

Extreme Heat Adaptation and Mitigation Programming: Lessons from the Affected Population



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Extreme Heat: Key Lessons

Mihir R. Bhatt interviewed by Manish Patel, AIDMI, India

MP What kind of heat data do NDMA and SDMA release and what is the frequency - what are the issues there?

MRB National Disaster Management Authority (NDMA) and State Disaster Management Authorities (SDMA) share warning data. More and more, over the years, data is shared including data on extreme heat early warnings, loss of life, response needs, and a lot of guidance notes and frameworks such as how to make a Heat Action Plan. There are challenges in focusing the heat data on key user needs; up-to-date; and far more areas such as heat impact data can be shared with the public as we have learned over the years. The Indian Meteorological Department (IMD) issues warnings based on the increase in average temperatures. Recently, they have also added the parameter of warm nights to their warnings. IMD did an excellent job of reducing the impact of extreme heat on the election process and voters. To enhance heatwave preparedness, the NDMA should prioritise the dissemination of user-focused, real-time heat impact data, including health impacts, economic losses, and vulnerability assessments, alongside existing warning and response information. This will enable more informed decision-making and targeted interventions by all, as we have learned.

MP What are some of the most concerning things about these heat datasets?

MRB First, the datasets are often scattered and therefore do not help build coherence that is useful for extreme heat action. Secondly, data is not harmonised with other departments such as agriculture or irrigation in a deeper way yet. Thirdly, the data is not updated from time-to-time or event to event to make data useful over time as we have learned for the 2023 and 2024 summers. Additionally, there is a discrepancy in recording heatwave deaths. Only cases of exertional heatstroke (which accounts for 10% of total deaths) are recorded, while cases of non-exertional heatstroke (which accounts for 90% of deaths) are not recorded. To improve data utility for heatwave action, the NDMA should lead the development of a centralised, co-created, interoperable heat information platform. This platform should integrate data from relevant sectors, and levels, including health, agriculture, and meteorology, ensuring data is standardised, updated regularly, and reflects a comprehensive understanding of heatwave impacts, including both exertional and non-exertional heatstroke mortality, as we have learned.

MP What are some recent examples of extreme heat warning systems under disaster conditions?

MRB India has one of the largest and multi-level multi-sector early warning systems covering extreme events such as Cyclone *Tauktae*. India Meteorological Department (IMD) leads this forecasting well. *Tauktae* was a turning point in terms of the warning system and how it can work and does work. This effectiveness in forecasting cyclones can also be applied to becoming more and more accurate in terms of extreme heat in India's hill, delta, coastal, desert cities, and other areas. The IMD has also been prompt in issuing heatwave warnings. In April 2024, IMD had correctly predicted and warned that 2024 would breach all previous temperature records and emerge as the warmest year on record with a lot of heatwave days. Building on the success of cyclone warning systems, the IMD should prioritise developing equally robust, location-specific extreme heat early warning systems (EHEW system). These systems should provide timely, actionable alerts tailored to the unique vulnerabilities of India's diverse geographic regions, including hill areas, deltas, coastal regions, and deserts, as we have learned.

MP And what were the extreme heat damages like?

MRB Damages per se have been hugely reduced due to the early evacuation of people, animals, and the protection of assets. India's early warning system covers the Indian coastline well now and cyclone-related mortality has come down by over 90% by official sources. And cyclone *Biparjoy* had no death! And this is a point to celebrate. AIDMI's work on innovation and research finds a reduction in the number of deaths is worth further study mainly in terms of loss and damage due to extreme heat in urban and rural areas. Extreme heat also has a detrimental impact on the economy and agriculture value chain. Farmers' yields of various crops and their quality are adversely affected by the extreme heat. Similarly, the number of working hours lost in extreme heat causes a sharp reduction in the GDP. Massive load shedding during the hot summer months also leads to a decrease in productivity. The ILO also estimated that by 2023, India will lose out on approximately 5% of its GDP due to the challenges of excessive heat. (under 1.5OC global warming scenario). Recognising the significant economic and agricultural impacts of extreme heat, the National Disaster Management Authority should collaborate with research institutions like AIDMI and many others to quantify heat-related losses. This data will

be crucial for advocating for increased investment in heatwave preparedness and adaptation measures.

MP **Would it be any less if we had extreme heat warnings in time?**

MRB Yes. Timeliness of early warning and targeting the last mile and last person will help maintain a zero death trend not only in cyclone hazards but also can be achieved in floods and heatwaves in 2025. Timeliness of warnings and adequate preparedness measures will also help in shielding against the loss and damage of heatwaves on the various sectors of the economy. To achieve a zero-death trend for heatwaves, the National Disaster Management Authority should prioritise the timely dissemination of extreme heat warnings, ensuring they reach vulnerable communities and individuals. This requires strengthening last-mile communication channels and implementing targeted preparedness measures.

MP **Do we have enough warning systems for flooding or landslides - how effective are they?**

MRB IMD is doing a good job on early flood warnings in terms of the level of flooding, the area that will be flooded, and time. What is needed is an anticipatory warning to individuals and assets at risk of flooding. More work on this is coming up in Kerala, Bihar, and Assam at the state level, AIDMI has learned. In terms of landslides, scientists at the Geological Survey of India (GSI), a scientific agency established under the Ministry of Mines to conduct geological surveys and studies of India, in collaboration with the British Geological Survey, have been evaluating a prototype to predict landslides in the Darjeeling district of West Bengal and the Nilgiris in Tamil Nadu. If the model proves successful, it is likely to be deployed in some parts of India as early as 2025. To enhance flood warning effectiveness, the IMD should collaborate with state governments and city authorities to develop and implement anticipatory warning systems that is not only up-to-date but ahead of the rest of the world. These systems should provide actionable information to at-risk individuals and communities, enabling timely evacuation and asset protection.

MP **What groups are the most vulnerable and Are there structures of compensation?**

MRB AIDMI has learned that a direct focus on women; children; Adivasi, minorities, and migrant labour on early warning, preparedness investment, and recovery is needed. AIDMI is demanding a revision of compensation in terms of the amount of money, time, schedule, and conditionality to reach the target individual and achieve the targeted impact. Recognising the disproportionate impact of disasters on vulnerable groups, the National Disaster Management Authority should prioritise these

groups in all aspects of disaster risk reduction. This includes tailoring early warnings, increasing preparedness investments, and revising compensation structures to ensure timely and equitable support reaches those most in need.

