

Building Adaptation and Resilience to Heat Waves



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ABOUT THIS ISSUE

In this issue of the *Southasiadisasters.net* titled "Building Adaptation and Resilience to Heat Waves," we present the timely need for the mainstream implementation of adaptation strategies against extreme heat, especially in the sprawling urban cities of South Asia. Heat waves are characterised by abnormally high temperatures, particularly in the summer months. They have multiple damaging direct and indirect effects on health, including dehydration, exhaustion, and in more serious cases, death.

Several social groups are more likely to be affected by heat waves, namely women, children, and low-income inhabitants of poorly protected neighborhoods. Despite their vulnerability, at-risk communities have crafted and championed adaptation strategies against heat waves for years. The best learning lessons for heat wave adaptation stem from community experience and expertise.

As the case of the 'City Coolers' and the 'Heat Action Plan' in Ahmedabad demonstrate, it is crucial for these adaptation strategies to be funded and implemented at the local grass-roots level. Vulnerable groups, especially women, must be included in decision-making and empowered to lead efforts to promote community resilience against heat waves. Furthermore, a data-driven approach coupled with capacity building will strengthen existing research and policy efforts. Through inclusive and collaborative action, heat wave adaptation can become a mainstream reality. ■

- Ravi Sadhu, T.H. Chan School of Public Health, Harvard University, Boston, USA

INTRODUCTION

The City Coolers

By *Mihir R. Bhatt*, All India Disaster Mitigation Institute, India

Though the socioeconomically disadvantaged live on the margins of India's city economy, and are greatly vulnerable to the damaging effects of heat waves, they are the swiftest heat wave adaptation and mitigation measure takers. The All India Disaster Mitigation Institute (AIDMI) works with one such cadre of community actors- the City Coolers.

These City Coolers are mainly from poor backgrounds. They include women who are primary breadwinners of their household, out-of-school children, casual and migrant laborers, and those who reside in low-income areas.

They have taken steps - individually and collectively - to make their home, work, and city cooler. They resourcefully utilise low or no cost additions or changes, such as curtains or creepers on the roof. They keep their neighbourhood homes cool by building double roofs, constructing ceiling 'coolers,' and planting trees; and they collectivise to join local civil society initiatives in health, education, wellbeing, and more taking place in the cities. They struggle, they collaborate, they coordinate, and find coherence in their own acts of cooling and that of others in a city as best as they can.

City Coolers push for a wide range of neighbourhood provisions, ranging from double tie roofs to hot-air-outlet holes. They do so by their own efforts. They negotiate with authorities and reach out to businesses to access material, design, money, and more. They take decisions and find processes to form communities and unionise to make their homes and city cooler.

These City Coolers do not appear in any humanitarian system review or reports. Nor do they appear in any climate adaptation or mitigation plans at the city, state, or national levels. They are also not beneficiaries of the Global Adaptation Fund or other national fund recipient lists AIDMI has found. And yet these City Coolers chip in their own resources - labor, material, design, and know-how - to make cities cool and habitable. Sadly, the aggregated pool of their resources is meagre, and cannot serve as leverage to attract larger resources for funds, building material, and skills training.

The budget for heat wave management and city cooling is mostly allocated at national and sub national levels, but not at grassroots levels. Subsequently, city cooling finance does not capitalise at the coolers' level. This calls for policy reform.

City Cooling measures -which can amount to hundreds in each city- are neither exchangeable across city locales nor across cities facing heat waves. As a result, each cooler in each city has to devise their own methods, tools, and measures, AIDMI work has found.

City Coolers transform cities into greener and cleaner spaces by expanding their innovations, activities, and income.

The loud and clear message is that City Coolers must be better funded and resourced to make cities heat wave resilient. In fact, they must lead the process of cooling. This will make cities cooler, faster, and better. ■

How can Women Lead Heat Risk Mitigation at all Levels?

By Leesa Chesser¹

Heatwaves are more deadly than any other climate hazard or natural disaster. A matter of international concern is that climate change is accelerating their intensity and frequency. Particularly older, pregnant and breastfeeding women are more likely to die or be impacted by heat waves due to the triple burden of productive, reproductive and community work.²

Yet women are powerful change-makers, influencing their communities and families, especially when they hold the power of decision making. Incorporating women leaders and their transformational skills into all levels of heat risk mitigation will build better prepared heat resilient and adaptive communities.³

The Sendai Framework highlights the role of all stakeholders in heat wave disaster management when states have the overall responsibility for reducing disaster risk.⁴ Adopting this framework to Australia, women can increasingly undertake pivotal leadership roles in heat risk mitigation at all levels if the following recommendations are implemented for various stakeholders.

As community leaders at the local level, women can:

- Actively engage in the risk assessment of their local community, including vulnerable individuals such as the elderly, people living disabilities, pregnant and breast-feeding women and children;
- Be trained to identify housing risks, water and power outage spots, food security risks, and to locate heat islands and cooler environments;
- Communicate early warning and heat wave preparedness messages;
- Recognise and incorporate Indigenous peoples, experiences, and traditional knowledge;
- Provide an important contribution to the development and implementation of heat wave mitigation plans, including risk assessment and early warning;
- Serve as emergency management planners for families, businesses, community groups, alongside education and healthcare providers;
- Act as responders and volunteers at cooling centres or heat refuges in public buildings like libraries, shopping centres, government building foyers with water, food, and respite coordination;

- Officiate local heat wave coordinators alongside responders, warning system operators and governments at all levels, guiding and influencing the local community to a resilient response.

