Local Innovation to Global Action for Heat, Health, and Livelihoods: Resilience Starts at Home



Home-based livelihoods under rising heat: local adaptation in everyday workspaces. Photo: AIDMI.

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Unshielded in the Thermal Crucible: Centring Women's Frontline Livelihoods in the Era of Global Boiling

By ***Ms. Rita Missal,*** *Member, and* ***Dr. Midhila Mallika,*** *Senior Consultant (Recovery & Reconstruction), National Disaster Management Authority (NDMA), India*

When United Nations Secretary General António Guterres declared that "*the era of global warming has ended; the era of global boiling has arrived,*" it was not merely a rhetorical flourish; it was a harrowing diagnosis of our modern climate reality. The planet is no longer simply warming at its margins; it is searing at its centre. Across the sun-scorched landscapes of the Global South, and particularly within the dense urban expanses of India, extreme heat has mutated from a seasonal discomfort into a relentless, slow-onset catastrophe.

To survive these severe heat-exposed conditions, our existing disaster recovery framework must undergo a mandatory shift toward policies and programmes tied directly to the health, dignity, social justice, and economic survival of those most exposed. As climate change causes widespread societal distress, extreme weather events are pushing those on the margins deeper into vulnerability and socio-economic isolation. Lacking adequate social safety nets and coping mechanisms, these communities are left dangerously unshielded. *"True climate resilience demands that we place those on the frontlines specifically women workers, outdoor workers, and small businesses at the absolute core of climate resilience."*

Under a warming and increasingly extreme climate, heat acts as a gendered and economic tax levied disproportionately on those who can least afford it. While outdoor labourers and municipal crews face life-threatening heat exhaustion under intense sunlight, women in the informal economy suffer a uniquely compounded burden. Millions of women operate home-based small businesses stitching garments, rolling incense, or preparing locally produced food beneath tin or asbestos roofs that transform informal dwellings into thermal traps.

Trapped inside these domestic kilns, their productive hours are lost into forced idleness. Beyond their economic labour, women also bear the heavy physical toll of unpaid domestic care, fetching water, managing households, and nursing heat-sick family members under suffocating ambient temperatures with minimal access to shaded sanitation or cooling facilities. This thermal stress spills directly into local economies. Small businesses run by women face severe financial shocks as extreme heat spoils perishable inventory, deters customer footfall, and erodes fragile profit margins. Transitioning from acute heat risk to resilient recovery demands that institutional policy



Informal Women Workers Working in Extreme Heat in Tamil Nadu. Picture credit: Athul S.G.



Women Informal Workers Cleaning a Pond Under the Scorching Sun. Picture credit: Athul S.G.

directly addresses these gendered realities.

India's National Disaster Management Authority (NDMA) has progressively strengthened its national approach to heatwave management, moving from emergency response towards preparedness, mitigation, and longer-term resilience. And now Heatwaves are among the disasters notified for assistance under the State Disaster Response Fund (SDRF) and the National Disaster Response Fund (NDRF), enabling states to provide assistance to affected populations through both funds in accordance with the prescribed norms. NDMA has also issued national guidelines for the preparation of Heat Action Plans (HAPs), which guide States and local authorities in developing measures for early warning, preparedness, public health protection, mitigation, and response. As of 2026, HAPs have been prepared across all 23 heat-prone States, with plans also developed at the district and city levels covering 195 districts and 64 cities. Within this institutional framework, heat resilience is increasingly being approached as a socio-economic and public-health concern rather than solely as an emergency-response issue. NDMA's advisories also recognise the particular vulnerabilities of informal and outdoor workers, including the need for gender-sensitive adaptation measures. As the women workers face distinct physiological and occupational risks, including altered working hours, restricted mobility, and disrupted home-based livelihoods. The HAP framework therefore offers an important entry point for strengthening gender-responsive heat adaptation and addressing these differentiated impacts.

> *"Put women workers at the centre of Heat Action Plans through safer work conditions, cooling, social protection, and livelihood security."*

The true power of heat adaptation lies in accessible, everyday solutions, and it is equally important to recognise the role of humanitarian organisations and civil society groups in translating these solutions into action and addressing the lived realities of women facing extreme heat. Their field-based interventions have helped translate heat-risk policies into practical measures at the community level. For instance, supporting neighbourhoods to adopt passive cooling techniques that can help reduce indoor heat, enabling women micro-entrepreneurs to work safely from home. Innovative financial protection measures, such as parametric heat insurance, to help prevent a single heatwave from pushing families into crippling debt. They show how social protection, early warning, financial protection, and community-based action can be brought together to address both the health and livelihood consequences of extreme heat. Such a way, India's evolving experience of combining government institutions with humanitarian and civil-society action offers useful lessons for implementing the Sendai Framework for Disaster Risk Reduction and the UN Sustainable Development Goals, while providing a potential model for other regions facing an increasingly severe and prolonged heat risk. *"In the era of global boiling, as the planet sears, true resilience is not built of stone and steel alone; it lives in by how fiercely we protect the health, economic sovereignty, and human dignity of those standing unshielded on the frontlines."* ■

