environmental, social, personal, and structural factors that determine risk perception to extreme heat. Secondary literature also reveals a lack of India-specific studies related to heat risk.

2 Gender-differentiated vulnerabilities

Women face disproportionate impacts and vulnerabilities related to extreme heat. Gender-responsive policies and interventions are needed to address the challenges women face due to heat stress.

3 Lack of localized, granular and behavioral data

Granular heat-related impact data and identification of vulnerable areas are lacking, which could otherwise develop suitable resilience-building solutions for extreme heat. Studies of the behavioral patterns of urban poor people during extreme heat days, such as work and rest cycles and hydration practices, can inform interventions and programs.

Coping strategies: Existing coping strategies for MSMEs and urban poor are highly inadequate given the magnitude of the heat stress challenge in coming years

There is an urgent need to develop adaptation solutions that are systemic and holistic and can address health, livelihood and housing conditions for MSMEs and its workers

1 Limited coping strategies of migrant workers

Migrant MSME workers currently have limited coping strategies to deal with extreme heat. Besides drinking more water and trying to stay cool with basic equipment, these workers have limited coping strategies that cannot meet the scale of future challenges related to increasing extreme heat.

2 MSMEs can only engage in incremental coping strategies

MSMEs have been only making incremental changes to address extreme heat. They generally cannot increase heat resilience for themselves and their workers. They factor in lower productivity during the summer with high heat levels and provide limited fans, coolers, and cool drinking water where possible to improve thermal comfort for employees.

Challenges to coping: Low risk perception of heat related risks, poverty and absence of effective financial solutions affect livelihoods of MSME workers

A lack of targeted support through government initiatives and markets worsens the impact of extreme heat

1 Low risk perception leads to lack of preparedness

Migrant workers and MSMEs do not perceive the risk of extreme heat to be very high for themselves and their businesses. Heat persists for a few months of the year and many report not being able to do much about extreme heat, which leads them to not take proactive steps to build resilience to it.

2 Poverty exacerbates heat vulnerability

Migrant workers who live in poverty are more vulnerable to extreme heat's impacts. For low-paying manual jobs, the lack of proper sanitation, adequate housing, inability to cover energy and healthcare costs, and higher exposure to heat add to vulnerability to extreme heat.

3 A lack of financial products and services to scale up coping strategies

A lack of financial products and services limits workers' and MSME's ability to build heat resilience. They cannot avail insurance products that help manage financial risks from wages lost or lower productivity due to extreme heat. Suitable and affordable cooling solutions for MSMEs and workers are lacking. MSMEs, in particular, lack access to low-cost capital to invest in cooling or thermal comfort.

4 A lack of government programs and initiatives hinders the scale up of effective coping strategies

Our study revealed government policies and initiatives were absent to help scale up coping strategies for migrant workers and MSMEs. The MSMEs we visited had no workplace heat-related policies and lacked the capacity to manage heat-related risks. In rapidly urbanizing areas, urban planning, nature-based solutions, or other interventions were limited, which could otherwise lessen the impact of extreme heat.

Government support: Pressing need to strengthen health systems, support vulnerable populations, & improve governance to build urban heat resilience

Strong need to build awareness and capacity of public officials towards addressing urban heat stress

1 Lack of targeted support for vulnerable groups

Vulnerable communities and groups have not been adequately targeted, and have limited support. Vulnerable groups, such as women, pregnant women, older adults, infants, and people with comorbidities face increased risk during heat stress, but government interventions lack targeted measures for them.

2 Weak data management infrastructure

Local governments have no way to track illnesses related to heat stress, deaths caused mainly due to heat stress, and vulnerable population data. Data sharing and coordination between government departments remains poor, which would otherwise enable better action in times of heat stress.

3 A need for stronger health systems

Extreme heat stress could eventually strain health systems. Rising heat stress can put pressure on the Indian health system due to increased challenges, such as more heat-related illnesses, heightened demand on healthcare, vulnerability of certain groups, power outages, and difficulties in resource reallocation.