As responders, government and non-government agencies, and supply chain operators should:

- Increase the number of women in disaster management and incident management to 50% via mentoring, scholarships, and training opportunities⁵;
- Participate annually in recognition of the 'Australasian Women in Emergencies Day' to celebrate women in emergencies and disaster management⁶;
- Engage women in the implementation of local, regional, national and global strategies that contribute to, and support, public awareness;
- Build a culture of advocacy and inclusiveness surrounding the unique problems women face and include solutions to these problems in disaster risk management approaches.

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² Covid-19 and Women's Triple Burden: Vignettes from Sri Lanka, Malaysia, Vietnam and Australia; <https://www.mdpi.com/2076-0760/9/5/87/html>

³ Mihir R. Bhatt, Understanding intersectionality in women led disaster preparedness and resilience in South Asia. Southasiadisasters.net February 2022; <http://www.aidmi.org/sub-images/publication/Snet%20198%20Understanding%20Intersectionality%20of%20WLDLDRR.pdf>

⁴ Sendai Framework for Disaster Risk Reduction 2015 – 2030; <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>

⁵ Prasad Bhagwan Sevekari, Role of RedR India in promoting women's leadership in disaster reduction. Southasiadisasters.net January 2022.

⁶ Australasian Women in Emergencies Day - 10 October; <https://www.igem.vic.gov.au/publications/media-releases/australasian-women-in-emergencies-day-10-october>

As elected officials, Ministers, Mayors, and Councillors within government can:

- Engage with relevant stakeholders, including women, children and youth, persons with disabilities, poor people, migrants, Indigenous peoples, volunteers, and older women in the design and implementation of policies, plans and standards;
- Coordinate the public, private sectors and not-for-profit organisations, academia, and scientific institutions, to work closely together;
- Create opportunities for collaboration, and for businesses

to integrate in heat wave adaption and resilience planning and responses through a gender inclusive disaster risk management approach;

- Ensure women leaders are given representation in a wide variety of ministerial portfolios, not just the "caring social services" portfolios;
- Integrate gender responsive budgeting and policy frameworks to resource and review heat wave mitigation responses and climate adaption budgets and plans.

Men and women experience the impacts of heat waves and disasters differently, with women being

impacted disproportionately.⁷ Organisations that pursue climate change work must champion gender equality through leadership capacity strengthening and capability building for women. Furthermore, deeper local gender inclusive stakeholder engagement, and adoption of gender inclusivity in budget allocation at the government level is warranted. Through these strategies, women will increasingly be at the heart of heat risk mitigation and response, creating stronger and more resilient responses to increasingly frequent and potentially fatal climate events such as heat waves. ■

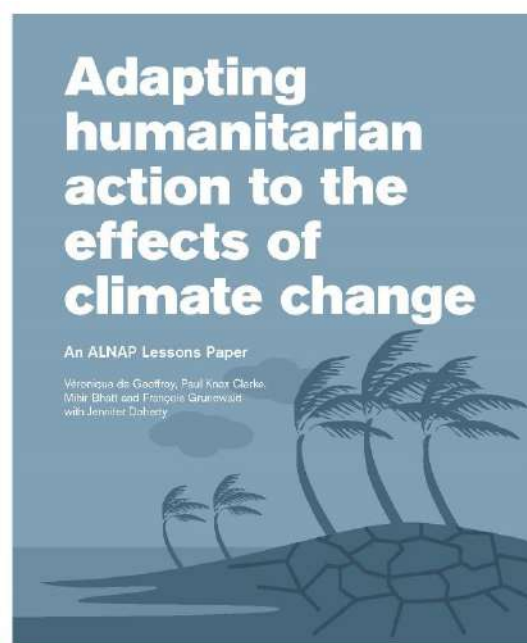


Heat waves evaporate work and income in India

India may account for 3.4 crore of the projected 8 crore global job losses from heat stress-associated productivity decline by 2030, according to a World Bank report. "Up to 75% of India's workforce, or 38 crore people, depend on heat-exposed labor, at times working in potentially life-threatening temperatures," it highlighted. "India could experience heat waves that break human survivability limit," it added.

City authorities and state agencies can no longer wait to adopt and implement heat wave adaptation and mitigation measures. They must act now.

Source: [India could see over 3 crore job losses due to severe heatwave: World Bank](#)



LESSONS PAPER

ALNAP

Humanitarian agencies in India can no longer afford to exclude heatwave mitigation from their annual programme planning. Heat waves are a contemporary reality and ways to deal with them are available to local NGOs due to timely policy work by ALNAP ([click here](#)).

⁷ Gender-Based Approach to Climate Change Adaptation: A advocacy paper from Lombok Island, West Nusa Tenggara, Indonesia. Collaborative research by IPB University, PI AREA, and Islamic Relief; <https://islamic-relief.org/wp-content/uploads/2022/11/GenderBasedClimateAdaptation-Indonesia.pdf>

The Need for Research-based Evidence to Support Humanitarian Action on Heat Waves: Reflections from 2020-2022

By *Mike Clarke*, Centre for Public Health, Queen's University Belfast, United Kingdom; Evidence Aid, United Kingdom; WHO Health Emergency and Disaster Risk Management Research Network, WHO Kobe Centre, Japan; and *Virginia Murray*, WHO Health Emergency and Disaster Risk Management Research Network, WHO Kobe Centre, Japan; UK Health Security Agency, United Kingdom

As with all areas of health emergency and disaster risk management (Health EDRM), humanitarian action focused on heat wave mitigation should be based on reliable evidence. This is increasingly important as climate change makes heat waves more frequent, intense, widespread, and damaging. In response to this imminent threat, important progress has been made in the past two years, which we highlight here.