Strengthening Heat Preparedness in Bihar: Protecting Public Health, Workers, and Vulnerable Livelihoods

By **Paras Nath Rai IPS (retd),** *Member, Bihar State Disaster Management Authority, India*

Abstract

Climate change has significantly increased the frequency, intensity, and duration of heatwaves across the globe including in Bihar, making extreme heat one of the fastest-growing climate hazards. Europe has witnessed unprecedented heatwaves in recent years, resulting in record-breaking temperatures, thousands of excess deaths, widespread wildfires, and severe pressure on public health systems. Beyond causing heat-related illnesses and deaths, heatwaves affect agriculture, water resources, energy demand, labour productivity and livelihoods. Rising temperatures have also contributed to an increase in lightning incidents, with studies indicating that even a 1°C rise in temperature can significantly increase lightning activity. For Bihar, as in many other states, it is a rural problem. Heatwaves do not strike all of a sudden and do not overwhelm the system, and are thus called a silent killer.

The geographical extent of heatwaves in Bihar has expanded considerably over the last few years. During 2021, prolonged heatwave conditions were largely confined to a limited number of blocks. However, by 2023 and 2024, the affected area had expanded to cover a much larger part of the State, with severe heatwave conditions extending across districts including Saran, Siwan, Muzaffarpur, Aurangabad, Bhojpur, Jehanabad, Kaimur, Rohtas, Gaya, Nawada, and Patna. The analysis shows not only an increase in the number of affected blocks but also a rise in the duration of heatwave days.

Recognising that heatwaves are a "silent disaster" requiring preparedness rather than only emergency response, the Government of Bihar has adopted a proactive and multi-sectoral approach under the leadership of the Bihar State Disaster Management Authority (BSDMA). Bihar has also promoted several long-term climate adaptation initiatives. In addition to the Heat Action Plan, the Jal Jeevan Hariyali Mission, with an allocation of over Rs. 24,000 crore, supports rejuvenation of water bodies, tree plantation, and groundwater conservation to reduce the impacts of rising temperatures. No wonder, fatalities due to heat are either nil or minimal over the years.

Bihar's Institutional Framework for Heatwave Preparedness

Bihar has institutionalised heatwave management through the Bihar Heat Action Plan (HAP), which was revised with technical support from the Indian Institute of Public Health (IIPH), Gandhinagar. The revised plan strengthens preparedness by defining clear responsibilities for departments and promoting coordinated action before, during, and after the heat season. The Heat Action Plan adopts a whole-of-government approach, involving departments including Disaster Management, Health, Public Health Engineering (PHED), Minor Water Resources, Agriculture, Energy, Labour, Education, Urban Development, Rural Development, Animal Husbandry, Information and Public Relations, Bihar Mausam Seva Kendra (BMSK), IMD, and District Disaster Management Authorities. The plan integrates short-term preparedness measures such as early warning dissemination, public awareness, hospital preparedness,





Akira Miyawaki method for dense native plantation and heat-island mitigation.



AC cooling/rest centre for gig workers during extreme heat.

drinking water arrangements, and emergency response with long-term adaptation measures including urban greening, water conservation, climate-sensitive planning, and resilient infrastructure. As part of its capacity-building initiatives, BSDMA has also provided training on GRIHA (Green Rating for Integrated Habitat Assessment), familiarising relevant stakeholders with principles of green and sustainable building practices. This training contributes to greater awareness of energy efficiency, water efficiency, environmental sustainability, and climate-responsive building design, which are important for long-term climate resilience and heat-risk reduction. As an additional approach to mitigating the urban heat-island effect, BSDMA has prepared a guidance book on the Akira Miyawaki method to facilitate its understanding and adoption as a nature-based approach for climate and heat-risk mitigation. Bihar has adopted the Akira Miyawaki method under the Jal-Jeevan-Hariyali Mission to promote dense plantation of native species in suitable urban and other areas. Such dense green spaces can provide shade, improve the local microclimate, and help mitigate the urban heat-island effect, thereby contributing to long-term heat resilience. Regular inter-departmental review meetings before and during the heat season ensure preparedness at both State and district levels, while implementation is supported through departmental budgets and existing government programmes.

