ALL INDIA DISASTER MITIGATION INSTITUTE

411, SAKAR-FIVE, BEHIND OLD NATRAJ CINEMA,
NEAR MITHAKHALI RAILWAY UNDERPASS, ASHRAM ROAD, AHMEDABAD - 380 009, INDIA
TEL/FAX: 0091-79-2658 2962, E-mail: bestteam@aidmi.org
Website: www.aidmi.org, www.southasiadisasters.net

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Mr. Arvind Kavia
National Institute of Disaster Management,
(Ministry of Home Affairs, Government of India),
Plot no. 15, pocket-3, block-b, sector-29, Rohini, Delhi -110042
Tel: 011-20873412
Mobile :9509964304
E-mail: arvind.nidm@nic.in
Website: https://nidm.gov.in

Sub: Submission of Case Study for Knowledge Platform on Urban Resilience

Dear Arvind Kavia

Greetings from All India Disaster Mitigation Institute, Ahmedabad!

Please find enclosed the case study titled "*Addressing the Demands of Small Business Communities for Building Extreme Heat Resilience in Urban India*" for your reference and consideration. We hope it contributes meaningfully to the Knowledge Platform on Urban Resilience initiative. Thank you.

Best wishes,

ALL INDIA DISASTER MITIGATION INSTITUTE AHMEDABAD

(Mehul Pandya)
All India Disaster Mitigation Institute

Encl.: Case Study on Addressing the Demands of Small Business Communities for Building Extreme Heat Resilience in Urban India

ADDRESSING THE DEMANDS OF SMALL BUSINESS COMMUNITIES FOR BUILDING EXTREME HEAT RESILIENCE IN URBAN INDIA

A Case Study by
Mihir R. Bhatt, Mehul Pandya, and Vishal Pathak,
All India Disaster Mitigation Institute (AIDMI), Ahmedabad

"The heat gets worse every year, our expenses rise exponentially, but our wages stay the same", said, a woman construction worker from Uttar Pradesh.

November 2024.

Extreme Heat's Impact on India: Perspectives from Leaders and Research

“India has 63 million micro, small, and medium enterprises (MSMEs), of which around 20% are women-owned, employing 22 to 27 million people.” - NITI Aayog.

"Because of its large population, India is, in absolute terms, expected to lose the equivalent of 34 million full-time jobs in 2030 as a result of heat stress" (ILO. 2019)[1].

“The intensity and frequency of heat waves have increased in recent times with climate change driving temperatures even higher. The number of States affected by heat waves has been increasing.” Said Shri Kiren Rijiju[2], Hon’ble Union Minister of Earth Sciences.

"We find that India could become one of the first places in the world to experience heat waves that cross the survivability limit for a healthy human being sitting in the shade" (Woetzel J et al., 2020)[3].

“We cannot stop natural calamities, but we can definitely minimise its effects by putting better strategies and systems in place", said the Prime Minister of India (The Hindu, 2023)[4].

“It is important that heat action plans developed by states, districts and cities are continuously improved in light of lessons learned from previous seasons. We must go beyond saving lives to saving livelihoods from heat waves' impact. This would require working across many different sectors." Said Shri Kamal Kishore, Member & HoD, NDMA[5].

[1] ILO. (2019). Working on a warmer planet: The impact of heat stress on labour productivity and decent work. International Labour Office (ILO). https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_711919.pdf
[2] NDMA. Press Note. 2024. Heat Wave 2024: Two-Day Workshop on Management Interventions and Mitigation Strategies for Heat Wave begins at Vigyan Bhawan, New Delhi. https://ndma.gov.in/sites/default/files/PDF/pressnote_heatwave_workshop_feb24.pdf
[3] Woetzel J et al., 2020. Climate Risk and Response: Physical Hazards and Socioeconomic Impacts. Will India get too hot to work? Case Study. November 2020. McKinsey Global Institute. https://www.mckinsey.com/~/media/mckinsey/business%20functions/sustainability/our%20insights/will%20india%20get%20too%20hot%20to%20work/will-india-get%20too-hot-to-work-vf.pdf
[4] The Hindu. 2023. India’s rescue efforts in Turkey, Syria lauded: PM Modi. https://www.thehindu.com/news/national/need-proactive-approach-tech-interventions-to-minimise-damage-from-natural-disasters-says-pm-modi/article66603794.ece
[5] NDMA. Press Note. 2024. Heat Wave 2024: Two-Day Workshop on Management Interventions and Mitigation Strategies for Heat Wave begins at Vigyan Bhawan, New Delhi. https://ndma.gov.in/sites/default/files/PDF/pressnote_heatwave_workshop_feb24.pdf

Contents

1. Summary

Our case study directly contributes to the NDMA strategy of "Starting with pilot cities selected based on heat severity, vulnerability, and local government interest, allowing customisation of cooling interventions and refining the model based on feedback[6]" and is perfectly suitable for replication and up-scaling.