Heat waves are hot weather events, formally defined as marked unusual periods of hot weather over a region that last for two or more consecutive days during the hot period of the year (Murray et al, 2021). Local conditions influence whether an event is called a heat wave, which means that several factors can lead to significant variations, including geography and topography, the built environment, and atmospheric conditions among others (Murray et al, 2021). This variation also affects assessments of the impacts of heat waves on human and animal health, worker productivity, agricultural production, ecosystems, economies, and the critical infrastructure that supports society, such as buildings, water, transportation, and energy systems (Boyle et al, 2010). An added complication is that heat waves interact with and amplify the severity of other hazards such as

wildfires, droughts, cyclones, urban heat islands and poor air quality, leading to the need for a multi-hazard risk management approach (Murray et al, 2021).

Research to support humanitarian action on heat waves needs to resolve uncertainties pertaining to the challenges imposed by extreme heat, and the ideal strategy to minimise and prevent such challenges. We point readers to Evidence Aid (www.EvidenceAid.org), which provides summaries of reviews relevant to humanitarian action and Health EDRM. In addition, the Global Heat Health Information Network increases awareness and

capacity to better manage and adapt to the health risks of dangerously hot weather in a changing climate (ghhin.org). Recently, a newly launched global platform dedicated to providing actionable knowledge relevant to climate and health has also been launched by the World Meteorological Organization and World Health Organization (climahealth.info).

We note some recent examples of relevant research on heat waves underscored in systematic reviews:

- Faurie et al (2022) used the results of 30 studies to compute that every 1°C increase in temperature increased direct heat illness morbidity by 18% and mortality by 35%.
- Wu et al (2022) showed that heat waves increased the risk out-of-hospital cardiac arrest, with more intensive heat waves having a greater effect on the elderly, especially older men.
- Arsad et al (2022) highlighted the need for research to better capture how different vulnerabilities such as having co-morbidities and belonging to specific sociodemographic groups can produce grave public health impacts. They also emphasised how research can play a role in helping stakeholders develop effective mitigation plans to reduce these impacts.



See full report: <https://apps.who.int/iris/handle/10665/363502>

- A mixed methods review of extreme events and gender-based violence conducted by Daalen et al. (2022) found positive associations between heat waves and gender violence. Liu et al. (2021) reported another noteworthy positive association between heat waves and adverse mental health outcomes (2021).

These reviews show that much of the current evidence on heat waves – as it pertains to humanitarian action and Health EDRM- is based on observational studies investigating the consequences of heat waves. There remains a paucity of evidence from experimental research that tests ways to intervene and minimise these adverse consequences. These will need to include, as noted by Faurie et al. (2022), the identification of preventative efforts to reduce heat-related illness during hot weather, especially for vulnerable populations. Our Cochrane review from a decade ago pointed to the need for such studies by outlining the design of a randomised trial of the effects of electric fans on serious morbidity and mortality in people aged 65 years or older in residential or care homes exposed to naturally occurring heat waves (Gupta et al, 2012).

As the impact of heat waves grows, so does the need to strengthen research efforts. This will require increased research capacity in the humanitarian and Health EDRM sectors, and stronger collaboration and engagement between the research community and policy makers, practitioners, and stakeholders. The recently published WHO Guidance on Research

Methods for Health EDRM introduces pertinent scholarly evidence. It includes case studies of relevance to heat waves including the review of using electric fans during heat waves (chapter 3.5), a study forecasting the costs of heat waves in Australia and the USA (chapter 4.7), the health consequences of the 1995 heat wave in Chicago and the European heat wave of 2003 (chapter 4.8), and an evaluation of the heat wave plan for England (chapter 4.15). The guidance is relevant to researchers, policy makers and practitioners. It will hopefully improve the quality of research and, thereby, the quality of policy, practice, and guidelines (WHO 2022).

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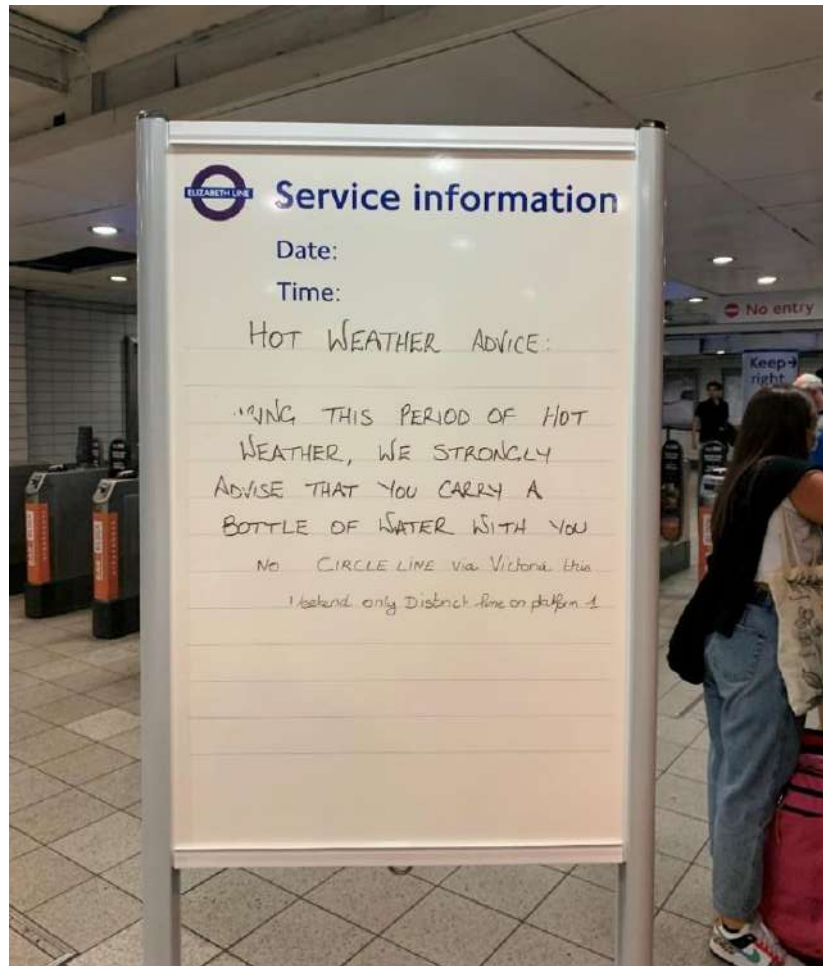
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The Case for Greater Focus on Heat Waves in Higher Education