Early Warning to Early Action

A major strength of Bihar's preparedness system is its Early Warning to Early Action approach. The state has invested in community preparedness through BMSK. The India Meteorological Department (IMD) and Bihar Mausam Seva Kendra (BMSK) provide impact-based weather forecasts. BMSK generates temperature, humidity and wind data up to the block level and rainfall data up to the panchayat level, enabling localised preparedness. Heatwave warnings generated by IMD and BMSK are immediately shared with District Disaster Management Authorities (DDMAs), line departments, district administration, Sub-Divisional Officers (SDOs), Circle Officers (COs), Panchayati Raj Institutions (PRIs), Urban Local Bodies (ULBs), and emergency response agencies to ensure timely preparedness and coordinated action.

By integrating accurate weather forecasting, inter-agency coordination, and timely preventive actions, Bihar has shifted its approach from early warning to early action, significantly strengthening preparedness and reducing the health impacts of extreme heat.

Protecting Public Health and Vulnerable Livelihoods

The Heat Action Plan places special emphasis on protecting vulnerable populations, including outdoor workers, farmers, construction workers, street vendors, children, elderly persons, and pregnant women. Health facilities are sensitised to identify and manage heat-related illnesses, while departments ensure the availability of drinking water, shaded public spaces, and public awareness on heat safety. Recognising the increasing exposure of gig workers, such as food delivery and e-commerce delivery personnel, Bihar has initiated the establishment of AC rest centres (Cooling Centres) at selected public locations. Along with advisories on avoiding peak heat exposure and ensuring adequate

hydration, these initiatives demonstrate Bihar's commitment to protecting workers whose livelihoods depend on working outdoors. BSDMA also conducted heat-wave safety training for persons with disabilities, focusing on practical measures for preventing and managing heat stress. The training covered precautions during extreme heat, adequate hydration, avoiding direct exposure to heat, and recognising symptoms of heatstroke. It also provided guidance on first aid and immediate actions to be taken when a person develops heat-related illness.

Community Participation and Local Innovations

Community engagement forms the foundation of Bihar's heat resilience strategy. Awareness programmes are conducted through Jeevika Didis about two crores spread across the state in villages; Aapda Mitras, more than 10,000 available in a large number of districts trained and equipped for handling of disaster, health workers, schools, youth volunteers, community radio, mobile awareness vehicles, street plays, puppet shows, newspapers, television, and IEC materials, ensuring that early warnings reach even the most vulnerable communities.

> *"Turn heat warnings into early action through local forecasts, cooling centres, safe water, health preparedness, and protection for vulnerable workers."*

Conclusion

Through its revised Heat Action Plan, localised forecasting systems, multi-departmental coordination, and innovative initiatives such as Jal Jeevan Hariyali and community-based awareness programmes, Bihar has established a comprehensive framework for protecting public health, workers, and vulnerable livelihoods. As climate change continues to intensify heat risks, Bihar's approach offers valuable lessons for other states seeking to translate local innovation into effective climate resilience and sustainable heat action. Our journey has thrown up some lessons for the future too. We need to create a health database for real-time monitoring so that we are able to detect early signs and take action. Secondly, reaching the poor in villages, many without access to phones or TV, remains a challenge. Therefore, we do need effective real-time dissemination protocols with better technology. AI has to play a significant role. We need to develop a vulnerability index for the most affected populations to strengthen our long-term mitigation, prevention, and response strategies. ■

बिहार में गर्मी से बचाव: चेतावनी से कार्रवाई तक

By All India Disaster Mitigation Institute (AIDMI), India

बिहार में बढ़ती गर्मी अब केवल मौसम की समस्या नहीं है। इसका सीधा असर स्वास्थ्य, काम और आजीविका पर पड़ रहा है। खासकर खुले में काम करने वाले मजदूर, किसान, स्ट्रीट वेंडर, डिलीवरी कर्मी, बुजुर्ग, गर्भवती महिलाएं और दिव्यांग व्यक्ति अधिक जोखिम में हैं।

बिहार ने हीटवेव से निपटने के लिए चेतावनी को स्थानीय कार्रवाई से जोड़ने का प्रयास किया है। भारत मौसम विज्ञान विभाग और बिहार मौसम सेवा केंद्र से मिलने वाली जानकारी जिला प्रशासन, स्थानीय निकायों और संबंधित विभागों तक पहुंचाई जाती है। इससे स्वास्थ्य सेवाओं, पेयजल, जन-जागरूकता और अन्य तैयारियों को समय पर सक्रिय किया जा सकता है।