4 Need for heat action plans to be gender-responsive

Heat action plans need to incorporate gender-responsive elements. Existing government preparedness and heat action plans focus on temperature thresholds and general public health measures, and overlook the differentiated impacts of heat on different genders. Heat action plans must incorporate gender-responsive elements to address the specific vulnerabilities and needs of women in relation to heat stress.

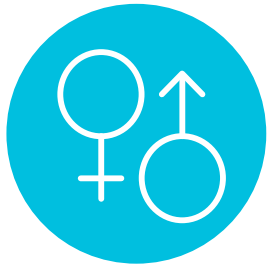
Impact of extreme heat on MSMEs and migrant workers

Heat stress and its health-related effects are still perceived as a low risk

We have organized the findings of the impact of heat on three parameters of health, livelihood, and infrastructure

Health: Extreme heat adversely affects human health as it causes heat-related illnesses and worsens preexisting conditions.

Heat-related illnesses: High temperatures expose migrant workers to a host of heat-related diseases that fall between exhaustion and death. These include heat exhaustion, weakness, dizziness, dehydration, electrolyte imbalance, heat rash, heat cramps, heat stroke, diarrhea, fainting (unconsciousness), fever, cold and cough, headache, redness in the eyes due to pollution, flu, and mental issues, such as anxiety and nervousness.



Differential impacts based on gender: Extreme heat impacts women disproportionately due to a combination of biological factors and social norms. Estimates show that 27,000 women die each year on average due to heat-related excess mortality. In India, this is projected to more than double to 73,500 by 2050. Pregnant and lactating mothers are extremely vulnerable to high temperatures. Exposure to prolonged periods of elevated temperatures is linked to adverse pregnancy outcomes, including stillbirth, congenital birth defects, and preterm deliveries.

Vulnerable groups are impacted disproportionately: Extreme heat impacts vulnerable populations, such as children, older adults, people with comorbidities, as well as people who have greater exposure to heat, such as outdoor workers, those involved in manual labor, such as rickshaw pullers and construction workers. Heat stress particularly exacerbates preexisting health conditions, such as respiratory problems, cardiovascular issues, and diabetes.

Heat affects workers' productivity and leads to wage losses

Livelihood impact on workers: High temperatures lead to productivity losses, lost working hours, and additional work burden for women.

Reduced productivity and income: High heat adversely affects workers' productivity through various factors that include reduced energy, slower physical performance, and impaired cognitive abilities. As a result, employees may produce less, work at a slower pace, and make more errors, which ultimately leads to lower outputs and reduced income. It is estimated that India already loses around 101 billion hours a year on account of heat, the highest in the world and is equivalent to work done by around 35 million people each working an eight-hour day in a year. In terms of GDP loss, India paints a grim picture. It is estimated India can lose upto 4.5% of India's GDP, approximately $150-250 billion by 2030 due to heat stress.

Greater burden on women due to unpaid work: Extreme heat results in women losing 19% of their paid working hours. But for women in India, more than two-thirds of all heat-related productivity losses are from unpaid domestic labor. Extreme heat causes women to work longer to do the same tasks—women have to work as much as 90 minutes extra per day on average doing paid and unpaid work. Men have to work much fewer additional hours. In India, on an average women lose 41 minutes per day, increasing to 47 minutes in an extreme year due to heat related stress.

Livelihoods

Heat stress poses a substantial challenge for MSMEs' growth prospects

Economic impact on MSMEs: Heat drives up operational and other costs, while power cuts strain MSMEs and limit growth opportunities for MSMEs.

Business losses for MSME employers: Employers factor in output reductions during periods of high heat. Over the long term, this results in business losses.

High costs of cooling for employers: Employers struggle to cope with the costs to run cooling products, especially during times of high heat. In some cases, the usage of power backups nearly doubles the cost of power and the operating expenses of small businesses.