MP **What is the law and policy situation around extreme heat risk and disaster management?**

MRB We have learned that India has a remarkable National Disaster Management Act (recently updated) which is becoming more and more effective. For example, as per the Act, all states of India have a disaster management plan. As per the Act India's Finance Commission has allocated US\$ 28.6 billion for the central and state governments for the next five years but it is yet to be detailed out how this money will be spent, most specifically for extreme heat. So we have a plan and a budget for it to manage disasters including extreme heat if we contextualise the budget as soon as possible. As of now, Heatwave is not notified as a disaster in the 12 disasters eligible for mitigation and relief under the National and State Disaster Risk Management Funds (N/SDRMFs). It is crucial to review this decision through an expert committee based on the emerging science and experience of implementing Heat Action Plans (HAPs). To ensure adequate funding for heatwave risk reduction, the Ministry of Home Affairs should explicitly designate heatwaves as a disaster eligible for mitigation and relief funding under the National and State Disaster Risk Management Funds. This will enable the targeted allocation of resources and support the implementation of Heat Action Plans.

MP **What are the two most important things that need to be done in extremely heated urban areas such as Delhi?**

MRB AIDMI's recent work on extreme heat in cities across India shows that each city or town must have a City Disaster Management Plan with extreme heat actions included in it. This is one. And two, AIDMI work has found that each plan must now have suitable and sustainable budget allocations to take local effective cooling actions - adaptation and mitigation - in partnership with citizens. Integrate heat resilience into urban planning and development policies, with a focus on reducing urban heat island effects and improving thermal comfort in low-income neighbourhoods and informal settlements. This may include measures such as increasing green spaces, using cool pavements and roofs, and improving building insulation and ventilation. To enhance heat resilience in urban areas like Delhi, municipal corporations should develop and implement city-specific Heat Action Plans integrated into comprehensive City Disaster Management Plans. These plans must include dedicated budget allocations for sustainable cooling measures, prioritising low-income and informal settlements, as we have learned. ■

એમાં ધગી ગ્યા તમે આટલા?

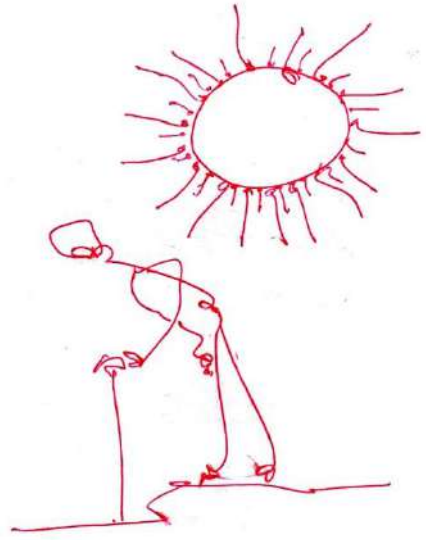
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એમાં ધગી ગ્યા તમે આટલા?
બખ્ખોરી વેળાં ને લીમડાનો છાંયો ને ઝોકે ચડેલા બે'ક ખાટલા!
એમાં ધગી ગ્યા તમે આટલા?

ભલભલી ભીંતુના પરસેવા છૂટ્યાં પણ પાંદડીયુ લીલી ઇ લીલી
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શીશમના પડછયાં તગારે તગારે ઓલીપા ઠાલવે છે લૂ
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આંબાની ડાળીયુ પર વાગે શરણાઈ અને પાંપણમાં ટહૂકા અંજાય
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વૈશાખે રોપાતા મંડપમાં મ્હાલવા તો આવે બાજોઠ અને પાટલા
એમાં ધગી ગ્યા તમે આટલા?

કૃષ્ણ દવે, તા-22-5-2024



"Extreme heat is having an extreme impact on people and planet. The world must rise to the challenge of rising temperatures."

ANTÓNIO GUTERRES, United Nations Secretary-General (25 July 2024)

"Extreme heat will cost us our planet if we do not act now to move to cooler ways of living with each other and nature before next summer."

A construction labour in Ahmedabad city



Lessons from NRDC Partners: Top Three Lessons

By *Dr. Vijay Limaye, Senior Scientist and Director, Applied Research Initiatives, Science Office & International, Natural Resources Defense Council (NRDC)*

NRDC India advises and provides solutions to organisations that are seeking to advance national and global climate goals through community-based solutions that prioritise public health and equity, create jobs, and boost resilience. Through our work with local officials and community partners on city-level Heat Action Plans (HAPs), NRDC works to improve preparedness and reduce the health harms of extreme heat in India. Below, we share three lessons from our work in this area:

Lesson 1: Heat Interventions Should Prioritise Vulnerable Populations

While the HAP approach has expanded rapidly across India, these plans can still be strengthened to better protect human health. In a recent assessment, about 95% of Indian HAPs analysed lacked vulnerability assessments that could help authorities to efficiently allocate limited resources. Such assessments typically include consideration of

three pillars: heat exposures, population vulnerabilities to heat that elevate risks in certain groups, and adaptive capacity resources that individuals and communities can access to reduce risks. Mapping of how these three factors overlap, for example as developed by NRDC India and Mahila Housing Trust (MHT) in Jodhpur's HAP, can illuminate compounding risks and inform interventions at the ward-level, providing communities and policymakers with a clearer picture of the problem and ways to address it.

Lesson 2: Data and Evidence Can Guide Effective Interventions

Heat preparedness actions are urgently needed, as are efforts to evaluate how these actions are benefiting public health. Ahmedabad's HAP, the first launched in South Asia, is one of just a handful of heat plans worldwide to be evaluated for health effects. By comparing citywide summertime

death rates before and after the HAP was implemented in 2013, a team of Indian and American researchers found that the plan helped Ahmedabad to achieve a reduced death rate on hot days, with more than 1100 deaths avoided each year post-HAP launch. Experts also found that mortality rates on the hottest days (at or above 45°C daily maximum temperature) dropped by 27% after the HAP was implemented, relative to pre-HAP years. With many more adaptation projects now being launched in India, the US, and internationally, attention to monitoring and evaluation is crucial.

Lesson 3: Careful Planning and Governance Mechanisms Are Crucial

As the impacts of climate change become more obvious on the ground, stronger coordination amongst government, civil society, and academics is needed to strengthen planning, preparedness, and governance. To advance this dialogue, India's National Disaster Management Authority (NDMA) has led annual discussions on improving preparedness ahead of the most intense phase of the annual heat season. In addition to these local efforts, effective HAP implementation also requires local and state governments to actively engage in dialogue with NDMA to identify, refine, and scale up best practices. The discussions facilitated by NDMA's convenings help to frame the urgent work of heat season readiness within the larger challenge of accelerating action to deliver improved heat protections for vulnerable populations in India over the long term. ■



Workers are exposed to direct sun at noon. "Rising Temperatures, Deadly Threat".