By Ainsley Trahan, PhD Student, University of Cambridge (Cambridge Disaster Research Network), UK

Heatwaves have had devastating impacts throughout history and continue to increase in both frequency and intensity. The 2010 heat wave in Ahmedabad generated an estimated 1,344 excess deaths; a heat wave across Europe in the summer of 2003 killed over 70,000; and projections show that at baseline climate conditions, the US could lose an average of approximately \$100 billion annually via heat-induced labor productivity decline (Azhar et al., 2014; Robine et al., 2008; Atlantic Council, 2021). Still, heat wave impacts are under-reported in international disaster databases, the reports of international organisations, and climate bulletins. Additionally, research on heat waves remains narrowly focused on the health and building sectors (Brimicombe et al., 2021a; Brimicombe et al., 2021b). The impacts of heat are clear. So why then, do heat waves continue to be understudied in academia?

The reasons for this are varied. Heat waves do not involve mass destruction of property, heat wave deaths are often relatively widely dispersed, and they are often not directly attributed to heatstroke (Rodriguez and Barnshaw, 2006; D'Ippoliti et al., 2010). Moreover, heat waves have historically lacked a consistent definition. The shifting definition of a heat wave accounts for the context-dependent nature of tolerability as influenced by factors including recent exposure to extreme events, humidity, and social practices (Tong et al., 2015).



It is time that heat wave mitigation and resilience-building activities are prioritised at the global, national, and local levels. Academic research has a key role to play in strengthening heat mitigation policy and increasing individuals' and societies' resilience to heat waves.

However, the lack of a consistent definition complicates both research and risk preparedness (Ho et al., 2017). Such factors contribute to the low visibility of heat-induced devastation, pushing heat waves to the margins of disaster research and policy.

We are currently underprepared for the increasing threats that heat waves pose to human health and wellbeing, as well as national economies and development trajectories. It is time that heat wave mitigation and resilience-building activities are prioritised at the local, national and global levels. Academic

research has a key role to play in strengthening heat mitigation policy and increasing individuals' and societies' resilience to heat waves. Research and practice are closely intertwined. Consequently, a push for more interdisciplinary, inclusive research may encourage stronger, more inclusive heat wave preparedness and response activities.

It is therefore critical that heat waves occupy a permanent space within mainstream disaster studies, public health, engineering, development studies, and beyond, at all levels of education. In encouraging the greater study of heat waves at the bachelors, masters and doctoral level, institutes of higher education will be increasing exposure to, interest in and understanding of an issue critical to global safety, wellbeing, and development.

Whilst pushing for the increased presence of heat waves within academic syllabi, educators and the institutes of higher education within which they reside must remember the value in diverse research approaches. There is currently a need for more qualitative research in heat wave studies, and greater consideration of the impacts of contributing factors to vulnerability such as gender. Moreover, it is crucial that educators prioritise the amplification of non-Western voices both contributing to research and detailing their lived experiences. As heat wave studies grows as a field, universities worldwide are presented with an opportunity to counter dominant patterns of elevating Western narratives over non-Western accounts. Heat waves, though context-specific in their impacts, are a global threat. Cross-

regional academic partnerships and equitable representation in heat wave research and its outputs are critical to the integrity of research and its potential influence on policy.

There is a need for more inclusive, representative, interdisciplinary heat wave research. To promote such work, universities must push for the greater presence of heat waves in undergraduate and graduate syllabi across disciplines. In providing students with the exposure and tools required for heat wave research, universities will encourage research needed to shape policy. Higher education is by no means the only or most critical actor in building heat wave resilience. However, institutes of higher education have a key role to play in the future of heat wave research, policy, and practice needed to increase inclusive resilience-building measures stemming from structural and non-structural mitigation strategies.