MSMEs face operational and financial strain due to power cuts in summer: MSME employers have to bear substantial additional costs when they run diesel generators due to frequent power cuts in summer. These often lead to business shutdowns and slower operations that affect the growth of MSMEs. "Running air conditioning in summer is costly due to frequent power cuts. Generators or additional fuel costs an average of 1.5 -2 lakh (1700$ to 2300$) monthly increasing my operating costs drastically. Sometimes, extreme heat forces me to shut the factory as workers fall ill, despite fans and coolers." - Sahil, an MSME owner in Gurugram. In Manesar, automobile hub for SMEs in Haryana, units incur an average of 250 $ per day for additional power needs.

Livelihoods

Heat's impacts on migrants are multifaceted and span housing and infrastructure, yet comprehensive strategies to address these effects remain lacking

Infrastructure: Migrants face the brunt of poor infrastructure, especially as energy and water needs rise during extreme heat days.

Burden on healthcare infrastructure: Heatwaves can strain healthcare facilities with a surge in heat-related illnesses. Concurrent power outages, common during heatwaves, further diminish healthcare capacity and amplify the healthcare system's vulnerability.

Housing conditions: Poor urban neighborhoods are more vulnerable to the extended effects of heat. People in densely built, low-income neighborhoods that lack open green spaces are highly exposed to the impacts of extreme heat.

Energy demand and electrical grid strain: Air conditioning and other cooling technologies significantly raises energy consumption in summer. High energy demand can strain already unstable electrical grids and worsen infrastructure challenges.

Inadequate cooling systems: Rising temperatures can strain existing cooling systems or render them inadequate to maintain a comfortable indoor environment. This can lead to heat buildup in the workspace and contribute to heat stress among workers. Without effective cooling, employees may experience discomfort, fatigue, and decreased concentration, which harms their performance and overall job satisfaction.

Existing coping strategies for extreme heat

Migrant workers and MSMEs have limited strategies to deal with extreme heat

We looked at the existing coping strategies of migrant workers related to health, livelihoods, and infrastructure.

Health

Increase in water intake

Employers offer drinking water and sanitation facilities. Workers drink more water and energy drinks, such as nimbu pani. They use earthen pots to cool drinking water.

Clothing

Workers usually wear light cotton clothes and cover their heads with gamcha or dupatta on hot days.

Livelihoods and Economy

Working hours

Workers try to change working hours to the morning or the evening to avoid the midday high heat where possible. Workers in some professions do not work during the day in the summer as a long-standing practice. Workers also try to take frequent breaks.

Infrastructure

Cooling

Workers use fans, coolers, and exhaust fans, where available, to keep cool. They try to build homes in the shade, keep doors and windows open for ventilation, and sleep outside at night.

MSMEs have limited coping strategies

Health

Employers ensure the availability of cool drinking water to help workers stay hydrated.

Economy

Employers factor in decreased productivity during summer months due to heat-related challenges.

Infrastructure

Employers provide fans and coolers in the workplace to keep cool during the high-heat summer months.

Manju, a MSME worker says

"In the summer, I have to take several breaks to drink water. I also need to cover my head with a cloth due to social norms. I cannot remove the cloth around men I do not know. Sometimes I have to take leave because the heat impacts my health. But I cannot do much about it, as this is the nature of my work."

Challenges in coping with heat stress

Migrant workers face several challenges to the uptake of coping strategies

We looked at challenges to the uptake of coping strategies for migrant workers related to health.

Health-related challenges

"Of course, we feel sick during summer. Every June-July, it becomes harder to work, and sometimes we feel dizzy and have fainted while working. But this is how it is. We cannot stop working just because it is hot. Everyone feels hot, even our employers. It is nothing out of the ordinary and not a big concern for us."

- A group of female MSME workers in Gurugram.

Perception

Worker's perception of risks from extreme heat on their health is low.

Sanitation

Women workers face additional challenges due to inadequate sanitation facilities in the workplace and at home. The lack of hygiene and sanitation facilities for women, particularly during menstruation, exacerbates health symptoms, such as dizziness, fainting, and weakness.