गिग और डिलीवरी कर्मियों के लिए कुछ स्थानों पर **कूलिंग और रेस्ट सेंटर** शुरू किए गए हैं, ताकि वे तेज गर्मी के दौरान सुरक्षित स्थान पर आराम कर सकें और पानी पी सकें। दिव्यांग व्यक्तियों के लिए भी गर्मी से सुरक्षा और प्राथमिक उपचार से जुड़ी जानकारी दी गई है।

समुदाय की भागीदारी भी महत्वपूर्ण है। जीविका दीदी, आपदा मित्र, स्वास्थ्य कार्यकर्ता, स्कूल, युवा और स्थानीय मीडिया के माध्यम से गर्मी से बचाव के संदेश लोगों तक पहुंचाए जाते हैं। आगे की जरूरत है कि चेतावनी हर कमजोर व्यक्ति तक समय पर पहुंचे और उसके साथ स्पष्ट कार्रवाई भी जुड़ी हो। ■

CLIMATE EDUCATION

This Heat Is Not Normal

How Women in Dehradun Are Using Climate Education and Storytelling to Combat Heat Stress

*By **Remya Sasindran,** Co-founder and Director of Projects, words. rhythms. images. And Communications Manager, Asian Disaster Reduction and Response Network (ADRRN), India*

It is not usual to talk about Dehradun and heatwaves in the same breath. Long known as a cool gateway to the hills, this Indian city lying in the foothills of the Himalayas is now seeing summers push past 40 degrees Celsius.

Women who live in low-income households in Dehradun's informal settlements spend the greatest share of their day indoors. These are homes with poor ventilation and little relief from the heat outside. While conversations on heat stress are common, there is no respite for those who do not have access to cooling hacks while longer-term solutions are worked out.

This is the gap that the project Community Action Through Storytelling on Extreme Heat, led by words. rhythms. images with Aryan Group, is addressing. Supported by the Asian Disaster Reduction and Response Network's SIDRRA project, the intervention was implemented in four settlements: Kathbangla, Chetna, Sapera, and Nagal. Aryan Group's existing learning centres are run by teachers who live in the same communities. With training on heatwaves and using storytelling as an experience-sharing and solution-building technique, 8 female teachers have kicked off the learning activities around heat stress and how their communities can prepare for what would most likely be an annual occurrence.

While the project closed in April 2026, what has changed is who is



Learning Centre teacher reads the COPE book on heatwaves out loud to her students.

leading the conversation and what the conversation is now about. Teachers use the COPE Disaster Champions books to teach their students about heatwaves and their storytelling training to open that same conversation with adults in the settlement. Together, these tools are helping these communities arrive at a shared understanding that heatwaves are not normal, shouldn't be endured in silence, and that the burden falls disproportionately on women.

> *"Use climate education and community storytelling to help women and families recognise extreme heat early and take practical protective action."*

These communities are now deliberately experimenting with modest solutions: reflective paint for rooftops, planting trees where there is space, drinking enough water through the hottest hours, blocking glare, and improving ventilation in homes never built with this heat in mind. The solutions are actions a household can take now, because larger, structural change will take time.

The intervention is also catalysing intergenerational knowledge transfer. Children are taking lessons home, initiating conversations about heat safety and gradually expanding awareness within their households and neighbourhoods. This self-directed behaviour represents a meaningful shift from passive recipients of information to active agents of climate action. This transition can have significant implications for community resilience building and advocacy movements.

The project's design also recognises that heat cannot be treated as a hazard in isolation from the harder economic realities these communities already navigate. Going forward, this points to a broader lesson: communities like those in Dehradun rarely experience floods, landslides, or wildfires as separate emergencies. They live through them as one continuous, compounding risk. WRI and Aryan Group's future work in this space will build on this reality from the outset. ■

WOMEN-LED RESILIENCE

How Women in Nepal Are United to Create a Climate-Resilient Future: A Case Study from Dhanusha, Madhesh Province

*By **Nub Raj Bhandari**, Program Director and Researcher, Janaki Women Awareness Society, Nepal*

Climate change alters the regular pattern of weather and atmosphere, which directly and indirectly affects the lives of human beings, forcing them to intervene. Human interventions, that aim to mitigate the impacts, mostly by adapting to changes in processes and practices. Extreme heat, irregular rainfall, landslides, floods, and drought are some of the direct impacts of climate change that people of Nepal have been suffering from for the past several years.