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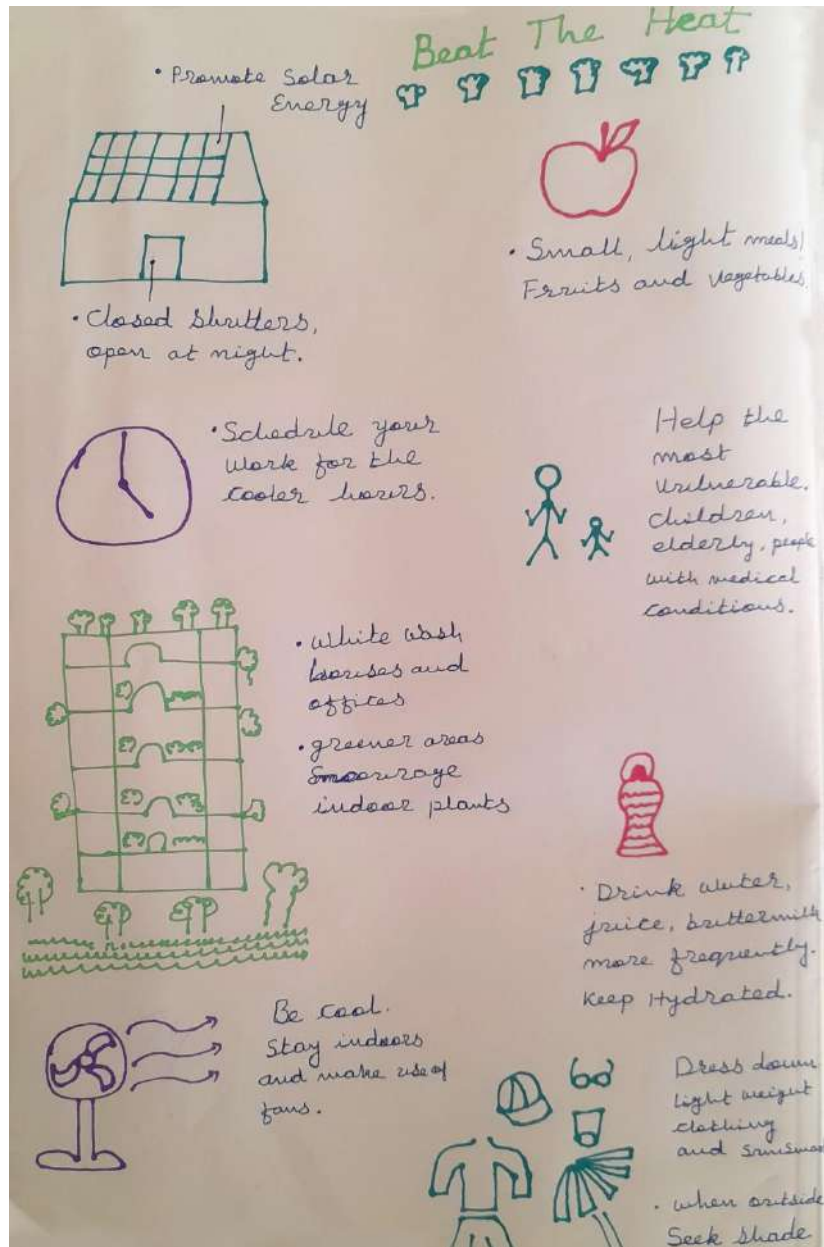
Heat Wave: Risk, Adaptation and Mitigation at AIDMI

By Vishal Pathak, AIDMI, India

AIDMI is determined to swiftly push for heat wave adaptation and mitigation in all of its work in India. Higher daily peak temperatures and longer, more intense heat waves are becoming increasingly frequent global phenomena due to climate change. Heat waves are periods of abnormally high temperatures, which usually occur in India between March to June, and sometimes even extend till July. They are major public health hazards, resulting in dehydration, heat cramps, exhaustion, heat strokes and even death for those affected. In addition, extreme heat can cause a number of ecological, environmental, health and economic losses. (IPCC, 2012)

After a deadly heat wave hit the city of Ahmedabad in May 2010, the Ahmedabad Municipal Corporation (AMC) developed a comprehensive 'Heat Action Plan' (HAP) for extreme heat events—the first government body in an Indian city to do so. (Hess, 2018)

HAP has sparked tangible change. Since 2010, the AMC, education and health institutions, and the city's inhabitants are collectively working to improve public health infrastructure in response to heat wave events. For example, ambulance services are now located strategically in places where many calls for help during heat waves are issued. Hospitals receive warnings when extreme temperatures are forecast and now have extra ice packs on hand. With the help of Civil Society Organisations (CSOs), drinking water stations and awareness-building materials are distributed throughout Ahmedabad



during extreme heat. An estimated 1,190 deaths have been averted every year in Ahmedabad as a result of HAP (Hess et al., 2018).

There is a growing need to set up adaptation and mitigation initiatives to increase community resilience against heat waves. The Heat Action Plan aims to achieve this need

through four key strategies. These include building public awareness and community outreach, initiating an early warning system and inter-agency coordination, enhancing capacity building among health care professionals, and reducing heat exposure to promote successful adaptive measures.

Community assets such as bus and railway stations, public schools and colleges, childcare centres, public markets, civil hospitals and clinics must provide access to safe drinking water facilities, contain greenery, and be roofed. The roof of these public assets must be white. Furthermore, coordinated action between government departments and CSOs at the municipal level is crucial to reduce the devastating health effects of heat stress on the local population. In Ahmedabad, the demand of electricity is constantly increasing in summer. This demand needs to be diverted to clean energy, such as wind and solar. However, the state government must subsidise these sources of energy to make them affordable options for all citizens. A practical heat action plan consisting of targeted policy interventions can increase information-sharing, communication, preparedness, and response coordination to enhance responsiveness to rising temperatures. For better protection against the deadly effects of heat waves for those who are most vulnerable in Ahmedabad, the following steps can be useful:

- Changing the timings of schools to better protect students and teachers.
- Increasing access to safe drinking water in vulnerable areas to prevent dehydration of inhabitants.
- Informing children on the importance of drinking water continuously in such weather events owing to their vulnerability.
- Conducting accessible and community-led awareness campaigns. Such campaigns need to be user friendly to enable all members of society--including those who are illiterate- to be better informed

on adaptation practices. The featured sketch in this article 'Beat The Heat' presents a simple way to make a poster more accessible through iconography.