Work policies

Workplaces lack adequate policies that permit workers to take leave during extreme heat. Workers may take time off when they feel unwell but struggle to deal with the financial losses from frequent absences. As a result, they decide to work even during extreme heat.

Safety

Safety concerns limit women's capacity to cope with heat. They cannot bathe during the day, cannot open windows and doors for ventilation, or sleep outdoors due to safety concerns. The lack of safe options for washrooms can impact hydration and eating behaviors, which increases vulnerability to heat stress.

Healthcare cost

Migrants frequently face difficulties when they access public hospitals due to long distances, which compels them to opt for costly private facilities. Individuals who deal with chronic health issues that extreme heat may exacerbate find it challenging to bear the cost of private hospitals. They are forced to borrow at steep interest rates to meet such medical expenses.

Health

Story: Migrant women's challenges of housing and sanitation in heat stress

"We have to rely on nature to protect against heat; we have no other option," says Shambu, a resilient migrant worker who embarked on a life-changing journey from Assam to migrate to Gurugram nearly four years ago. Her motivation? To create a brighter future for her family of seven.

- **Living conditions:** Shambu, along with her husband and children, currently lives in a modest *kutcha* (temporary) dwelling constructed from galvanized tin sheets. Their makeshift home has a door but no windows for ventilation. Many in her community erect their *kutcha* homes beneath the protective canopy of trees as a resourceful tactic to combat the sweltering heat.
- **Sanitation struggles:** Her family has to manage with just one community toilet. Heat stress exacerbates the risk of illnesses and infections amid such poor sanitary infrastructure.

Prioritize safe housing conditions:

Shambu's living situation highlights the importance of safe and adequate housing for migrant workers. Temporary structures, such as *kutcha* houses, should be designed with proper ventilation and insulation to mitigate extreme weather conditions.

Build community resilience

Collaboration and resource-sharing among migrant communities should be encouraged to help them adapt to changing conditions. Shambu's community shows resourcefulness in using trees for shade, which underscores the importance of community resilience.

Promote education and empowerment

Improved education and awareness programs among migrant workers, which empowers them with knowledge about their rights, health, and safety, can help increase their resilience.

Migrant workers face several challenges to the uptake of coping strategies

Migrant workers face challenges related to their livelihoods and productivity that inhibit the uptake of coping strategies.

Extreme heat leads to higher energy poverty

Migrant workers cannot afford the costs of cooling products, such as refrigerators, coolers, fans, and air conditioners, alongside the additional electricity cost to run them. Many reported that they owned a fan or cooler but could not afford the electricity to run them. This financial strain intensifies during school closures when children are at home during summer vacations or high-heat days.

Lack of insurance and government support

Workers resort to using savings and then borrow informally to smoothen consumption shocks due to the costs of cooling and healthcare related to extreme heat. They borrow from friends and neighbors or ask for salary advances or loans from their employers. Workers we spoke to had limited access to formal financial services and did not purchase health insurance. No insurance products for wage losses were available.

"I have to leave my children at home alone during school breaks in the summers. They sit with the cooler on an entire day. This increases the bill a lot, and I have to work overtime."

Hema, an MSME worker at a clothing company.

"The workers ask for loans, if necessary, from the employer. They may also take their monthly salary in advance."

A female worker in an automobile parts manufacturing factory

Story: Poor financial health worsens the heat stress burden for workers

"I try to save as much as possible. Sometimes, I have to ask the employer for money, but at other times, I try to manage by asking my relatives. It is hard." Jaya lacks access or knowledge of any government or employer-related offerings that she can resort to for financial needs, especially for heat-related illnesses.

Jaya left her hometown in Bihar with her family to seek employment opportunities in Faridabad's bustling MSME sector. She has been working here for the past three years, and currently works as a machine operator in an automobile factory.

Jaya and fellow MSME workers grapple with financial instability and often face unexpected crises. They rely on these strategies:

- Savings: They save diligently but may still struggle to accumulate sufficient funds.
- Informal borrowing: During emergencies, they borrow from relatives, neighbors, or each other, which offers short-term relief.
- Employer aid: Some employers provide loans or salary advances, which helps workers address immediate financial hardships.