Photo Credit NRDC.
<https://www.nrdc.org/sites/default/files/india-heat-outdoor-workers-1B.pdf>

Shelter Lessons from Heatwave Affected Population: Top Three Lessons

By *Rajneesh Sareen*, Programme Director, Sustainable Habitat Programme, Centre for Science and Environment, New Delhi, India

The rising episodes of heatwaves are placing an enormous public health threat on the population of India by pushing them out of thermal comfort. The sixth assessment report of the International Panel for Climate Change 2022 points to the fact that heat stress will rise so much that a third of the global population will live outside thermal comfort, beyond adaptive capacity by 2070.¹

The recent heatwave stifling north India conveys that this public health threat is looming closer while maximum temperatures remained above 45°C in the states of Haryana, Delhi, Rajasthan and Uttar Pradesh.²

Unfortunately, there is no mechanism or measure in place that protects or prepares the people from extreme heat, let alone the vulnerable groups. Cities at the moment are only taking ad hoc measures. For instance, Kolkata has planned cool cabins which are glass cabins fitted with air conditioning and placed in public areas. With only a handful of these cabins operational, this strategy has already failed in one of the largest urban centres of India.³ This shows that cities need something more grounded and effective in the long term.

Heat stress does not affect everyone in the same way. While the elderly and children are more vulnerable to heat, the poor, especially those who



Photo Credit: Habitat Programme, CSE India.

work outdoors are more vulnerable to the rising heat. Heat-trapping material used in informal settlements like roofs made of tin, tarpauline and galvanized iron sheets combined with prolonged exposure to the sun leads to high vulnerability of the poor.

An analysis by the Centre for Science and Environment (CSE) revealed that 75 per cent of slum dwellers are living in the most heat stressed areas in Kolkata. This calls for appropriate mitigation measures with a priority to the shelter of the vulnerable population.

India Cooling Action Plan was launched in 2019 to enable thermal comfort for all. It aims at providing thermally comfortable housing to the poor by adopting Eco Niwas Samhita 2018 – the Energy conservation buildings code for residential

buildings. Other than this, the National Building Code 2016 also suggests temperatures for cities at which adaptive comfort can be achieved. Overall, research has brought a few considerations for designing housing:

Climate Responsive Design

Building envelopes should be designed such that they respond to the movement of the sun and harness the effect of natural wind. The east and west façade of the house should be fortified so as to not allow the harsh sun in. Staircases and storage areas are a few such options. While the southern façade faces the sun, appropriate shading devices or chajjas can allow the warm winter sun and block the harsh summer sun. Similarly, there are many passive design techniques that can enable buildings indoors to remain cool or

¹ https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter08.pdf

² <https://www.thehindu.com/news/national/swathes-of-north-india-reel-from-severe-heatwave-conditions-delhis-najafgarh-hottest-in-country/article68198588.ece>

³ <https://www.deccanherald.com/india/fatal-heat-waves-are-testing-indias-ability-to-protect-140-crore-people-3026690>

cut down a few degrees on the Celsius scale.

Compliance with Emerging Codes

Eco Niwas Samhita 2018 lays focus on the insulating property of materials known as thermal transmittance value (or U-value). This parameter combined with a few others gives the residential envelope transmittance value (RETV) of the building as part of the code. RETV of residential buildings must be below 15 Watts per sqm (W/sqm). However, a CSE study found that most of the affordable housing is

currently achieving RETV between 15 and 18 W/sqm.⁴ New affordable housing must focus on complying to the Eco Niwas Samhita 2018.

Traditional Wisdom, Modern Use

The role of materials in providing thermal comfort has become more important than ever before. The use of mud, cob, thatch and bamboo is quite popular in India to make houses that can withstand harsh temperatures. Architects have hybridised these materials by using them in walls and adding strength to the structure through a reinforced

concrete cement frame. Such techniques can substantially lower the indoor temperatures.

Other than this, cool roofs made of terracotta tiles or brick bat coba have been used traditionally to prevent heat ingress from the roof. Broken tile chips reflect the sun and reduce the surface temperature by a few degrees. Reflective paints are becoming a popular quick solution to do the same. Green roofs that are partially or completely covered with vegetation can also bring respite from heat. ■

HEAT STRESS ADAPTATION

Exploring the Role of Community Commons in Heat Stress Adaptation

By Dr. Anjali Karol Mohan, Consulting Urban and Regional Planner; Partner at Integrated Design, Bangalore, India

Climate change presents an imminent threat to our planet with urban areas bearing the harshest impacts of extreme weather events like heat stress, droughts and or flooding. In a context where rapid urbanisation, primarily in low- and middle-income countries, is accompanied by a rapid proliferation of informal settlements (IPCC, 5th Assessment Report), it is the poor and the marginalised who are impacted disproportionately. The crisis is inherently unjust as often these communities are left to cope with these events without support, relying on informally derived coping strategies and capacities (Mohan et al 2022). Even as cities gear themselves to plan and implement climate action, the focus remains on mitigation. Steered by international narratives and national policy directives, mitigative actions aiming at GHG reduction remain the dominant narrative in these plans. Owing to the context-specific nature

of adaptation strategies and lack of quantifiable targets (as opposed to mitigation targets like net-zero GHG emissions by 2075), adaptation strategies, particularly aiming to assist the poor and the marginalised are often glossed over or at best assume a second priority. Yet, there is an urgent need to focus on contextual adaptation strategies that go beyond short-term reactive and or knee-jerk reactions.

With the onset of summer, Indian cities are experiencing record-high temperatures (Business Standard, 2024). While the government health and disaster advisories advocate for increased water consumption and staying indoors, research and innovation in building envelope insulation exploring active and passive cooling technologies and thermal insulation methods is also gaining traction. However, there exists a critical gap - a lack of focus on outdoor spaces like streets,

courtyards and open areas, also referred to as community commons. This gap is glaring in urban poor settlements where the paucity of private space, necessitates the usage of these commons as extensions of the house. The commons in effect aid everyday living - cooking, cleaning, bathing and even sleeping - and livelihoods - livestock rearing, tailoring, vending, and storage - amongst others. Yet, increasing population and densification, increased construction and concretisation (as part of redevelopment efforts) and commensurate loss of vegetation make the usage of these spaces challenging. Thus, rendering these spaces adaptive is critical for immediate gains while achieving long-term goals of social justice.