Addressing these issues needs collective action and also needs changes in the daily behaviors of human beings. In this article, I present an example of what women-led, community-driven climate action looks like. Over three hectares of degraded barren land in Lalghadh, Mithila Municipality, Dhanusha District, in the Madhesh Province of Nepal, is now covered with mango trees, bamboo, a fish pond, and cash crops such as turmeric. Under the facilitation support of Janaki Women Awareness Society (JWAS), a non-governmental organisation that is operating in central Southern region Nepal for over the three decades, the change started 20 years ago when 40 women from the local community decided to work together to restore the land. On National Soil Conservation Day, 9 August 2005, these women came together to form a group called *Aishwarya Ban-Batika* in Nepali (*Aishwarya–The Forest-Garden* in English).

> *"Invest in women-led local institutions that restore ecosystems, diversify livelihoods, and sustain climate action over the long term."*

In the group, the leadership has always stayed with women. When the group's founding president passed away, her daughter-in-law took her place. The group has followed this practice ever since. The current president said that transferring membership to younger generations of the same families, when a member passes away, is one of the reasons for keeping 40 active women members for two decades. The group also holds an informal annual general assembly every year, on the 11th day of *Asar* in the Nepali calendar (25 or 26 June), and follows its own written rules on transparency and financial accountability.

This shows that the climate action here is fully community-owned. No outside organisation manages the forest day to day. The women manage it themselves, following rules they wrote and updated on their own.

The group's plantation work began with 260 mango and broom-grass (*Amriso* in Nepali) plants. When the broom-grass started dying after about eight years, the women replaced it with bamboo. Today, mango trees and bamboo cover the entire area of *Aishwarya Forest-Garden,* a greenery that these women had once only dreamed of.

Before this work began, the village below the Forest-Garden used to suffer heavy flood damage during the monsoon. Water flowing down from the forest would cause major destruction. The current president said that, 20 years ago, they had always dreamed of seeing greenery



Greenery everywhere – Mango trees, bamboo, and turmeric plants. Photo: Nub Raj.



A fish pond created by conserving water flowing downstream. Photo: Nub Raj.

above them, and for the past 20 years, they have been living with that green. The pond and the plantations together have reduced the flood risk and also created new homes for birds and animals.

This shows two things happening together, reduced flood risk upstream and a restored ecosystem on the ground. This kind of result is hard for top-down programmes to achieve, because it depends on knowledge of the local terrain, flood patterns, and the community's own priorities, which only the residents themselves hold.

The group's economic change has been just as important as the ecological one. Their income has grown steadily, now coming from mangoes, bamboo, fish raised in the pond, and crops like turmeric grown under the shade of the mango trees.

The pond has also become a second source of livelihood. It supplies irrigation water from January to March, which lets the community grow three crops a year on the land below.

Twenty years after the women first started, the *Aishwarya Forest-Garden* stands as proof that community-led climate action, once it is properly rooted in local leadership and local institutions, does not need ongoing outside support to keep delivering results. ■

REGIONAL COOPERATION

From Community Action to Regional Cooperation: Lessons for Gender-Responsive Heat Action

*By **Kumudu Herath,** Duryog Nivaran Project Manager for SIDRRA*[1]

Extreme heat is increasingly affecting health, livelihoods, productivity and everyday life across South Asia. Like any disaster, its impacts are not experienced equally. Women working in small-scale sectors, persons with disabilities, and socially excluded communities often have fewer resources and options to prepare, respond and recover.

The SIDRRA project was grounded in the understanding that disaster impacts are not experienced equally across communities. While the project addressed multiple hazards, its experience in strengthening inclusive, community-based and locally led disaster risk governance offers useful lessons for advancing **gender-responsive heat action**.

In Sindhupalchowk, Nepal, Practical Action worked with communities and local governments to strengthen impact-based forecasting, risk communication and anticipatory action. Participatory risk mapping helped communities to identify not only hazard-prone areas, vulnerable households and safe locations, but also different vulnerabilities shaped by gender, social structures and livelihoods. The project also highlighted the importance of **simple and accessible warning messages** to ensure that people with different levels of literacy can understand and act on risk information.

The SIDRRA experience also highlights the value of **women as active agents** for preparedness and resilience. In Mirpurkhas, Pakistan, a member of a Peasant Women's Trade Union in a flood-prone village who lives with a disability caused by polio, gained practical knowledge on early warning and safe evacuation through project training. Having

[1] This article is based on the experience and learning of Duryog Nivaran through the recently concluded regional programme, Strengthening Inclusive Disaster Risk Governance for Climate Resilience in Asia (SIDRRA), implemented in partnership with IRC and ADRRN.

experienced the devastating floods in 2022, she understood the importance of early action and conducted cascade training for other villagers, particularly women and persons with disabilities. This experience demonstrates the importance of investing in women's leadership and ensuring that those most exposed to risk can also contribute to designing and communicating solutions.