Financial vulnerability:

MSME workers like Jaya, are exposed to significant financial vulnerabilities due to their limited access to formal financial services and safety nets. Stakeholders must address these vulnerabilities to enhance their resilience.

Need for awareness:

Many workers like Jaya express a desire for access to financial programs or insurance but lack awareness of existing provisions. Heightened awareness of such financial tools and access to them can empower such workers to cope better with financial challenges during heat-related illnesses and hospitalizations.

Role of other ecosystem players:

Government and other ecosystem players need to facilitate access to insurance, credit, and savings services that formal sector financial services providers offer.

Government initiatives:

Governments should consider the implementation of targeted financial support programs for MSME workers that can support workers during heat stress and other climate-related disasters. These programs can act as a crucial safety net and help workers weather financial storms caused by factors, such as extreme heat stress.

Story: Lack of government and employer support for migrant workers

Hema is 43 years old and has been working at a clothing company, an MSME in Gurugram, for the past two years. She relocated from Bihar with her family. Her other coworkers are Shilpa from Bihar and Gurmi from Uttar Pradesh, who also migrated from their home states to earn their livelihood in the city.

Heat-induced health impact: Hema said that they have to regularly deal with scorching workplace conditions, which often lead to dizziness, vomiting, diarrhea, weakness, and high fever. The employer too acknowledged similar health issues due to extreme heat.

Escalating healthcare costs: These women often visit local private hospital in case of small ailments such as fever or weakness due to dehydration. While they feel this is better than resorting to medication through the advice of a local chemist, private hospitals are costly and that strains their finances.

Limited employer assistance: Although the employer provides aid during medical emergencies, significant financial burdens persist when family members fall ill. None of the women have access to insurance or have purchased it. Hema highlights that she struggles to navigate crowded government hospitals and incurs high private healthcare costs, which further impacts their savings.

Financial vulnerability and need for insurance and government safety nets for heat stress:

The workers' preference for private hospitals, despite financial strain, highlights their financial vulnerability. They lack adequate insurance coverage, which increases their susceptibility to healthcare-related expenses that can significantly affect their savings and income stability.

Healthcare accessibility challenge:

These workers struggle to navigate crowded government hospitals and face high costs of private healthcare, which pose substantial challenges for these workers. This highlights the urgent need for accessible and affordable healthcare options tailored to their needs.

The private sector's role:

While employers provide assistance during emergencies, they can play a more proactive role to address the financial burdens caused by health issues. Workers have a strong need for access to insurance, credit and savings services from the formal sector and financial services providers.

Migrant workers face several challenges to the uptake of coping strategies

We looked at challenges to the uptake of coping strategies for migrant workers related to infrastructure.

Lack of public services

Limited public services worsen extreme heat's effects on crowded informal settlements. They face frequent power cuts, limited sanitation facilities, and inadequate access to drinking water due to a lack of municipal services.

Limited public infrastructure

Inadequate public infrastructure exacerbates heat challenges in densely populated, rapidly urbanizing areas with migrant worker populations in the NCR region. Insufficient green spaces and neglect of urban planning are evident, as cooling locations (designated spots that provide cooling), parks, and water bodies are notably absent.

Poorly constructed homes

Residents of Gurgaon's informal settlements live in stifling tin sheds without adequate ventilation, worsened by the absence of cool roofs and reflective paint. Men sleep outdoors for cooler nights, while women, due to safety and social norms, endure the indoor heat with closed doors and windows.

Lack of sanitation

Inadequate sanitation worsens heat discomfort, especially for women. Workplaces lack women's facilities, which makes access challenging during menstruation and leads to health issues. For instance, informal settlements in Gurgaon or Faridabad in the NCR region often have only one washroom shared by the entire community.

Issues with mobility

Extreme heat makes walking and bicycling difficult, which limits mobility options for millions in cities of developing nations.