Drawing upon our action research across multiple Indian cities, we establish community commons as socially just and adaptive spaces

⁴ <https://www.cseindia.org/guidelines-for-affordable-housing-in-telangana-11116>

(Mohan et al. 2020). Exploring the usage and functionality of the commons and, the coping mechanisms to deal with heat stress allowed for co-producing (through multi-stakeholder participation involving communities and non-governmental organisations) adaptation strategies critical to aid everyday living and livelihoods. Focusing largely on passive technologies, several Nature-based Solutions were arrived at. These include detention ponds to trap pollutants, green buffers along the selected streets; vegetative islands, food forests, previous roads, and installing shaded trellis amongst others. The overall objective was to render commons as transformative spaces in building resilient communities (Refer to Figure 1 below)

Further, multi-stakeholder workshops were organised with the state as an important stakeholder where efforts were made to institutionalise these strategies within formal city climate action plans. The need for sharing platforms and continuous deliberations emerged as critical in breaking the power hierarchies between the state and community while ushering in accountability measures (Mohan and Muraleedharan 2024).

References:

1. Business Standard. (2024, May 26). *Intense heatwave: 37 cities record temperatures over 45 degrees Celsius.* @Bsindia; Business Standard. <https://www.business-standard.com/india-news/intense-heatwave-37-cities-record-temperature-over-45->

degrees-celsius-124052600671_1.html

2. IPCC. (2014). 5th Assessment Report. In IPCC. IPCC. <https://www.ipcc.ch/report/ar5/syr/>
3. Mohan, A. K., & Muraleedharan, G. (2024). Exploring co-production in redirecting climate urbanism. *Climate and Development*, 1–19. <https://doi.org/10.1080/17565529.2024.2339249>
4. Suri, S. (2023). *It's time for climate justice- A Global South perspective on the fight against the climate crisis.* Orfonline.org. <https://www.orfonline.org/research/a-global-south-perspective-on-the-fight-against-the-climate-crisis>
5. Mohan, A. K., Muraleedharan, G., & Aristizabal, J. G. (2022). Socially Just and Adaptive Spaces. *Landscape*.



Figure 1 (1) Varying surface temperatures of different materials causing increased heat stress, (2) Multiple usage Commons: Janatha Colony, Bangalore, (3) Use of Green Sheets and Cloth as heat barriers: Nehru Colony, Bhopal. Source: Integrated Design.

Green Solutions for Programming Sustainable Heatwave Adaptation and Mitigation: Lessons from Coastal Bangladesh

By *Muhammad Taher*, Evaluation and Research Consultant, Bangladesh

In recent years, the coastal area of Bangladesh has seen a major increase in investments in the development of physical infrastructures and manufacturing industries. Large sea ports, special economic zones, and large power plants are being established one after another. At the same time, projects to build “resilient urban centres” (Municipalities) are being busy renovating and building new roads, embankments, cyclone shelters, buildings for different purposes, and water supply and drainage systems. While these initiatives are generally welcomed, technical specialists express their concerns regarding negative environmental impacts. They have been particularly critical of the massive pouring of concrete in

these areas, and the rising level of emissions from the factories and power plants. The combined effects of these are believed to be responsible for the increasing level of heat in the area, which has now started to claim human lives. According to one report, heat stroke claimed about ten lives in April 2024 alone when the temperature rose above 40 degrees Celsius. According to newspaper reports, over seventy per cent of the population of Bangladesh was affected by the heatwave (IFRC, 4 May 2024 in <https://reliefweb.int/disaster/ht-2024-000056-bgd>). The coastal region in the South of the country has experienced relatively higher increases in heat compared to other areas.

Programming orientation

Responding to these concerns, engineers and social development professionals have recommended ‘nature-based green solutions’ (NbS, in short). This approach helps people adopt climate-adaptive and environment-friendly development interventions that emphasise the creation of green space, the planting of trees, and the promotion of natural drainage into the urban environment. Bangladesh National Adaptation Plan (NAP, 2022) also calls for the expansion and conservation of green and blue infrastructure for the improvement of urban environments and drainage systems. It commits to undertake action research for developing and exploring the use of ecosystem-based



View from a coastal town showing an imposing installation for power generation.

adaptation and nature-based solutions.

Following on, the experts engaged in the development of coastal Municipalities in Bangladesh, emphasised different nature-based solutions to minimise the potential negative effects of the proposed physical infrastructures. Besides, they have a particular focus on building awareness about environmental safety, early warning systems, disaster risk reduction, and adaptive actions to fight the impacts of climate change. However, it is believed that many of the planning and policy documents do not elaborate on the details of what tools and means will enable them to achieve those objectives. The local government institutions (i.e., Municipalities) appear to be left with directions on “what to do but not how to do it”.

How to implement green solutions

Adaptation investments have traditionally favoured ‘hard’ or ‘grey’ infrastructures (referring to the pouring of concrete for infrastructure), which typically focus on a single or small range of purposes, such as embankments for a flood protection scheme. The new suggestions, however, includes NbS adaptation options which are believed to be two to five times more cost-effective than traditional ‘hard/grey’ infrastructure. The green-solution investments can provide a variety of benefits to society. Besides the reduction of impacts of floods, cyclones, and heat stress, they can additionally offer benefits such as, recreational opportunities, increased tourism, biodiversity conservation and better health. If a labour-intensive approach for the construction work is needed and adopted, the local

communities will have employment benefits. Vulnerable and marginalised groups will particularly benefit from NbS investments as they (green solutions) often reduce climate risks for indigenous peoples, women, the elderly, and people with disabilities. Community groups directly dependent on natural resources or those who are physically exposed to climate impacts may see many benefits in them. However, the diverse range of intangible benefits produced by this kind of actions are sometimes overlooked by policymakers. Community groups may also fail to fully appreciate the co-benefits generated by these ‘alternative’ approaches due to a lack of technical knowledge or lack of awareness about the far-reaching impacts of ‘green development’ process. ■

KEY LESSONS

Heatwave Adaptation and Mitigation Programming – Lessons from Vulnerable Populations

By *Kshitij Gupta, AIDMI, India*

Heatwaves have acquired catastrophic proportions in India. Several recent studies have revealed that over 90 per cent of India’s total land area is now categorised in the “extremely cautious” or “danger zone” concerning the increasing occurrence of heatwaves, primarily attributed to climate change.⁵ Moreover, the impact of heatwaves goes beyond human health, affecting economic

productivity, food security and increased water stress.