Thematic Area: Climate Change Adaptation

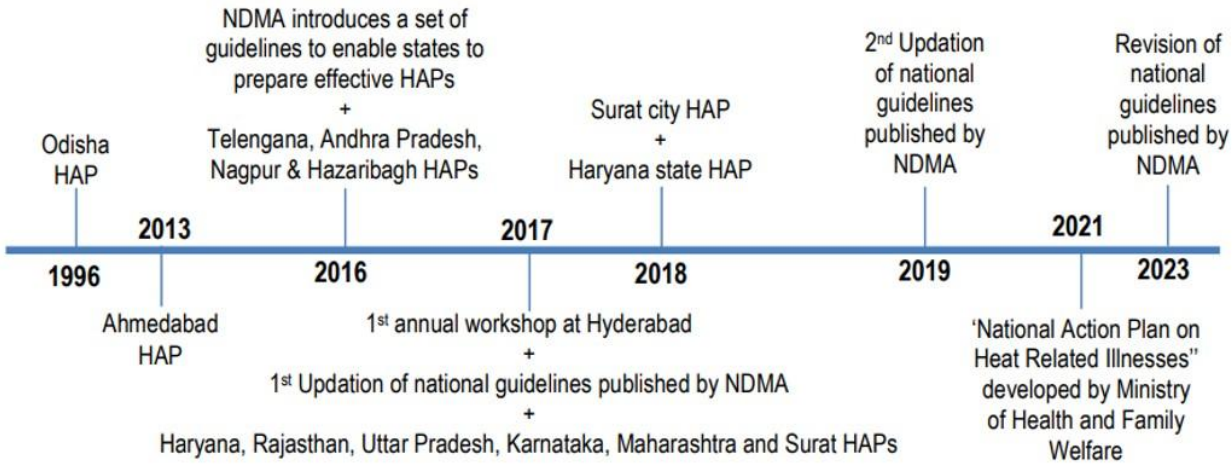
Sub-thematic area: Urban Heat Islands

This case study examines the impact of extreme heat on small business communities in urban India and validates strategies to enhance their resilience. The case study highlights the need to understand the specific challenges faced by small businesses, including limited access to financial services, social protection, and cooling resources. Recognising these vulnerabilities, the project provided targeted support to small businesses, including financial assistance and guidance on adaptation measures as part of urban resilience. This support has shown immediate positive impacts, enabling businesses to diversify their income streams, implement heat-resistant practices, and ensure business continuity despite extreme heat events. The findings provide valuable insights on urban resilience for policymakers and stakeholders to develop effective interventions and foster a more resilient and sustainable urban environment in the face of climate change in India, but also beyond.

2. Before Situation

Climate change is fueling more frequent and intense heat waves each year, posing a significant threat globally, particularly in densely populated countries like India. The National Disaster Management Authority (NDMA) warns of rising vulnerability across all Indian states. “The National Disaster Management Authority (NDMA) has categorised 23 of India's 28 states and some 100 cities and districts as being at risk of suffering extreme heat.” [7] Although heatwaves aren't legally classified as natural disasters in India, the government recognises their significant threat. The National Disaster Management Authority issued heatwave management guidelines in 2015 (revised in 2019)[8], and the 2019 National Disaster Management Plan established a framework for heatwave responsibility. The IMD plays a vital role in forecasting, while the NIDM focuses on research and capacity building. The *Sachet*[9] National Disaster Alert Portal provides LIVE Current Location as well as All India Disaster Alerts from multiple sources. The SACHET mobile app provides warnings from authorised Government sources and authorities to warn the public of a possible disaster situation. The Ministry of Environment, Forest, and Climate Change[10] launched the India Cooling Action Plan to address long-term cooling needs by reducing demand and promoting research. At state levels, public health departments, disaster management authorities, and Municipal corporations work together to develop localised heatwave action plans.

[6] Dr. Krishna S. Vasta, Member, NDMA, 2024. National Framework for Heatwave Management and Mitigation.Global Trends in Rising Temperature and Heat Waves
[7] D. Jatindra. 2022. Indian states ready with plans to mitigate heatwave impact, official says. https://www.reuters.com/world/india/indian-states-ready-with-plans-mitigate-heatwave-impact-official-2022-05-06/
[8] Ministry of Home Affairs, GoI. 2022. RAJYA SABHA STARRED QUESTION NO.*367. ROLE AND SIGNIFICANCE OF NDMA. https://www.mha.gov.in/MHA1/Par2017/pdfs/par2022-pdfs/RS06042022/367.pdf#:~:text=Since%202017%2C%20NDMA%20has%20held%20Heat%20Wave%20preparedness,in%20loss%20of%20life%20due%20to%20heat%20wave.
[9] https://sachet.ndma.gov.in/
[10] Ministry of Environment, Forest and Climate Change (MoEF), 2019. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1568328