Story: Poor infrastructure and lack of heat-resilient policies worsen heat stress at the workplace

"The overhead lights where we work cause extreme heat and during this summer, it became difficult to work here. It would be a relief if our employer provided better alternative lighting."

- Divyaranjan

Divyaranjan is 23 years old and works at an automobile parts manufacturer firm in Faridabad's densely congested MSME area.

Workplace and coping mechanisms: He has been working in the factory for the past three years and has seen the working conditions worsen due to increasing heat stress. The automobile manufacturing factory has machines that create heat. He often finds it difficult to work there during hot months. He takes more breaks and drinks more water to cool down during these months.

Workplace challenges in the heat: The factory has installed large overhead lights to ensure the proper visibility required for such work. During hot months, these lights worsen the situation, and Divyaranjan struggles to work under them.

Heat-friendly workplace infrastructure and design:

The factory's use of large overhead lights are necessary for proper visibility. Yet they have unintended consequences during hot months. This highlights the need for ergonomic workplace design that considers lighting's impact on the thermal comfort of workers. Capacity building and knowledge enhancement of MSMEs to help them build heat-friendly workplaces is an urgent need.

Employee input and collaboration:

Employers should actively engage with their workforce to gather insights on the challenges they face and collaborate on solutions to enhance productivity and comfort.

Occupational health and safety training:

Employers should provide comprehensive occupational health and safety training to their workers on ways to recognize and manage heat-related risks. Workers should be educated on the signs of heat stress and the importance of regular breaks and hydration. They should know to seek medical assistance when needed. This knowledge can empower employees to protect themselves in hot working environments.

MSMEs also face several challenges in the uptake of coping strategies

The challenges to the uptake of coping strategies for MSMEs are mainly in terms of productivity and infrastructure.

Productivity

Lack of knowledge about risks and low capacity to build resilience

MSMEs generally are not aware of climate-related heat risks. They do not know how they are vulnerable and how such risks could impact their business—directly or indirectly through their supply chains. Limited external support also means they cannot access information, tools, or training to take action to build heat resilience and have significant capacity gaps. MSMEs also have insufficient knowledge about access to green finance, low-carbon technologies, and markets.

Lack of finance for resilience and green investments

MSMEs generally lack access to financing to invest toward increased resilience to extreme heat and other types of shocks. Dedicated low-cost credit and insurance products are lacking, which could target MSMEs to help them decrease the risks of green investments and facilitate resilience-building investments, such as installing insulation, cooling technologies, and improving energy efficiencies.

Infrastructure

A higher energy demand leads to electrical grid strain

Air conditioning and cooling technologies significantly raises energy consumption in summer. This high energy demand can strain already unstable electrical grids and worsen infrastructure-related challenges.

Higher water requirements

Higher temperatures increase the need for water and can dry up water sources that people and organizations depend on. High water use can impact areas with low water availability.

Lack of improved spatial planning and nature-based solutions

Rapid urbanization has led to limited attention to spatial planning, and a lack of nature-based solutions, such as parks and water bodies. Municipalities are overburdened and lack capacities for urban planning, which leads MSMEs and their workers to suffer from urban heat effects and the impacts of increasing extreme heat. Urbanization also leads to greater urban heat island effects and pollution.

MSME profile: Employer challenges

"We can only control how the conditions are inside our factory. We cannot control power cuts." - Sumer Mittal, employer at Sumer & Sons in the industrial belt of Faridabad near Delhi.

Sumer Mittal operates Sumer & Sons, an 80-year-old MSME in the exports industry, founded by his grandfather with approximately 20 employees.

Nitish owns V.S. Enterprises, an MSME that manufactures car parts. He manages a workforce of around 125 employees.

Both entrepreneurs grapple with infrastructure and government support issues in their respective industrial areas. They have also witnessed the challenges posed by frequent power cuts.

"Pali is not a government-authorized area, so our employees cannot access fundamental facilities."

– Nitish at V.S. Enterprises.