- Protecting occupationally at-risk workers. Authorities must enable the provision of cool water to workers exposed to intense heat, and implement policies to shift their work timings to cooler hours. Furthermore, city authorities must train and educate at-risk workers and their employers regarding the appropriate actionable measures against heat related illnesses.
- Promoting micro-level planning and assessment in tandem with city planning. This is important to ensure tailored policies are designed for vulnerable groups - particularly people living in slum areas, laborers, children, senior citizens and pregnant women.

The heat contingency plan is a valuable tool that can strengthen the preparedness of health institutions in order to better respond to the number of heat related diseases. Cities across the world have protected citizens with a wide range of measures such as tree plantation on city roads for shade, enforcing building bylaws for overhangs to shade walls and windows, and increasing protective structures for individuals on duty such as the traffic police or street cleaners. Such measures have been undertaken in Ahmedabad, but at a much smaller scale than the heat wave challenge demands.

A disaster provides the opportunity to build back better. The responsibility is on us to turn this ongoing and increasing loss of life and livelihoods into a consolidated

strategy for heat wave preparedness that not only reduces the impact of heat waves, but also proactively protects citizens in an equitable manner.

Frontiers for AIDMI Heat Wave Action

What are the frontiers for heat wave action? From AIDMI's ongoing work on extreme heat the following key areas emerge:

- Supporting heat wave related public allocations based on performance.
- Helping local recovery through heat wave management and mitigation measures.
- Engaging women to be heat wave protection leaders, and helping them make a home-based living out of heat wave protection plans.
- Increasing the coverage of heat wave affected workers in the informal sector in urban areas.
- Integrating heat wave protection measures with social protection measures for all women and workers.
- Supporting heat wave adaptation and heat wave mitigation across urban India.

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Pivots for Heat Resilience

By *Dr. Aditya V. Bahadur*, Principal Researcher and Member of the Secretariat Adaptation Research Alliance, International Institute for Environment and Development, UK

Climate models demonstrate a remarkable convergence when it comes to alarming projections on heat. Extreme heat is becoming a visceral reminder that the impacts of climate change are being tangibly felt today. Due to their peculiar geomorphological characteristics, towns and cities are particularly badly affected. To effectively ameliorate risk from this hazard for the world's burgeoning urban population, we need to change how we conceptualise urban resilience.

First, we need to embrace new approaches for acquiring and analysing data on when and how cities are likely to be impacted by extreme heat. Unlike non-urban areas, temperatures in cities can vary street by street, block by block. The height of buildings, amount of greenery and the length of reflective surfaces all have a mediating impact on heat. Therefore, while some neighbourhoods might not be experiencing extreme temperatures, others might be. To account for such complexities, we need to embrace 'big data' approaches. One such approach is currently being tested in the USA. The innovation tracks battery temperature data from the cell phones of 500,000 city dwellers across the country. It then employs an algorithm (developed through real-world calibration) to convert this battery temperature into air temperature information (Overeem et al., 2013). Through this, it is now possible to have very precise temperature readings for urban areas, which permits authorities to target resources for tackling heat waves more effectively. This is just one example from a plethora of cost

effective and decision friendly approaches that draw on big data for informing resilience decisions.

Second, no approach to tackling heat will be effective unless we engage with vulnerable urban communities meaningfully. Low-income urban dwellers are perhaps the worst affected demographic. We must recognise that putting them in the driving seat of decision making processes is critical to finding the right solutions to tackle the adverse impact of heat waves. We must draw on their knowledge by ensuring that, for example, 'Heat Action Plans' are not purely the product of experts and their expertise but emerge from collaboration and co-creation with the urban poor who are on the frontlines of this risk. We must recognise that including community members in taskforces, response teams and other institutions for tackling heat will ensure a greater degree of trust between the authorities and vulnerable populations to deliver purposeful solutions. Similarly, we must recognise that cities of tomorrow in the Global South will be built by semi-trained, informal builders and artisans, and not expert architects. Therefore, training this group of informal professionals in techniques of cooler, greener buildings will be a more judicious course of policy action as opposed to the current focus on building the capacity of formal actors.

Finally, cities of the Global South will need to generate additional resources to not only offset the financial harm that heat waves will wreak on urban economies, but also

enforce measures to mitigate their damage to ecology and public health. Current sources of finance – namely international climate funds – are slow, static and pose high barriers to accessibility for city governments. Instead, we need a new suite of innovative finance mechanisms that will arms cities with fast, flexible, and effective finance for tackling heat, such as the Municipal Resilience Bonds (Gorelick, 2018). These have been used effectively by cities such as Cape Town to tackle water stress. While there are no legal or administrative impediments for cities in India to issue these funds, city authorities face infrastructural challenges in seeing a return on investment. A sustained initiative to build the capacity to issue these bonds and employ the proceeds in actions to tackle heat will surely deliver rich dividends.