Community-led environmental management is another important pathway for building resilience to climate-related disasters. In Kailali, Nepal, community forest user groups combined forest fire preparedness with recharge ponds generating benefits for fire control, water conservation, recreation, fisheries, and ecotourism. Women increasingly participated in leadership and decision-making in forest fire management, while male champions were also engaged to address restrictive gender norms. These nature-based and locally managed solutions demonstrate how climate resilience can simultaneously address environmental, social and livelihood concerns.

In addition, the project supported some exploratory studies and contributed towards extreme heat and risk communication. All India Disaster Mitigation Institute (AIDMI) provided evidence from five Indian cities on how extreme heat and climate events translate into loss and damage for small businesses. The findings highlighted that those most exposed to climate risks are often least equipped to respond, emphasising the need for **people-centred climate finance** with targeted support for informal women workers, poor households, and home-based producers. They also highlighted the need for integrating small business protection into city-level Heat Action Plans. The regional study conducted by Practical Action Consulting India further highlighted that effective risk communication is not only a technological issue but also a governance challenge, requiring trusted and accessible information, clear decisions, and two-way communication.

"Scale gender-responsive heat action by linking women's leadership, accessible early warning, community solutions, and regional learning."

The wider value of these experiences lies in **regional learning and cooperation**. Local innovations become more influential when they are documented, shared and connected to policy and practice across countries. SIDRRA created such connections by bringing community experiences into regional dialogues, knowledge products and advocacy processes. This demonstrates how regional cooperation can help transform locally grounded practices into shared learning and collective action for a more inclusive and climate-resilient South Asia.

In conclusion, learning from SIDRRA experiences, effective and gender-responsive heat action requires attention to women as active agents, community-led and nature-based solutions, simple and accessible early warning, and stronger regional learning and cooperation. ■



Locals with the risk maps they prepared of their community during a participatory risk mapping activity. (Photo credit: PAC Nepal)

URBAN COOLING

Cooling Communities through Nature: Jalgaon's Green Corridor and Cool Roof Initiative

By ***Amol Kale***, *AIDMI, India*

Heatwaves are no longer an occasional summer challenge—they are becoming an annual reality for cities across India. In Jalgaon, Maharashtra, where summer temperatures frequently exceed 45°C, extreme heat poses serious risks to health, livelihoods, and the quality of life, particularly for low-income families. To address these growing challenges, Jalgaon has initiated two complementary Nature-Based Solutions (NBS): Green Corridors and Cool Roofs.

The Green Corridor initiative envisions the development of a 4-kilometre urban green corridor using native tree species to reduce heat stress and improve environmental conditions. Although the project is in its initial phase, 0.3 kilometres of the corridor has been completed with the plantation of 51 native saplings. These trees have been carefully selected to provide shade, improve air quality, support biodiversity, and create cooler neighbourhoods over time. The initiative also encourages local residents to participate in watering and protecting the trees, fostering a sense of community ownership and ensuring their long-term survival.

Alongside urban greening, the project introduced Cool Roof Solutions in the four hamlets of Samtanagar Slums, where tin-sheet roofs often trap heat and make indoor living conditions extremely uncomfortable during summer. By applying reflective roof coatings, the intervention helps reduce heat absorption, making homes cooler and improving thermal comfort for vulnerable families without relying on expensive cooling systems.



Application of Cool roof solution, Jalgaon, Maharashtra, India.

Following a household survey across the settlement, the project successfully completed Cool Roof installations in 100 households. These homes are now better protected from extreme heat, offering residents a safer and more comfortable living environment during periods of high temperatures. The intervention demonstrates how simple, affordable technologies can make a meaningful difference in improving climate resilience at the household level.

> *"Scale affordable urban cooling by combining green corridors, cool roofs, and community participation in heat-prone neighbourhoods."*

The combination of Green Corridors and Cool Roofs illustrates the value of integrating ecological restoration with community-focused adaptation measures. While the Green Corridor contributes to lowering outdoor temperatures and improving the urban environment, Cool Roofs provide immediate relief inside homes where families spend much of their time.

Jalgaon's experience shows that climate resilience is built through practical action, local participation, and sustained commitment. Every tree planted and every roof transformed represents an investment in healthier communities and a more climate-resilient future. As cities across South Asia continue to experience rising temperatures, initiatives like these offer scalable and affordable solutions that place people, nature, and resilience at the centre of urban development. ■

Intervention Recipient Study: Nirmala Dinesh Gaikwad

"During extreme periods, the sheet metal panels converted the rooms into an oven. Internal conditions became unlivable, matching structural challenges encountered during blackouts."