Power interruptions impact cooling

Frequent power cuts disrupt cooling equipment and lead to operational issues in factories. Business owners like Sumer can only manage conditions within their factories but cannot control power interruptions.

Infrastructure deficits in informal clusters:

MSMEs outside formal clusters, such as Pali in Faridabad, lack critical public services, such as toilets and proper roads. This poses challenges for business owners like Sumer.

Need for targeted government support:

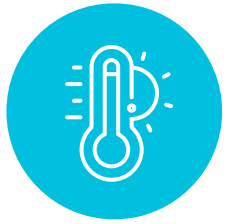
The absence of specific government interventions to mitigate heat-related challenges highlights the importance of tailored support for MSMEs. Such support could encompass infrastructure development, subsidies for cooling technologies, and policies that address heat stress in the workplace.

Government response

Gap in knowledge and capacity of local officials and administrators to combat heat stress

Local agencies need significant capacity building to address heat stress

Risk is perceived more seriously when there is a higher visibility of symptoms and aftermath of a hazard: Heat waves, unlike other hazards, are not notified as a disaster at the national level. Last year, the Chief Medical Officer of Faridabad claimed there had been no cases of hospitalization from heat stress. Besides putting aside a few beds for emergency heat case management, they did not see the need for additional or significant preparedness activities.



Potential for strengthening planning and implementing proactive measures for heat resilience: There is no sustainable effort or planning processes to enable anticipatory actions and preparedness for extreme heat. The Health Department has an emphasis on prevention through the provision of guidelines and advisory measures for hospitals and health centres, rather than treatment.

Need to strengthen healthcare system: Factory workers have access to government hospitals, but these facilities often have long waiting times, overcrowded conditions, and overwhelmed staff. Navigating through the bureaucracy can be time-consuming. As a result, workers tend to opt for private hospitals even for minor health issues like fever despite incurring higher costs for private hospitals.

Need for urgent action in addressing heat stress as a pressing and an ongoing concern

Lack of implementation of HAPs at the local level

- **Heat Action Plan for the State exists, but there was no evidence of it being implemented at the municipal level**: It was unclear to the officials how implementation should happen at the local level. Hospital preparedness involved reserving extra beds and following general heat advisories only.
- **The District Disaster Risk Management Cell was busy responding to the recent floods** in the July 2023 Yamuna River which had impacted thousands of people across the city and did not have the capacity or resources for any extreme heat preparedness work.
- **Inadequate focus on expanding cooling areas and nature-based solutions:** There were no interventions on expanding cooling areas, increasing nature-based solutions, or community solutions for addressing extreme heat. The Department of Education cancels classes during high-heat days.

Despite lack of action at the local level, there is some activity from the Center

- The National Disaster Management Authority (NDMA) has developed National Guidelines on Heat Wave Management to guide state governments and other stakeholders in developing heat wave management plans.
- The Ministry of Health and Family Welfare has issued advisories to all states and union territories on the need for preparedness and response measures during heat waves. The government has also launched a Heat Health Action Plan (HHAP) in some cities.
- The Ministry of Labour and Employment urged all states and UTs to take necessary steps towards preparedness and effective management of the ensuing heatwave conditions for workers and laborers employed in various sectors. For instance, the Centre issued an advisory asking for rescheduling working hours for workers and laborers across different sectors. [ii]

Annexes

About the research: Qualitative research to understand impacts and coping strategies to deal with extreme heat

MSC conducted qualitative research to understand how extreme heat impacts migrant MSME workers. We spoke to 50 migrant workers and four MSMEs across Delhi-NCR.

Research methodology

- **Research focus:**
  a) MSMEs employers
  b) MSME migrant workers
  c) District health officials and
  d) Disaster Management Cell official
- **Tools used:** In-depth interviews (IDIs), and focus group discussions (FGDs).

Location: Delhi-NCR (**Faridabad and Gurugram**)

Respondent type: 50 male and female migrant workers who had migrated to Delhi, and four MSME employers.