Source: VNIT Nagpur, 2024[11]

Despite all these efforts extreme heat continues to devastate agricultural yields, strains healthcare infrastructure, and increases energy demands, highlighting the interconnected environmental and societal impacts. Lives area lost and livelihoods are damaged due to extreme heat. With an average of 2,000 annual fatalities, heatwaves disproportionately affect vulnerable populations lacking access to cooling resources, including outdoor labourers and those living in inadequate housing. India's informal sector, representing 80% of the workforce and 50% of GDP, is highly vulnerable to heat waves. Understanding their financial services, social protection access, coping mechanisms, and recovery strategies is crucial to mitigate their disproportionate risks due to limited formal support from the state or the market. In this context, urgent action-research project was needed to understand the specific needs and demands of these at-risk groups to develop effective mitigation strategies.

3. Implementation Measures

To build extreme heat resilience among small businesses, a multifaceted approach was implemented. The measures taken can be broadly divided into two categories:

1. **Understanding the Needs:** Conducting a demand survey of small businesses in urban areas to assess the impact of heatwaves, identify existing coping mechanisms, and understand specific needs and challenges.
2. **Providing Targeted Support:** Offering direct support to select heatwave-affected businesses, addressing both loss and damage incurred and facilitating anticipatory actions to mitigate future risks.

3.1 Understanding the Needs

Objectives

As a first step, a demand survey of small businesses with the following objectives was designed to identify demands for infrastructural improvements and the need for financial assistance.

1. **Assess the Impact of Heatwaves on Small Businesses:** Assess the financial losses, operational disruptions, and health risks faced by small businesses and their employees due to extreme heat.

[11] NDMA. 2024. National Workshop on Heat Wave 2024. Management Interventions and Mitigation Strategies for Heat Wave. February 13-14, 2024. Presentation on Model Heat Action Plan for Indian Cities by Dr Rajashree Kotharkar, VNIT Nagpur. https://ndma.gov.in/index.php/heatwaveworkshopfeb24

2. **Identify Existing Coping Mechanisms:** Document and analyse the effectiveness of existing coping mechanisms employed by small businesses to mitigate the negative impacts of heatwaves, highlighting both successful and unsuccessful approaches.
3. **Inform Policy and Stakeholder Action:** Provide actionable recommendations to guide policymakers, civil society organisations, and relevant stakeholders in developing policies and initiatives that enhance the resilience of small businesses to extreme heat.
4. **Provide Targeted Support:** Evaluate the need for direct support measures, addressing both loss and damage incurred by heatwave-affected businesses and facilitating anticipatory actions to mitigate future risks.

Data collection and analysis

Data was collected over fifteen days between April and June 2024 by a ten-person team (equally divided by gender) with at least five years of experience in disaster risk reduction. The survey utilised the Kobo toolbox and was conducted in four locations across India: Puri, Lucknow, Ahmedabad, and Kochi. The 60-question survey, divided into eight sections, collected comprehensive household-level data, including demographics, housing characteristics, and the impact of heatwaves on health, livelihoods, and expenditures. The survey also explored coping mechanisms, financial aid preferences, and the specific needs of small businesses facing heatwave-related challenges. A comprehensive dataset was collected from 433 respondents across Puri, Lucknow, Ahmedabad, and Kochi using handheld devices via the Kobo Collect application. The data, initially stored in an Excel file with 177 columns, enabled robust statistical analysis on the impacts of heatwaves and informed targeted interventions.

Results

Gender Analysis

- **Demographics:** The survey, covering four Indian cities, included 433 participants, with 40% female and 60% male. Gender distribution varied by city, with Kochi achieving parity, while Ahmedabad and Lucknow had male majorities and Puri a female majority. Most respondents, regardless of gender, were aged 35-54.
- **Occupations:** Male respondents were predominantly street vendors (37%), followed by those involved in smaller trades (such as snack, fruit, or flower sellers, and small business owners like electricians, cobblers, and tailors) (16%) and construction labourers (14%). Female respondents were most frequently classified as "small traders" (41%), street vendors (33%), or domestic workers (9%).
- **Health Impacts:** Men reported higher rates of heat exhaustion and heatstroke among household members, while women reported more heat rashes and cramps. Women generally reported greater mental health challenges, except in Kochi. Common issues included mood swings, difficulty concentrating, and sleep disturbances. In Lucknow, men reported higher rates of anxiety and panic attacks.