In 2024, all previous records have been broken by the intense heat. Between March and May 2024, almost 56 people died due to the extreme heat and there have been more than 25,000 cases of heat strokes being reported across the country.⁶ The situation is even more worrisome as the general elections are underway in the world’s largest

democracy. In India’s most populous state Uttar Pradesh, it has been reported that at least nine people involved in election duty have died due to suspected heatstroke and several others have fallen sick. This follows a similar pattern from the previous year where close to 150 people died due to heatwave-related illnesses and ailments.⁷

Perhaps the population groups most vulnerable to the adverse impacts of

⁵ Bardhan, R., Debnath, R., Gama, J., Vijay, U. (2020). REST framework: A modelling approach towards cooling energy stress mitigation plans for future cities in warming Global South. *Sustainable Cities and Societies*, 65, 102369. [DOI: 10.1016/j.scs.2020.102369] <https://doi.org/10.1016/j.scs.2020.102315>

⁶ Mishra, N. (2023, June 5). Heatwave: 56 related deaths reported in India from March to May; 25,000 heat stroke cases, Odisha 20 deaths in May. *Mint*. <https://www.livemint.com/news/india/heatwave-56-related-deaths-reported-in-india-from-march-to-may-25-000-heat-stroke-cases-odisha-20-deaths-in-may-11717401959354.html>

⁷ Indian Express. (2023, May 11). Deaths up in Ballia hospital as heatwave sweeps UP, MP. <https://indianexpress.com/about/heat-wave/>

heatwaves are the workers of the informal economy. Not only do they work out in the blistering heat without any social or physical protection, but they are often entrapped in a vicious cycle of poverty and deprivation whenever they suffer any disruption due to the extreme heat. The All India Disaster Mitigation Institute (AIDMI) recognised the elevated vulnerability levels of such workers and conducted a demand survey of heatwave mitigation actions in Lucknow, Uttar Pradesh.

This demand survey revealed a lot of useful lessons for heatwave adaptation and mitigation programming for promoting the welfare and protection of informal economy workers. Some of these lessons are discussed below.

The first lesson is to conduct comprehensive mapping exercises to identify the specific vulnerabilities and hotspots of informal sector workers in urban areas of India. This research should not only focus on geographic concentrations but also consider factors such as the nature of work, living conditions, access to essential services, and existing coping mechanisms.

The second lesson is the need for greater research on viable livelihood adaptation strategies for informal sector workers during heatwave events. This could involve investigating alternative income-generating activities, exploring the feasibility of temporary relocation or work schedule adjustments, and identifying sustainable cooling

solutions for outdoor work environments.

The third lesson is that developing and promoting affordable and sustainable cooling solutions tailored to the needs of informal sector workers is a critical action area. This could involve researching low-cost, eco-friendly cooling technologies, such as evaporative cooling systems, solar-powered fans, and insulation materials.

The fourth lesson is to promote climate-resilient infrastructure solutions in informal settlements and urban slums. This could include investigating the use of cool roofing materials, green infrastructure, and passive cooling techniques. Collaborative efforts involving urban planners, architects, and community members can lead to contextually relevant and sustainable solutions.

The fifth key lesson is to enhance heatwave early warning systems and ensuring their effective dissemination to informal sector workers is a crucial action area. Research is needed to understand the most effective communication channels, language barriers, and cultural factors that influence the uptake and response to heatwave advisories among this population.

By focusing on these lessons, the stakeholders can collectively address the multifaceted challenges posed by heatwaves to informal sector workers in urban locations across India. All in all, interdisciplinary collaborations, community engagement, and evidence-based interventions will be key to developing effective and sustainable solutions that enhance the resilience of these vulnerable communities. ■



A construction labourer working in the sweltering heat in Lucknow, Uttar Pradesh. Photo: AIDMI.

Lessons from South to North: Adaptation Measures by Heatwave Affected Population

By Md. Tahsinul Haque, Freelance Writer, BSS (Sociology), MSS (Sociology), University of Dhaka, Bangladesh

Climate change's worldwide effects are becoming more apparent as its spectre grows. Heatwave frequency and intensity increases are two of the phenomenon's most visible signs. Heatwaves, while traditionally associated with tropical regions, are increasingly a global phenomenon affecting populations in both the Global South and North. Against this context, people in the Global North can learn a lot from the adaptation tactics used by heatwave-affected populations in the Global South.

Understanding the Heatwave Crisis

Heatwaves seriously jeopardise ecosystems, agriculture, infrastructure, and human health. As temperatures soar to previously unheard-of heights, vulnerable

groups—the elderly, children, and those with pre-existing medical conditions—are especially prone to heat-related ailments including heatstroke, dehydration, and cardiovascular problems.

Lessons from the Global South

Recurrent heatwaves have long been a problem for countries in the Global South, including Bangladesh, India, and portions of Africa. Out of need, some areas have created adaptation strategies that use local knowledge and creative fixes to lessen the effects of intense heat.

Community-Based Adaptation

Resilience-building efforts in heatwave-prone regions now centre on community-based adaptation projects. Local communities have made use of their combined

knowledge to put into practice tactics including:

Water Management: Desalination facilities, pond sand filters and rainwater harvesting have been installed to guarantee the dependable availability of clean water, which is essential for cooling and hydration during heatwaves.

Land Use Planning: Food security has increased and livelihood possibilities have been broadened by adaptive land use practices, which include growing heat-tolerant crops like sweet potatoes and maize and turning agricultural areas into shrimp aquaculture fields.

Built Environment: Innovative home designs, such as cluster housing and flood-proof buildings,



A vehicle of the Dhaka North City Corporation sprays water along a busy road to lower the temperature amidst a heatwave. Photo: AFP

have been embraced to resist high temperatures and flooding, offering safety during heatwaves and other hydro-meteorological calamities.

GPI (Government Policies and Institutional) Support

Climate resilience is built and adaptation efforts are facilitated in large part by government policies. With an emphasis on areas susceptible to heatwaves, such as agriculture, water supply, and public health, Bangladesh's National Adaptation Programme of Action (NAPA) and Bangladesh Climate Change Strategy and Action Plan (BCCSAP) have offered the foundation for climate-resilient development.

Lessons for the Global North

Proactive adaptation measures are desperately needed in the Global North as heat waves become more frequent and severe in areas that are traditionally unaccustomed to such extremes. Several important lessons can be learned from the experiences of communities in the Global South.

Community Engagement: Giving local communities the authority to



Photo by Daily Kaler Kantho.

spearhead adaptation initiatives promotes ownership and guarantees sustainable and contextually appropriate solutions.

Multi-sectoral

Heatwaves have many effects, and addressing them requires a concerted effort from the health, infrastructure, urban planning, and agriculture industries.

Investment in Resilience: Putting early warning systems, social safety nets and climate-resilient infrastructure first can lower

vulnerability and improve adaptive capability.