The Challenge

- During peak summer in Jalgaon, the house became extremely hot during the daytime.
- The roof absorbed excessive heat, making the floors and indoor spaces uncomfortable.
- Even with continuous fan use, the rooms remained hot and suffocating.
- During electricity cuts, the indoor temperature became unbearable within minutes.

The Solution

- Under the "Nature-Based Solutions for Heat and Water Stress" project, sponsored by Tata Trusts and implemented by AIDMI, Practical Action, and Krushi Vikas, a solar-reflective "Cool Roof" coating was applied to the rooftop.
- The coating reflects sunlight and reduces heat absorption, helping maintain lower indoor temperatures.

The Impact

- Noticeable reduction in indoor temperature within four days.
- Floors remained cooler, and indoor heat was reduced significantly.
- Reduced dependence on fans and electricity.
- House remained comfortable for more than two hours during power cuts.
- Improved comfort and living conditions during extreme summer heat. ■

निर्मला दिनेश गायकवाड

"अत्यंत उष्णतेच्या काळात पत्र्याच्या छपरामुळे घर भट्टीसारखे तापत असे. विशेषतः वीज गेल्यानंतर घरात राहणे कठीण होत असे."

समस्या : जळगावमध्ये उन्हाळ्याच्या काळात निर्मला दिनेश गायकवाड यांच्या घरातील पत्र्याचे छप्पर खूप तापत होते. त्यामुळे दिवसा घरातील खोल्या आणि फरशी अतिशय गरम होत असे. पंखा सतत चालू ठेवूनही घरातील उकाडा कमी होत नव्हता. वीज गेल्यानंतर काही मिनिटांतच घरात राहणे कठीण होत असे.

उपाय : "Nature-Based Solutions for Heat and Water Stress" या प्रकल्पांतर्गत घराच्या छपरावर सूर्यकिरण परावर्तित करणारे **कूल रूफ कोटिंग** लावण्यात आले. हा प्रकल्प Tata Trustsच्या सहकार्याने AIDMI, Practical Action आणि Krushi Vikas यांनी राबविला. या कोटिंगमुळे छप्पर कमी उष्णता शोषते आणि घरातील तापमान तुलनेने कमी राहण्यास मदत होते.

परिणाम : कूल रूफ कोटिंग लावल्यानंतर काही दिवसांतच घरातील उष्णता कमी झाल्याचे जाणवले. फरशी अधिक थंड राहू लागली आणि पंखा व विजेवरील अवलंबित्व कमी झाले. वीज गेल्यानंतरही घर दोन तासांपेक्षा अधिक काळ आरामदायी राहिले. त्यामुळे अत्यंत उष्ण हवामानात घरातील राहणीमान अधिक सुरक्षित आणि सोयीचे झाले. ■

COASTAL LIVELIHOODS

Coastal Communities Confront Extreme Heat

By **Harakh Patel,** *AIDMI, India*

Livelihood plays a central role in the lives of home-based women small business owners and artisans in coastal regions of India. Through every season, their daily schedules revolve around the time they need to work on their craft and to carry out daily duties to sustain their household. Extreme heat is an increasing summer occurrence in Odisha. While coastal communities are familiar with preparedness for cyclones and floods, heat does not always receive the same level of attention. However, small home-based businesses and artisans in the coastal district of Puri are growing more conscious of how to protect their livelihoods in extreme climate conditions.

There is a challenge in balancing protecting one's health from heat while not compromising on livelihood development. The outdoor markets in Odisha remain closed from 12 PM to 4 PM during the summer months to reduce exposure and prevent heat-related illnesses faced by both businesses and customers. However, artisans in the Puri district revealed in conversation that artisans face reduced earnings, as market activities shifted to cooler hours, reducing the time they could comfortably allocate to their craft. Heat planning must accordingly consider how changes affect income and daily routines.

Does wanting to protect their income justify keeping the market open during dangerously hot hours of the day? Awareness and inclusion in design are crucial here. We shared with the artisans that the UV rays index during the summer in India reaches highs of 13+ during peak afternoon hours, but drops to moderate levels of 3-5 from 4 PM[2]. The artisans had raised concerns of skin diseases, worsening allergies and irritations, but only just became aware of how UV rays from the sun can lead to these illnesses, contributing to decisive efforts to cool their indoor work spaces to ease working in the afternoon. Interventions combined with awareness allows at-risk populations to be sympathetic of action taken and opens channels for local adaptation solutions.

> *"Protect coastal livelihoods by combining heat-health awareness, safer workspaces, cool roofs, ventilation, and livelihood-sensitive Heat Action Planning."*



"I learned many important points about heat and my health. I practise them, and I have checked my haemoglobin…. I take medicine according to the doctor's advice."
– Binodini Parida, Patachitra Artisan



Applique artisan, Priyanka Iyer, showcasing her applique work in a coastal town in Odisha.