Housing Analysis

- **Housing Types and Prevalence:** A slight majority (51%) of respondents rent their homes. While 67% reside in well-constructed "pakka" houses with concrete roofs, a significant portion (25%) live in less durable "kutcha" houses with tin roofs. This contrast is particularly stark in Puri and Ahmedabad, where kutcha homes represent 50% of surveyed households, compared to Kochi and Lucknow, where all respondents reported living in pakka houses.
- **Health Impacts Based on Housing Type:** The type of housing significantly influences heatwave health impacts. Residents of pakka houses primarily reported heat rashes and cramps, while those in kutcha houses experienced more heat cramps and heat exhaustion. This difference highlights the vulnerability of kutcha dwellings to extreme heat.

- **Mental Health and Housing:** Housing type also correlates with mental health challenges. While 43% of those in concrete-roofed homes reported no mental health issues, mood swings were the most common concern among the rest. Conversely, kutcha house residents experienced higher rates of mood swings (30%), concentration difficulties (21%), and anxiety attacks (18%), underscoring the psychological toll of inadequate housing in extreme heat.

Geographical Insights (from Ahmedabad, Puri, Kochi, and Lucknow)

- **Physical Health Impacts:** Ahmedabad reported the highest prevalence of heat exhaustion (71%), heat cramps (47%), and heatstroke (44%). Puri saw a 100% incidence of heat rashes and 85% for heat cramps. Kochi showed a lower incidence, with 73% reporting heat rashes. Lucknow had high rates of heat cramps (73%), heat exhaustion (90%), and heatstroke (37%).
- **Mental Health Impacts:** Ahmedabad saw widespread sleep issues (43%), anxiety (40%), and mood swings (37%). Prui reported alarming rates of mood swings (89%) and sleep disturbances (68%). Lucknow mirrored these trends with high rates of anxiety and stress. In contrast, Kochi reported minimal mental health challenges.
- **Economic Impacts:** Kochi showed resilience, with 49% reporting no income loss, while 41% experienced a week's loss. Ahmedabad and Puri faced more severe disruptions, with 42% and 50% reporting income losses lasting one and two weeks, respectively. Across all cities, there was a demand for financial assistance and support for small businesses to mitigate heatwave impacts, particularly in Lucknow, given its vulnerability and younger demographic.
- **Occupational Vulnerability:** Ahmedabad had a high concentration of street vendors (73%), while Kochi saw a mix of street vendors (42%) and construction workers (25%). Puri's workforce primarily consisted of artisans and small business owners (78%). Lucknow showed a diverse spread across street vendors, agricultural workers, and those facing unemployment. Heatwaves led to reduced job opportunities and income loss, particularly among street vendors, construction workers, and artisans.
- **Increased Spending During Heatwaves:** Heatwaves led to increased spending across all surveyed cities. Ahmedabad and Puri saw the majority facing 11-25% higher costs. Kochi mainly experienced increases up to 10%, while Puri faced a severe burden with 46% reporting 26-50% higher costs. Lucknow showed a similar distribution to Ahmedabad.
    - ***Special Concern for Water Bill Increases:*** Ahmedabad saw a mixed impact, with 36% reporting increases up to 10% and 36% experiencing no change. Puri faced a stark increase, with 84% seeing bills rise by up to 50%. Lucknow also saw a significant impact, with 94% facing increases up to 25%. Kochi demonstrated resilience, with 97% reporting no change in water bills.
    - ***Increase in Prices of Essential Commodities:*** While Ahmedabad and Kochi saw slight increases, Puri and Lucknow experienced more substantial food price inflation.
    - ***Healthcare Costs Related to Heat Exposure:*** Ahmedabad saw 43% reporting minor costs, while Kochi had 61% with no costs. Puri experienced moderate cost increases for 65% of respondents, while Lucknow showed a mix of minor and moderate cost increases.

Urban-Rural Disparities in Heatwave Impacts and Responses

- **Heatwave Impacts:** Urban areas experience varying economic impacts, while mental health issues are more prevalent. Rural areas face widespread physical affliction, economic hardship, and infrastructure challenges.
- **Water availability and costs:** While a small percentage of urban residents faced significant water bill increases, nearly half of Puri's population experienced such increases. Rural areas also suffer from reduced water availability, heat cramps, and rashes. Urban areas see

smaller water bill increases and supply reductions, while rural areas face significant increases and widespread shortages.

- **Community Priorities:** Rural communities prioritise comprehensive heatwave management and insurance against heatwave-related losses. In contrast, urban residents prioritise home modifications for heat resilience and timely heatwave advisories.
- **Adaptation Measures:** Despite the increasing heat, most people in both urban and rural areas haven't made significant home modifications to combat heatwaves. In Puri, planting trees for shade is a common practice. Urban dwellers often use wet towels, fans, and reflective roof paint to mitigate heat.
- **Extreme Heat Insurance:** Urban residents largely support insurance covering healthcare costs, income losses, and work disruptions due to heatwaves, along with enhanced social security benefits for heat-related illnesses. Rural populations prefer revisions to social security programmes for more targeted support against heatwave challenges.