Conclusion

As heatwaves become more and more of a concern worldwide, regional knowledge and experience sharing can improve adaptation plans and increase resilience. Communities in the Global North can handle the problems of a warming world and create a more sustainable future for coming generations by adopting the lessons from the Global South. ■



Heatwave Impacts on Small Businesses

by Nikeeta Prajapati, AIDMI, India

સખત ગરમીને કારણે ગ્રાહકોની સંખ્યામાં ઘટાડો અને ધંધાના કલાકોમાં ઘટાડો થાય છે. ધંધાનું આ નુકસાન ભરપાઈ થઈ શકે તેમ નથી. ઉનાળાના મહિનાઓ અને તેમાં પણ સખત ગરમીના દિવસોમાં 30% થી 40%ની આવક ઘટે છે અને ઘરખર્ચમાં પણ ઓછામાં ઓછો 30% જેટલો વધારો થાય છે. શરીરમાં અશક્તિ, માથાનો દુખાવો, અને ધંધાની ચિંતા રહ્યા કરે છે. ગરીબ પરિસ્થિતિમાં ધંધો બંધ કરી શકાય નહીં, પરંતુ હવે ઉનાળાના સખત ગરમીના દિવસો વધતાં બીજો ઉપાય નથી મળી રહ્યો.

- પાયલબેન બાબુભાઈ વાઘરી, અમદાવાદ.

Payal, a ready-made cloth seller from Ahmedabad raising issues of economic loss of business, and health issues due to heatwaves.

Heatwave in Asia: Agenda for Action

By *Habib Ur Rehman*, Climate Change Specialist for Asia, International Rescue Committee

Every year, hundreds of millions of people in South and Southeast Asia endure a relentless heatwave that forces school closures, disrupts agriculture, and heightens the risk of heat strokes and other health complications. This intense heat typically occurs in April and May, just before the region's annual summer monsoon brings much-needed rain to the parched soil.

A heatwave is a prolonged period of excessively hot weather, often with high temperatures and humidity, which can impact human health, agriculture, ecosystems, and infrastructure.

Heatwave Adaptation and Mitigation Programming - Lesson from affected population

Pakistan

Situation: A severe heatwave struck the Cholistan region in March and April 2022, as reported by the Pakistan Meteorological Department (PMD), causing extensive damage to vegetation, crops, water resources, and livestock. Lasting 41 days from March 11 to April 19, 2022, the high-intensity heatwave was followed by



Desilting of Water ponds and Constructing rainwater harvesting.

a brief six-day period of relatively lower intensity (April 27 to May 2). The drought and severe heatwaves in Cholistan have had far-reaching impacts across multiple districts. In Bahawalpur District, 11 areas from two Union Councils (Ahmed Wala, Nawan Khu Salam Sar Area, Misri Wala, Dhandla, Khan Garh, Rasool Sar, Bijnot, Panwaraan Wala, Laraan Wali, Maroo Wali, Bhoondri) were severely affected out of four union councils in Cholistan. This crisis has endangered human lives, livestock, and wild species, resulting in the deaths of many sheep and cows. Additionally, approximately 200 water ponds have dried up, further jeopardising the lives that depend on

them. The drought and heatwaves have compelled people in Cholistan to migrate to plain areas with their animals, although many remain stranded in the desert, hoping for relief and rain. Seasonal migration began earlier, reducing disposable income for those seeking water sources. In total, 200,000 people in Cholistan faced dire need of humanitarian assistance.

Adaptation and Mitigation Programming: In response to the heatwave and drought, IRC has initiated adaptation and mitigation programming. A rapid vulnerability assessment informed immediate needs and adaptation strategies. Local civil society organisations have been engaged to incorporate indigenous knowledge, with their staff deployed for assistance. Long-term adaptation and mitigation plans have been developed, focusing on activities like pond desilting, rainwater harvesting, Multipurpose Cash Assistance (MPCA), Mud grass cultivation, drought resistance seeds were distributed, Community Livestock Extension Workers (CLEWs) were trained on first aid, Health workers and volunteers were trained in life-saving skills, and distribution of dignity and hygiene



Distribution of Dignity Kits among Women committees.



Heatwaves situation.

kits. Health and hygiene sessions are tailored for various demographics, ensuring cultural sensitivity. Inclusive Village Community Committees have been formed to enhance community resilience, with stakeholder coordination workshops organised.

Bangladesh

Situation: As Bangladesh grapples with a relentless heatwave, the urgency of the situation cannot be overstated. Recent findings from the Bangladesh Meteorological Department (BMD) paint a concerning picture: temperatures have soared in 51 out of 64 districts, with forecasts predicting even higher temperatures of up to 44-45 degrees Celsius by the end of May.

Vulnerable groups, including children, the elderly, pregnant and lactating women, and outdoor workers acutely feel the impact of these extreme heatwaves. Farmers, too, bear the brunt as they struggle with crop losses and dwindling water levels, exacerbating threats to food security and biodiversity.

Adaptation and Mitigation Programming: IRC Bangladesh has initiated several measures to mitigate the impact of heatwaves, especially in Primary Health Care Centers (PHCCs) within Rohingya camps and affected regions such as Cox's Bazar, Khulna, and Barishal.

Collaborating with local partners, the program emphasises raising awareness about the socio-economic and health impacts of heatwaves and strategies for mitigation. Key ongoing initiatives include:

1. Ensuring an adequate supply of drinking water and normal saline at PHCCs to prevent dehydration.
2. Developing guidelines for Community Health Workers (CHWs) and community members to avoid movement within the Rohingya camp between 12:00 PM and 2:00 PM, and adjusting operational hours accordingly.
3. Community Health Workers trained in the provision of the First Aid.
4. Conducting continuous public awareness campaigns through the InfoSheba website and IRC Bangladesh's social media platforms.

5. Continuously monitoring the situation on the ground with partners in Cox's Bazar, Khulna, and Barishal, who have reported heat-related illnesses in the community. IRC supports awareness programs in response.
6. Conducting ongoing community sensitisation through IRC CHWs about heatwave risks and advocating preventive measures during stakeholder meetings.

These initiatives have had a positive impact, as there have been no casualties or serious adverse effects among the targeted population despite facing multiple heatwaves, including the recent one. This success is attributed to the proactive mitigation approach of IRC and its partner organisations, ensuring the implementation of key measures and raising awareness. ■



Future of Heatwaves in South Asia

By Kunal Satyarthi, Krishna AchutaRao, Mariam Zachariah, Mihir R. Bhatt and Khayal Trivedi

Some futures are far more unknown than others. Perhaps the future of heatwaves in South Asia is one such future. HOISA has been critically observing what makes heatwaves in South Asia different, how it is prone to more such events, and the attempt to judge a heat wave index for South Asia. A recent panel discussion looked at the Future of Heatwaves in South Asia in a world that is 1.5 to 2°C warmer.