In this regard, shifts are needed across the domains of data, community engagement and financing to ensure that vulnerable people in cities across the Global South can be effectively resilient against the exigencies of extreme heat.

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Response to Heat Waves in India

By Saji Varghese, Head, Emergency Relief, HEA Department, World Vision India, Tamil Nadu, India

South Asia has been experiencing very high temperatures in the recent past, leading to many deaths. India too has experienced increased instances of heat waves which are more intense in nature with each passing year. The monsoons have become unpredictable, and the country has witnessed drought persistently. The compromised adequacy and quality of food, nutrition, drinking water, health services, and fodder for animals is visible in rural areas. Small and marginal farmers are unable to pay off their mounting crop debts due to recurring crop failure resulting from adverse heat. The poor in the rural areas are the worst affected.

In light of these grave trends, the work of [World Vision India \(WVI\)](#) is especially pertinent. WVI is present in more than 120 districts across the country through Development Programmes working with the rural and urban poor. In all our programmes, we ensure that

communities are empowered to deal with disaster through **preparedness** and **emergency relief**. In the past 15 years, WVI has responded to heat waves in the states of Madhya Pradesh, Rajasthan, Maharashtra and Tamil Nadu. It has a track record of supporting heat wave adaptation in the regions of Bundelkhand, Vidharbha and Marathwada.

1. Preparedness

WVI has a two-pronged approach in preparing to deal with disasters and external shocks – community preparedness and organisational preparedness.

Community Preparedness

Disaster Risk Assessment: In collaboration with communities, WVI conducts disaster-risk assessments and trains community members to identify and respond to all risks that they are prone to. The assessment of their capacity and vulnerability is closely linked to

heat-wave preparedness and mitigation.

Community Preparedness Plan: WVI facilitates the creation of 'Community Preparedness Plans' documents a seasonal calendar, and the capacities and vulnerabilities of the communities in their vernacular. Through training programmes and forward linkages with the local administration, WVI enhances community capacity.

Task forces: WVI creates different task forces according to team members' personal aptitude and skills on first aid and early-warning, so that they can take responsibility for their communities and are linked to an institution of support such as the village Panchayat. WVI sends early warning alerts and necessary precautions to these task forces, who are activated and engaged through relief and recovery, working in tandem with the Panchayat.

Projects to Mitigate Risks: WVI has also worked with high risk communities to strengthen their capacity to adapt to drought and heat waves through:

Climate smart agricultural projects: These projects empower small and marginal farmers to take up mixed farming with organic-farming methods through training and handholding.

Farmer Managed Natural Regeneration (FMNR): WVI facilitates the sensitisation and training of faith-based and community leaders as well as the youth on the need for planting trees in schools, 'ICDS' farmlands and FMNR plots. WVI



also trains farmers on drip irrigation, compost making and agroforestry.

Integrated Watershed management: WVI promotes watershed management techniques that help in the sustainable conservation of ground water.

Organisational Preparedness

Emergency Reserve fund: WVI has a special reserve fund to deploy during unprecedented disasters without waiting for donors/ grants. This helps in a timely and relevant response. Besides this, WVI also has pre-approved 20% of its development budget for emergencies.

WV Disaster Management Team:

WVI has a Disaster Management Team that is a select group of 70 experienced and skilled staff members who provide professional leadership in child-focused disaster management and resilience building across the country.

National Disaster Preparedness Plan:

WVI has mapped all affected communities for all major disasters, enabling the organisation to be prepared for all seasons.

Engagement with IAG/ SPHERE India/ likeminded agencies: WVI is part of state and national level forums of likeminded agencies, academia, civil societies, and other bodies to be prepared to respond in times of disaster. It has provided leadership in joint assessments and planning in the states of Tamil Nadu, Bihar, Uttar Pradesh and Maharashtra.

2. Emergency Relief

Household level assistance: WVI has worked with the village panchayats for identifying the most vulnerable households who need support.

Food Items: WVI has supplied dry ration worth 15 days to the vulnerable poor so that they do not have to venture out for livelihood activities during extreme heat waves.

Drinking water: Additionally, WVI has provided drinking water through tankers, frequently in collaboration with local panchayats. It has also ensured that households have access to a minimum quantity of 20 litres per person per day.

Water storage tanks: WVI has provided the equivalent volume of

200 litres of water in the form of containers for families.

Cattle: WVI has also supported families through providing fodder and water for cattle during heat waves. At places it has also provided cattle sheds and organised veterinary camps.

For better management of heat waves in the future, WVI recommends establishing timely early warning systems on extreme weather conditions and strengthening primary health systems to provide basic healthcare support during emergencies. It also advocates for integrated watershed management as a people's movement. This movement should not only recharge ground water aquifers, but also promote the regeneration of degraded lands.