Demands of Small Business Communities in Cities of India

- **Subsidising water bills and offering free water distribution centres** during heatwaves gain significant support in Puri and Lucknow. This reflects an understanding of the amplified financial strain caused by heatwaves, especially for vulnerable populations like street vendors.
- Providing **rebates or financial assistance for energy-efficient cooling systems** is a favoured strategy in Ahmedabad and Lucknow. This approach offers both immediate relief from heat and long-term sustainability benefits by reducing energy consumption and costs.
- Kochi and Puri show a strong demand for **a comprehensive strategy to ensure a reliable supply of essential goods, water, and power** during heatwaves. This could involve subsidies, water conservation programmes, and ensuring affordability and accessibility of basic necessities.
- In Lucknow, there's a notable preference for **investing in power grid upgrades and incorporating renewable energy sources**. This reflects a focus on addressing increased energy demands during heatwaves and transitioning towards more sustainable energy solutions.
- **Expanding healthcare access and providing insurance for heat-related illnesses** are crucial, particularly in regions like Puri with severe heatwave impacts. Affordable healthcare and insurance can mitigate the economic and health burdens of heatwaves.
- In Ahmedabad and Kochi, over half of the respondents expressed a need for subsidised cooling devices like fans or air conditioners. This highlights the demand for **affordable access to cooling solutions in households**, particularly in regions facing intense heatwaves.
- Lucknow shows a strong need for **timely heatwave advisories, early warning systems**, and education on reducing heat exposure. This highlights the importance of improving information dissemination and awareness campaigns in the state.
- A consensus exists across all locations on the benefits of **direct cash transfers during heatwaves** to cover basic necessities and medical expenses. This approach provides immediate relief and is crucial in ensuring the most vulnerable can cope with the immediate impacts.
- For long-term mitigation, **subsidised loans for retrofitting homes with cooling systems and heat-resilient materials** are preferred in Ahmedabad and Lucknow. Kochi and Puri favour a mix of grants, low-interest loans, and microfinance options to support adaptation efforts.

3.2 Providing Targeted Support

A new survey was conducted to assess the support needed by those affected by extreme heat in urban, semi-urban, and nearby rural areas across six districts in India: Puri, Kochin, Lucknow,

Anand, Ahmedabad, and Guwahati. The survey aimed to understand the types of support required, categorised as compensation for loss and damage and implementation of anticipatory actions. The criteria for receiving financial assistance prioritised vulnerable households, including those with disabilities, women-headed households, impoverished families with high heat exposure, those actively working to overcome poverty, and those who experienced loss and damage due to recent heatwaves.

The efforts were to see how a small member of thoughtfully supported small businesses can give an indicator for a national programme for cooling protection for small businesses.

The survey results directly informed AIDMI's design and implementation of support for heatwave-affected populations. These efforts included anticipatory action and addressing loss and damage, funded by the Green Finance Fund. The initiative provided financial support to a diverse range of small businesses across five cities, including street vendors, construction workers, food suppliers, and small farmers. A total of 336 small businesses received support for anticipatory actions, while 134 received assistance covering losses incurred due to extreme heat.

Sr. No	Location		Total forms filled for assessment			Total supported persons / victims			Anticipatory Action	Loss and Damage
	State	District	Male	Female	Total	Male	Female	Total	No. of Persons	No of Person
1	Odisha	Puri (rural and semi urban)	34	66	100	34	66	100	89	11
2	Kerala	Kochin (urban)	54	70	124	44	56	100	49	51
3	Uttar Pradesh	Lucknow (urban)	32	10	42	32	10	42	23	19
4	Gujarat	Anand (rural and semi urban)	-	128	128	-	100	100	81	19
		Ahmedabad (urban)	69	141	210	47	64	111	89	22
5	Assam	Guwahati (urban)	43	32	75	6	11	17	5	12
	Total		**232**	**447**	**679**	**163**	**307**	**470**	**336**	**134**

3.3 Significant Effect After Implementation

AIDMI support, both for anticipatory actions and addressing loss and damage, led to improved thermal comfort, business continuity, income diversification, enhanced housing, and reduced heat-related risks. The aid enabled businesses to mitigate stock spoilage, recover income losses, compensate for lost wages, cover health expenses, and ensure food and water security for vulnerable communities.

Impact of Financial Aid for Taking Anticipatory Actions

- **Improved Thermal Comfort:** AIDMI's financial support empowered individuals and businesses to invest in cool roof installations in homes and workplaces. This directly contributed to significantly reduced indoor temperatures, creating a more comfortable environment for residents, employees, and customers.