The [IPCC AR6 2021](#) report predicts that as global temperature increases, we will witness an increase in frequency and intensity of extreme. These events could become 30 times more likely with the already 1.2°C warmer climate. Calculated through hazard attribution, this will additionally increase 8 times in a 2°C warmer world. [Studies](#) also show that regions with high humidity and high temperatures will particularly be high-risk areas, as we see that heat index (a combination of temperature and humidity) increasing by 2 degrees. This can and will be deadly, as we expect heatwaves to be longer in duration (40+ days).

AIDMI's work on heatwave shows that the affected population numbers and their diversity in terms of socio-economic and occupational context is increasing in all communities. The measures taken by the community members on their own, out-number

almost all other public measures at individual and community levels. This calls for an immediate implementation of short-term, mid-term and long-term actions.

While much needs to be done, a lot has been achieved or is underway thanks to various agencies in the region—such as the NDMA (India), and similar counterparts in South Asia. National guidelines for preparedness, developing a national framework on heatwave preparedness and mitigation, Heat Actions Plans at the city and state level, a national plan on heat-related illness and much more are coming up. In India, we are already witnessing the outcomes of these efforts. The mortality rate has drastically reduced in the past years. Over 17 heat waves-prone states have prepared heat wave action plans and 14 states are preparing.

We are also observing similar efforts in South Asia. In Pakistan, an anticipatory response fund by the Start network is conducting training in preparedness and cooling. Cooling action plans are underway, and frontline workers are being trained. In Bangladesh, a Chief Heat Officer has been appointed in Dhaka, and Heat Action Plans are underway in several municipalities along with other pilot projects.

But while this work is being carried out, there are many challenges for policymakers. Firstly, heat waves affect differently to different groups differently which may be defined by age, economics, and urban or rural location. Secondly, there are scientific gaps in measuring the local thresholds and interplay of other meteorological parameters – velocity and humidity within different ecological zones. Thirdly, addressing deaths and damage needs more nuanced consideration in South Asia. Reading into the multiple causes of death and thereby formalising it into data is also very challenging. AIDMI calls it the “intersectionality of heatwave deaths” in its work on heatwaves.

As a way forward, we must observe heat waves better and study how they are linked to forest fires, drought, and other calamities. We need to develop a loss and damage framework for South Asia that is more context-specific. Data collection and analysis for evidence-based policy is required by authorities in South Asia. This situation calls for constant, ongoing anticipation of how the situation is evolving to ensure that we adapt to this human-induced climatic phenomenon that will affect over 2 billion people. ■

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Planning for Extreme Heat: Lessons and Recommendations for South Asia

By *Owen Gow*, Associate Director, Arsht-Rock; *Lenio Myrivili*, Global Chief Heat Officer, UN-Habitat & Arsht-Rock; *Bushra Afreen*, Chief Heat Officer, Dhaka North; and *Mihir R. Bhatt*, AIDMI, India

In the 19th formation day of the NDMA, HOISA presented its fourth panel discussion on observing heatwaves. In continuation with previous work, this edition focused on the planning for extreme heat.

The increasing intensity of heat waves combined with other crises such as air pollution, floods and cyclones, create a cascading effect on vulnerable populations such as labourers, migrant workers, and women. Two ongoing, distinct, examples of heat-wave mitigating efforts in Dhaka North and Athens were brought forward.

Dhaka North

Recently, Dhaka North became the first city in Asia to appoint a Chief Heat Officer (CHO) by the Mayor of Dhaka North City Corporation. This initiative is a result of [Adrienne Arsht-Rockefeller Foundation Resilience Center's Global Champions for Heat Action platform](#). Bushra Afreen, the appointed CHO highlighted that heatwave-related conversations are often missing at the city level with no specific funding mechanism. The official appointment of this position therefore enabled advocacy for more investments, resources and attention for resilience work in the city.

Dhaka has several organisations and entities working in silos with different communities of varying needs. The CHO's position particularly focuses on this gap and aims to create interventions that are inclusive by working with the municipality and other agencies. The challenge is that one needs empirical and scientific data that provides the

necessary knowledge to set priorities. The CHO is now facilitating the installation of air quality sensors, heat sensors, and humidity sensors to allow for data collection.

In the near future, their city-wide application - Shobar Dhaka will integrate cooling hubs into the city map, along with guidelines for heatwave periods, warning systems, and mechanisms to report or flag a problem. Dhaka is also set to see its first urban forest, with diverse local species. All these projects are aimed at being sustainable and shall create a circular economy providing employment.

Athens

Athens is one of the hottest capitals in Europe and is affected by increasing intensity and frequency of heatwaves, fires, floods and droughts. More than 80% of the city is covered with hard surfaces with unevenly distributed green cover.

Lenio Myrivili, Global Chief Heat Officer to UN-Habitat and former Deputy Mayor in Athens shared that one of the first attempts to tackle this crisis was to create a heat map of the city by using land surface temperatures. Their research directly linked land surface temperatures with mortality.

Followingly, the city adopted a 3-step strategy to combat heat: Awareness raising, preparedness and redesign. The awareness-raising initiatives dealt with creating campaigns, convincing policy and decision-makers, and communicating about the invisible

nature and impact of heat waves. One of the projects was to categorise heatwaves by linking meteorological data (heat) with its impact on health. Similar algorithms are also being generated for other cities, to then deduce categories of heatwaves.

Based on the categorisation of heatwaves, appropriate action and preparedness measures are opted for such as early warning systems, mass messaging, cooling stations, etc. And lastly, the city is studied with the intention of adapting it to face extreme weather. Today's cities are badly designed for climate change as they trap the heat and humidity within the city. "We must think of redesign to facilitate cooler and greener environments".

But as we present case studies and solutions that some cities are opting for, how must other cities, stakeholders and even individuals act and begin implementing some of these ideas in their local contexts?