Note: The study is qualitative in nature. The key insights are indicative only.

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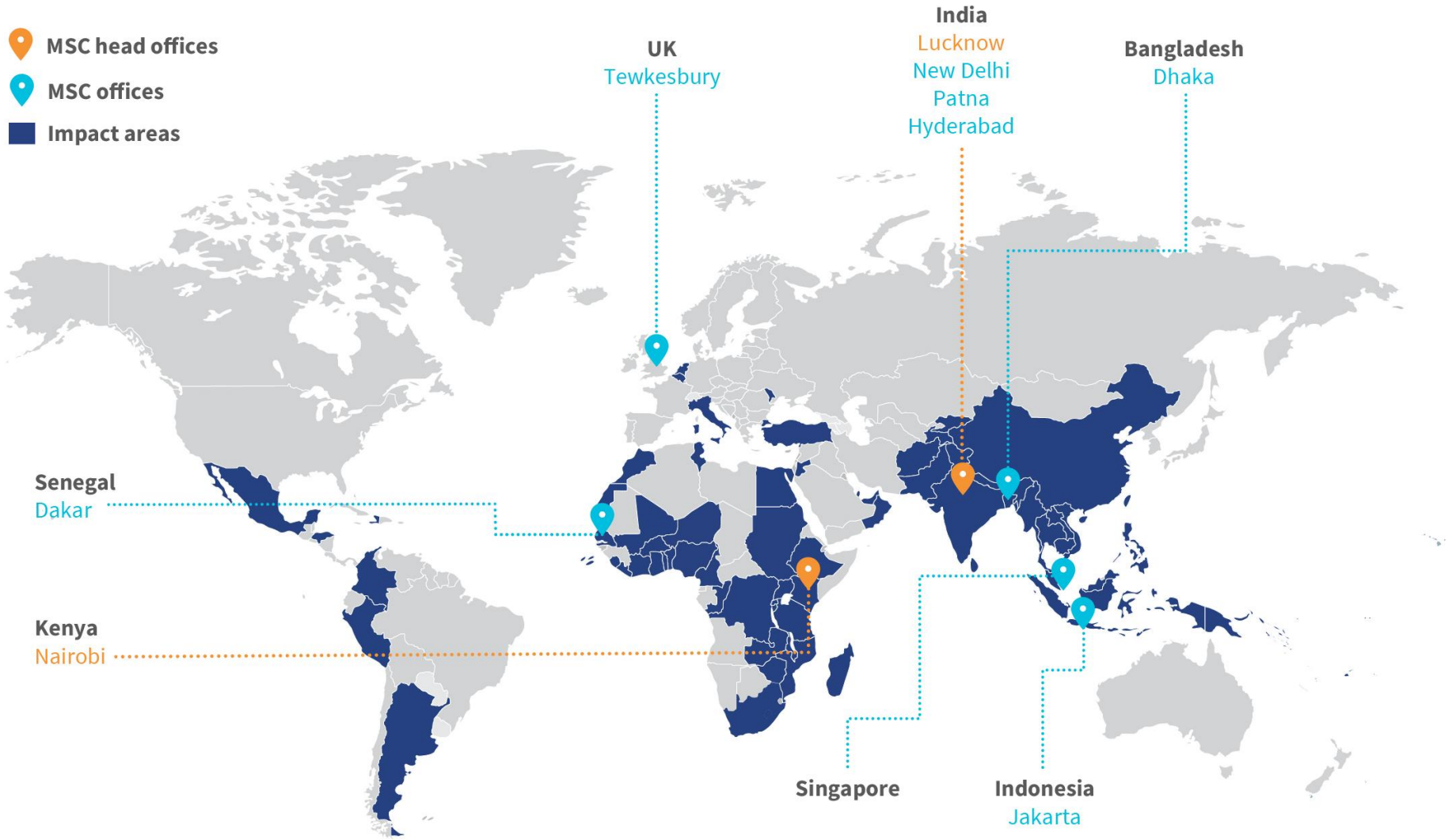

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