Furthermore, WVI advocates that industries should seriously adopt long-term efforts of climate change mitigation in the form of reducing greenhouse gas emissions and switching to clean energy and cleaner technologies as per government directives. ■

RESOURCES

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By Maj Gen Alok Raj, PVSM, AVSM, (Retd), India

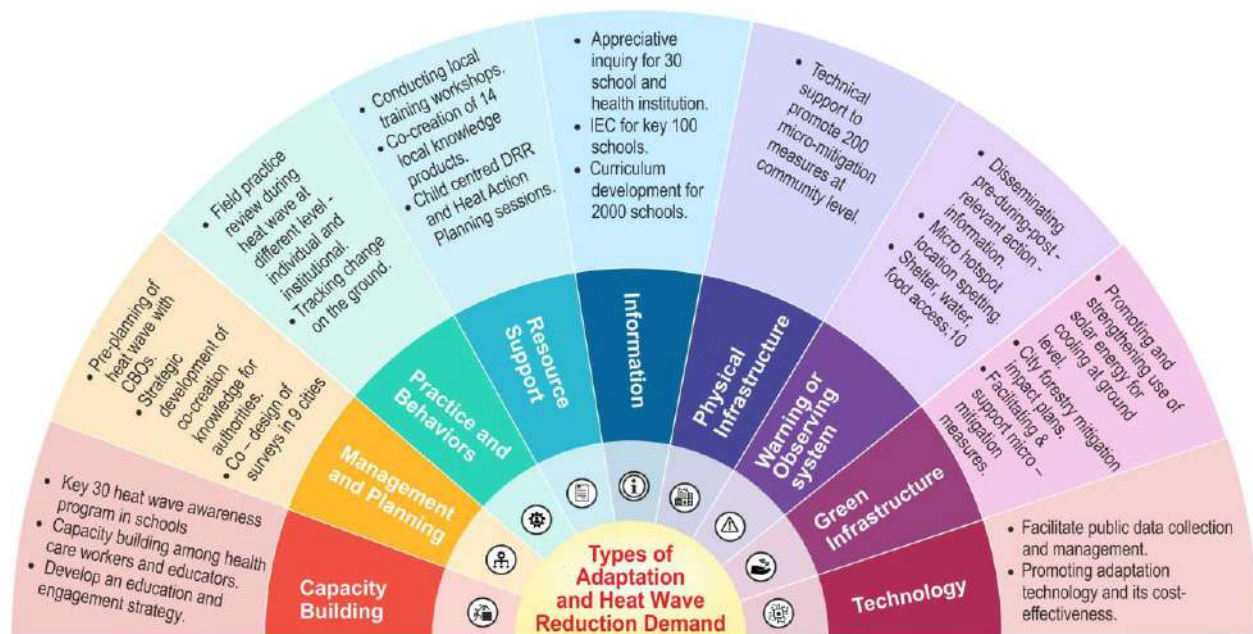
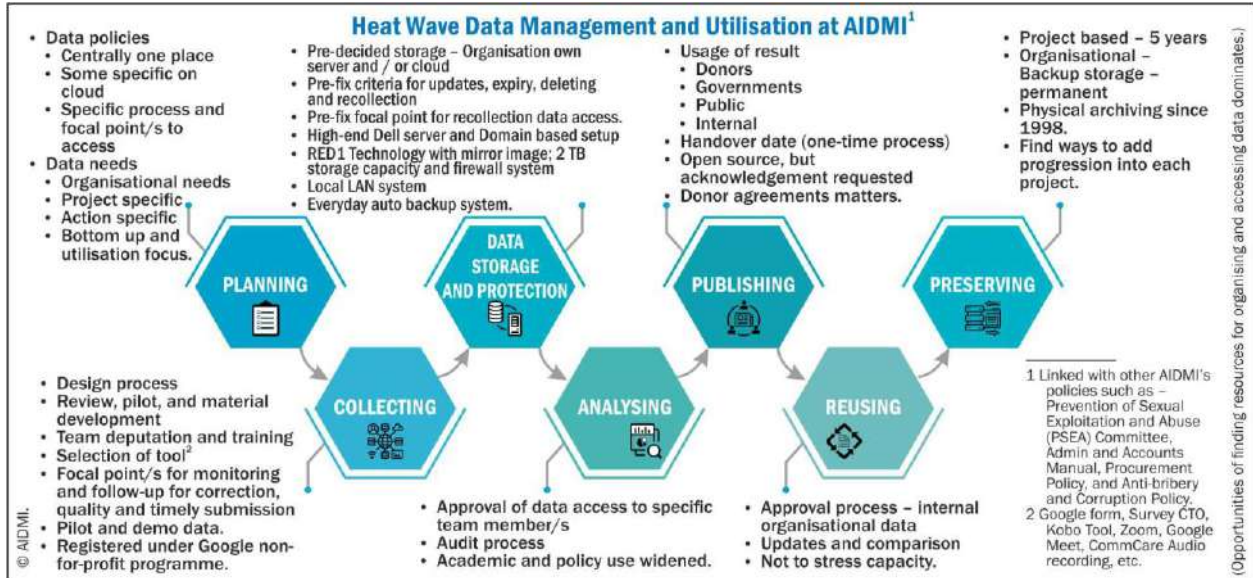
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Data and Demand: Heat Wave Work by AIDMI

By AIDMI

Over the past two decades, AIDMI has experienced a sharp rise in the demand for designing and implementing heat wave adaptation and mitigation related policies from local public, private, and civil society organisations. The following two infographics demonstrate our approach to meet this demand:



AIDMI has discovered that the best learning lessons for heat wave mitigation come from at-risk communities and their adaptation. As a result, AIDMI created a cross-regional dialogue across sectors and geographies, exposing different vulnerable communities to adaptation measures and practices of other affected peoples in the hope of generating novel yet locally tailored practices. One such innovation came from Aurangabad district in Maharashtra. Two families with different “know-hows” in cooling roofs and making walls heat-resistant mutually benefited from combining their adaptation strategies. Learning from this innovation, AIDMI is developing a local heat wave adaptation measure dictionary by and for heat wave affected families across India incorporating a “combination and multiplication” approach of strategies. We welcome any interest in joining this effort. ■

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