- **Business Continuity and Increased Productivity:** Through its financial assistance, AIDMI enabled the installation of sheds at places of business, particularly for street vendors. These sheds provided crucial shade and protected both vendors and their products from extreme heat, helping maintain customer footfall even during peak heat hours and preventing income loss due to reduced working hours.
- **Business Diversification and Increased Income:** AIDMI's financial aid played a key role in facilitating business diversification. By helping a fruit vendor purchase a juice machine, for example, AIDMI empowered them to offer new products, attract a wider customer base, and increase their income.
- **Enhanced Housing Conditions:** AIDMI's support extended to low-income households by providing financial aid for housing improvements like installing small windows for ventilation. This directly translated to improved airflow, reduced indoor heat, and the creation of a healthier living environment.
- **Increased Awareness and Capacity Building**. By providing financial aid alongside orientation programmes on climate adaptation, AIDMI empowered individuals and communities to make informed decisions about heat-resilient practices. To ensure effective heatwave preparedness, AIDMI prioritised educating beneficiaries on accessing timely alerts. Training sessions emphasised understanding advisory systems and encouraged the use of mobile applications like Sachet for real-time updates, enabling proactive measures.
- **Reduced Loss and Improved Access to Essentials:** Recognising the impact of extreme heat on perishable goods and the importance of hydration, AIDMI's support facilitated the creation of cool and cold storage facilities. This intervention helped minimise the loss of goods due to heat spoilage and ensured access to safe drinking water, contributing to community health and well-being.

Impact of Financial Aid for Loss and Damage

- **Stock Spoilage Mitigation:** AIDMI assistance helped businesses replace perishable goods lost due to extreme heat and inadequate storage, reducing financial strain and ensuring continuity.
- **Business Loss Recovery:** Direct financial aid from AIDMI covered lost income due to reduced operating hours or temporary closures during extreme heat events, enabling businesses to recover more quickly.
- **Wage Loss Compensation:** AIDMI support helped cover lost wages for employees, particularly daily wage earners, who were unable to work due to extreme heat, protecting livelihoods and ensuring well-being.
- **Health Expense Coverage:** AIDMI assistance provided a safety net by covering medical expenses for heat-related illnesses affecting both business owners and employees, reducing the financial burden of healthcare.
- **Food and Water Security:** Recognising the essential need for hydration and nutrition, AIDMI support provided access to food and water during extreme heat events, ensuring the well-being of vulnerable individuals and communities.

3.4 Financial Details

The financial aid ranged from 3000 to 7000 INR. Overall, the interventions benefited 307 women-owned businesses and 163 male-owned businesses.

3.5 Policy Recommendations

The following recommendations aim to address the multifaceted challenges posed by heatwaves in India, encompassing policy, funding, research, collaboration, and community engagement.

For the Government

1. **Recognise heatwaves as a disaster:** Recognising heatwaves as a disaster (MHA, 2023)[12] will allow authorities to access National and State Disaster Response Funds (N/SDRFs) for preparedness and mitigation (Bhushan, 2019)[13]. "This would allow states to execute the full range of HAP actions and, for immediate relief, go beyond the 10 per cent discretionary allocation of SDRF funds" (Pillai A., 2023)[14]. It will also empower authorities at various levels with statutory powers to enforce orders (Jha R., 2021)[15].
2. **Provide clarity on how HAPs will be funded:** Without formal recognition as a disaster, heat action plans are India's primary policy weapons against heat waves. However, there is a lack of clarity on how these plans will be funded for preparedness and mitigation. A review of HAPs in India found that 17 of 37 HAPs failed to mention funding mechanisms. Thus, it is essential to create a central fund, harness the National Adaptation Fund on Climate Change (NAFCC), or leverage 15th Finance Commission provisions for preparedness and capacity building, as Arunachal Pradesh and Telangana demonstrated. (Pillai A. 2023)[16].
3. **Promote climate-responsive cooling techniques in government-funded constructions:** The national government should promote climate-responsive cooling techniques as a norm in public-private constructions. More than 40 million urban and rural households could benefit if the Pradhan Mantri Awas Yojana (PMAY) can adopt such practices (World Bank, 2022)[17].
4. **Make decision-making data-driven:** Collecting and analysing data on heatwave trends, health impacts, and community vulnerabilities is crucial for informed policy development. Because a heatwave is not a notified disaster, accurate information on sectoral economic impacts and disaggregated data on illness and deaths are unavailable nationally. (NDMA, 2019)[18]. The official data from the health ministry on heat-related mortality from 2015-2023 contradicts the data from agencies such as National Crime Records Bureau (NCRB) and India Meteorological Department (IMD), including media reports (Pandey K, 2023)[19]. Thus, there is a need to identify and assign responsibility to a central agency to ensure that each heat-related death is registered and reported in India.