The [Heat Action Platform](#) is a repository of various articles, strategies, case studies and resources on how learnings from different cities and regions of the world can be effectively communicated to inspire action for creating resilient cities. With this platform, any individual, practitioner, or government authority can feed their research and practice. HOISA therefore urges its readers and network to explore this platform to make this effort into a movement led by each individual in combatting extreme heat and weather. ■

Economic Resilience in the Face of Heatwaves: Insights from India's Heat-Exposed Workers

By Akash Yadav, AIDMI, India

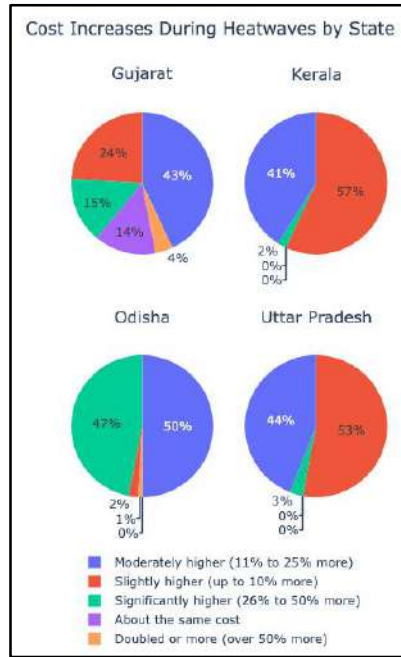
Economic Challenges of India's Heat-Exposed Workers

Heatwave risks and losses are usually not fully perceived by vulnerable populations exposed to extreme heat. However, as climate change intensifies and extreme heat events become more common, workers are slowly realising the economic instability caused by such extreme events. A recent survey by AIDMI across Gujarat, Odisha, Kerala, and Uttar Pradesh reveals that affected populations, especially street vendors, are voicing their need to adapt to these harsh conditions. Their experiences highlight multifaceted challenges and emphasise the necessity for targeted economic resilience initiatives.

Economic Impacts of Heatwaves

Based on our results, we find that heatwaves significantly impact heat-exposed workers in all the states surveyed. In Ahmedabad (Gujarat), 43% experienced income loss for less than a week, 31% for 1-2 weeks, and only 15% reported no loss. In Lucknow (UP), 65% faced income loss for 1-2 weeks, with only 4% reporting no loss. Odisha, where the respondents were from primarily rural backgrounds, had 50% facing income loss for over two weeks, and none reporting no loss. Kerala showed better resilience with 49% reporting no loss and 41% facing short-term losses.

The diverse economic impacts highlight the vulnerability of different occupational groups. Street vendors, construction labourers, and small business owners are among the



most affected, experiencing significant disruptions to their livelihoods. These workers, dependent on daily earnings, face immediate financial hardships when extreme heat hampers their ability to work effectively.

Rising Costs During Heatwaves

The financial strain during heatwaves is considerable. In Gujarat, 43% reported 11-25% higher costs, while 15% experienced 26-50% higher costs. In Kerala, 57% faced up to 10% higher costs, with 41% experiencing 11-25% higher costs. In Odisha, 50% reported 11-25% higher costs, and 47% faced 26-50% higher costs. In Uttar Pradesh, 53% experienced up to 10% higher costs, with 44% facing 11-25% higher costs.

Water bills also surged, particularly in rural Odisha (84% reported up to a 50% increase) and Uttar Pradesh (94% reported up to a 25% increase).

Kerala demonstrated better management, with 97% reporting no increase in water bills.

Healthcare Costs and Economic Strain

Healthcare spending due to heat-related ailments varied significantly. In Gujarat, 43% of respondents faced minor healthcare costs, aligning with the reported minor health impacts like heat cramps and exhaustion. In contrast, Kerala reported 61% experiencing no healthcare costs, which correlates with the minimal health challenges reported. Odisha, experiencing moderate to severe health issues, saw 65% reporting moderate increases in healthcare costs. Uttar Pradesh reported a mix of minor (51%) to moderate (42%) increases in hospital costs, reflecting the range of health impacts from heat strokes to exhaustion observed in the state.

The increase in healthcare costs places an additional financial burden on households already struggling with reduced incomes and higher living expenses. This economic strain is exacerbated by the need for cooling solutions, medical treatments, and other heatwave-related expenses.

In conclusion, the economic challenges faced by heat-exposed workers due to heatwaves are significant and multifaceted. Rising costs during heatwaves place an additional burden on vulnerable populations, requiring concerted efforts to enhance community resilience. ■

Heatwaves in Africa: What Communities Are Doing

By *Paul Lodry DONGMO*, Environmentalist, Disaster Risk Reduction and GHG MRV Expert and Coordinator of African Environmental Network, Africa

Heatwaves are becoming more and more prevalent around the world. Indeed, 2023 was the year in which we experienced the most heatwaves (WMO, 2023); however, we realise that 2024, which began with a series of heatwaves mainly in Africa, is likely to be a warmer year than 2023. These anomalies range from +1 to +8 °C on average at the global level, leading to extreme heatwaves.

In Africa in particular, we are observing anomalies of +8 to +12 °C caused by anthropogenic climate change (C3S/ECMWF, 2024). In fact, these anomalies manifested themselves in temperatures of almost 48 °C in March 2024 in Mali, causing more than 102 deaths. Since the beginning of March to May, many people in Niger, including the most vulnerable: babies and the elderly, have been hospitalised, often ending up dead. In Cameroon, we are seeing temperatures of over 45 °C, leading to the deaths of pregnant women and children and the loss of harvests. The same high temperatures are consuming agricultural production in the western and central regions, and are also leading to a proliferation of malaria through the multiplication of mosquito larvae. In Kenya, education has been affected by the postponement of the start of the summer school term as a result of rising temperatures brought on by heatwaves ranging from 37 to 40 °C in Kenya, combined with other extreme weather phenomena. This is one of the serious natural disasters associated with drought and famine, and the death of livestock and

people. The Kenyan government has had to review the national action plan on climate change and prioritise a rapid response that could save the situation, as 38 of the 42 counties have been affected, a clear indication that Kenya remains highly vulnerable to heatwaves.

The adaptation measures taken include: improving the management of natural resources such as water, land and forests to stimulate climate-resilient agriculture and reduce over-dependence on rain-fed agriculture; improving the integration and coordination of climate actions in policy, planning and investment; implementing policies and measures that mobilise climate finance in the public and private sectors. These measures are inclusive and integrated management measures that take into account: local communities, which are mainly constituted of women and young people, the public sector represented by decentralised local authorities, civil society and the media. Countries such as Kenya, Cameroon, Niger and the DRC⁸ have taken steps to implement these measures.

Other activities have been carried out by communities in their own environment, such as the local awareness-raising, information and training campaigns facilitated by the African Environmental Network in 7 countries, where more than 600 people have been reached, informed and trained about extreme weather phenomena and slowly associated with solutions to be promoted at local level. Among these solutions we have the one mentioned above to which we have added urban forestry which is a long-term nature-based solution to reduce the impact of heatwaves and associated diseases by providing a favourable microclimate, we also have agroforestry and agro-ecologies with selective trees resisting high-temperature conditions and also facilitating local micro condensation to provide fresher and dew water to crops.

Heatwaves will become more and more common if we don't act now, collectively, by sharing technologies and taking innovative approaches for the benefit of our communities. ■



Photo credit: African Environmental Network.

⁸ Democratic Republic of Congo.

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