For UN and donors

5. **Invest in research and innovation:** Continued research and innovation in heatwave management strategies is essential. This includes studying the effectiveness of current measures, exploring new technologies and approaches, and increasing interdisciplinary collaboration among scientists, policymakers, urban planners, healthcare systems, and communities. The UN agencies and donors working in India should invest more in research and innovation by various actors.

[12] MHA, GOI. 2023. RAJYA SABHA
UNSTARRED QUESTION NO. 691. DECLARING HEATWAVES AND COLDWAVES AS NATURAL DISASTER
https://www.mha.gov.in/MHA1/Par2017/pdfs/par2023-pdfs/RS08022023/691.pdf
[13] Bhushan, C. (2019). Heatwaves to become more intense, declare it a natural disaster. Financial Express.
https://www.financialexpress.com/opinion/heatwaves-to-become-more-intense-declare-it-a-natural-disaster/1611696/
[14] Aditya Valiathan Pillai and Tamanna Dalal. (2023). How is India adapting to heatwaves?: An assessment of heat action plans with insights for transformative climate action. CPR report. https://cprindia.org/wp-content/uploads/2023/03/Heat-Report_27March-23_Updated-Table.pdf
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https://www.worldbank.org/en/news/press-release/2022/11/30/a-greener-cooling-pathway-can-create-a-1-6-trillion-investment-opportunity-in-india-says-world-bank-report
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https://www.downtoearth.org.in/news/climate-change/data-gaps-in-heatwave-deaths-widen-as-india-battles-record-smashing-temperatures-90839

6. **Finance HAP implementation:** Since several HAPs lack transparent and sustainable financing, UN agencies and donors can be vital in providing financial resources to implement HAPs in India effectively. They can support long-term funding for developing, revising, and implementing HAPs to ensure continuous preparedness.
7. **Establish a multi-stakeholder platform:** Develop and facilitate a multi-stakeholder forum that brings together governments, NGOs, academia, the private sector, media, and community representatives can facilitate collaboration and coordination for heatwave preparedness, response, and recovery. This platform can serve as a space for sharing knowledge, lessons, and good practices, identifying gaps in current policies, and fostering dialogue and collaboration among different actors.

For civil society and the private sector

8. **Provide affordable and clean cooling solutions:** The private sector in India is expected to play a massive role in exploiting the $1.6 trillion heat-wave opportunity by 2040. "By 2037, the demand for cooling — for products such as air-conditioners, refrigerators, and cold chains — is likely to be eight times more than current levels" ((ET Online, 2023)[20]. Manufacturers of cooling products should prioritise energy-efficient and affordable cooling solutions to help mitigate the impacts of heat waves on vulnerable populations.
9. **Implement and measure the impact of innovative solutions through pilot projects:** The CSOs should engage with the government and implement pilot projects in partnership with urban authorities, especially in vulnerable cities of India, to test and evaluate different heatwave mitigation strategies. Such pilot projects should focus on urban green spaces, cool roofs, and building design adaptations to withstand extreme heat better.
10. **Create public awareness:** Civil Society Organisations (CSOs) should create public awareness about the dangers of heatwaves and the importance of preventive measures. This can be done through public announcements, educational programmes, and community outreach initiatives. Awareness campaigns targeted toward vulnerable populations, such as children, women, the elderly, people with disabilities, and individuals with pre-existing health conditions, can be effective in promoting adaptive behaviors and reducing heat-related mortality.

4. Conclusion: Importance of Piloting Heatwave Resilience for Small Businesses in Urban India

"No national landscape of risk can be drawn out in Asia without including heatwave risk", said Mihir R. Bhatt, AIDMI (UNDRR et al., 2015)[21].

This pilot project is crucial for cities in India and South Asia due to the escalating threat of extreme heat fuelled by climate change. The project focuses on understanding the specific needs and demands of vulnerable small business communities, which form a significant part of the informal sector in these regions. By identifying their financial services, social protection access, coping mechanisms, and recovery strategies, the project aims to develop effective mitigation strategies to build extreme heat resilience. The insights gained from this project can be applied to other cities facing similar challenges, making it highly relevant for the entire region. AIDMI recommends establishing a national programme focused on cooling protections for small urban businesses in India. This programme should encompass financial aid for cooling solutions, training on heat resilience, and access to early warning systems. We urge UN agencies and foundations to directly support such local programmes, prioritising the specific needs of these vulnerable businesses.

[20] ET Online, 2023. Cooling business is super hot: Here's India's $1.6 trillion heat-wave opportunity. https://economictimes.indiatimes.com/industry/cons-products/durables/cooling-business-is-super-hot-heres-indias-1-6-trillion-heat-wave-opportunity/articleshow/100911969.cms

[21] UNDRR et al. (2015) Heatwave in India: Lessons for implementing Sendai Framework for Disaster Risk Reduction in Asia - Q&A with Mihir R. Bhatt. PreventionWeb. https://www.preventionweb.net/news/heatwave-india-lessons-implementing-sendai-framework-disaster-risk-reduction-asia-qa-mihir-r

5. Annexure-I. Case Study - The Finance Gap: The world has never been richer, disasters have never been greater: Getting funds to where they are most needed

This is a shopkeeper, Biju, on the main street of Cochin facing the Bishop's home.

He received an amount to cover his business loss and damage due to extreme heat in 2024 summer from a created fund.

He bought an extra canvas shed for his plastic item vending stall, set up an additional umbrella to protect customers from direct heat, offered cold water and soda to customers who turned up to his vending stall, and has now started selling seeds for organic plantations of domestic shrubs of spices in the city.

There are an estimated 3000 such vendors or street shops in Cochin. And in each Indian city (street) corners almost invariably has such Bijus. Most of them are women.

Such small businesses suffer small losses due to extreme heat but the loss is not visible to customers or authorities whose job it is to protect citizens from the negative impact of extreme heat on their lives or livelihoods.

The year 2024 was a more severe year than 2023. Each year severity of heat is increasing and will continue increasing as per the International Maritime Organization (IMO) and India Meteorological Department (IMD) of India.

After the Kandla cyclone in 1998, AIDMI had set up Livelihood Relief Fund (LRF) to support the affected population. In 2023 AIDMI focused its funding on addressing the loss and damage with direct cash transfers to individuals in now six cities of India on demand basis.

Biju reflected on the 2023 heat to find a way to reduce the loss to his income in 2024. What he needed was additional sheds to cover his customers. Water or a drink to attract and retain his customers. Store more water for drinking and sprinkling around at 2 pm when the heat is most extreme. He also decided after discussing with AIDMI how a green cover in cities can mitigate heat impact and started to sell seeds to his customers to grow spice shrubs for green cover.

This was a small financial gap where a small out of 70 to US$ 70 to US$ 100 helped avoid loss and damage to his income and asset.

Cochin is a rich city. It is an engine that pumps growth in the Middle East. It attracts largest remittance from abroad. City authority and citizens can easily cover all such Bijus in Cochin. They can compensate loss, restore damage, fund anticipatory action, and can also offer insurance coverage and more.

6. Annexure-II. Photos of Small Businesses Affected in India: Summer 2024

	
"When it is hot, our flowers wilt and lose their colour quickly. This makes it hard to sell them, and we struggle to make a living." – A flower seller in Ahmedabad.	*"When it is this hot, nobody wants a shave, let alone a haircut. I am lucky to make half of what I usually do." – A roadside barber from Ahmedabad.*
	
"In the summer, the road gets so hot, it burns even through my slippers. I sit here all day selling my wares, and after a few hours, I can barely stand it. Customers do not want to stop in this heat, so business suffers." - A woman selling household utensils by the roadside.	*"We have no roof over our heads, and the sun burns everything. Even cooking is a struggle. We collect water wherever we can, but it is never enough." - A woman living on a Delhi footpath with her family.*
	
"The water is getting too warm now. The fish are getting sluggish, and some are even dying. It is a worry, especially with the cost of everything else going up." - A fish farmer in Kerala, commenting on the impact of the heatwave.	*"Kerala was never this hot when I was a girl. We had sunshine, sure, but it was a gentle warmth, not this harsh heat. Every year it gets worse, hotter and stickier." - An elderly woman from Kerala, reflecting on the changing climate.*

	
"This heat is merciless. The mangoes and bananas ripen too fast, and then they rot. I am throwing away more fruit than I am selling these days. It is a terrible loss." - A woman selling fruit on the streets of Kerala.	*"The heat is brutal. By midday, the fish starts to spoil even with ice. I have to sell it quickly, or I am left with waste and lost income." - A woman selling fish by the roadside in Kerala.*
	
"My hands are already rough from working with the coir, and this heat dries them out even more. It is getting harder and harder to twist the fibres into rope in this weather." - A woman who makes coir rope in Odisha, speaking about the summer heat.	*"The sun is so harsh now. Everything is drying up - the leaves, the fruits, even the wells. It is a real struggle to grow anything these days." - A woman farmer in Odisha.*
	
"You cannot trust the weather. One day, it is scorching hot; the next, it is humid, and then suddenly, we are hit with these unseasonal downpours. I can never predict how much stock to buy. My snacks get soggy, or I run out completely." - A woman running a roadside snack cart.	*"I stand here all day under the sun to sell my vegetables. This umbrella offers a little shade, but the heat is relentless." - A woman selling vegetables from her cart on a Delhi roadside.*

All photographs in this documents are AIDMI.