Disaster-resilient infrastructures built in spaces that face co-location of hazards and cascading effects must try to cater to all relevant disaster risks. Home-based small businesses and artisans have reduced exposure to the sun, but still face extreme heat during the day and night. Their homes, now made of cement to protect them from cyclone and flood damage, are structures that harbour and trap heat from the day into late hours of the night.

When optimal night temperatures are not maintained, quality of rest and recovery reduces. Heat stress from the day bleeds into the night and the following days, weakening mental health and intensifying fatigue. While the nature of their work often does not allow artisans to use a fan for cooling, they have recognised the need for effective

[2] Nomadseason. (2026, May 2). UV index in Puri, India. https://nomadseason.com/uv-index/india/odisha/puri.html

cross-ventilation and cool roofs for cement homes. The nature of an artisan's business informs their approach to resilience.

The work of an artisan is physically and mentally demanding, involving continuous detailed and repetitive work. Heightened focus on their work affects their body and eyes. Those with pre-existing illnesses like anemia, asthma and even blood pressure, face magnified effects of extreme heat as their thermoregulation capabilities are hindered.

A woman artisan from the Puri district recognises these worsening conditions of health and their effects on livelihood:

"My workers face existing health challenges including anaemia, asthma and high blood pressure. Their condition gets worse during the extreme heat, affecting their ability to work."

Awareness of heat, health and livelihood connections effectively showcased the importance of regular health check-ups and treatment of existing illnesses to protect both their health and livelihoods. Understanding their own experiences of extreme heat and how it affects their health has fostered a stronger commitment to take initiative in adapting to extreme heat.

Women small business owners and artisans in coastal Odisha continue to take initiative to protect their health and livelihoods from extreme heat. Awareness of how heat and sun exposure interact with their bodies and understanding the role infrastructure plays in extreme heat exposure inform the initiatives they take to strengthen resilience. Building more evidence on the local experience of extreme heat exposure and adaptation can help structure inclusive and supportive policies, thereby encouraging Heat Action Planning for All. ■

CASE STUDY

How Awareness Converts into Action

*By **Binapani Mishra** and **Srikrushna Mohapatra,** SWAD, India*

Aparajeta Pani, 38, lives in Kanjiabazar and works as a patachitra artisan. She employs four other women and supports her family with her income. Her workplace is a small tin-roofed shed, which became extremely hot this year as temperatures rose sharply. To keep the shed cooler, Aparajeta applied white cement to the roof and laid chancha (a mat made of coconut leaves) over it. She also uses stand fans and keeps drinking water in an earthen pot inside the shed.





I felt stressed when my income decreased during the extreme heat season. I cannot work for long hours, and my employees are absent. This seriously affects my income and livelihood. The lessons I learned opened my eyes, and now I take care of my health, along with that of others and strengthen my livelihood.

Through this process, she learned how extreme heat affects human health. She can now identify the peak heat hours of the day and understands how heat can worsen conditions such as high blood pressure (BP), stress, weakness and anaemia. She also learned that anaemia and high BP can seriously affect health, and that excessive sweating or very little sweating can signal an underlying health problem. She recognised the importance of knowing what to do and what not to do during extreme heat.

Earlier, Aparajeta relied only on her own experience and bodily sensations to understand her health, and she had never sought medical advice. The four women who work with her followed the same practice. Having learned how closely health and heat are linked, she tested her haemoglobin and BP, recognising that her health is central to protecting her livelihood and increasing her income. Aparajeta now shares what she has learned with her co-workers and with other women in her neighbourhood, encouraging them to adopt measures that reduce the impact of extreme heat. ■

WAY AHEAD

From Heat Warnings to Heat Action for All

*By **Mihir R. Bhatt,** AIDMI, India*

Extreme heat is no longer only a seasonal weather concern. The experiences brought together in this issue show that heat affects health, livelihoods, household security, water access, working conditions and local economies. It also shows that the impacts are unequal. Women workers, informal workers, home-based producers, small businesses, older persons, persons with disabilities and low-income communities often face the highest exposure with the fewest options to protect themselves.

India has made important progress in forecasting heat and strengthening Heat Action Plans. State and local experiences, including those from Bihar, demonstrate how early warning can be linked with health preparedness, drinking water, cooling spaces, worker protection and community awareness. But the next step is more demanding: **every warning must lead to timely, practical and locally relevant action.**

This requires moving from **Heat Action Plans to Heat Action Planning for All**.

The articles in this issue offer several directions for this shift. First, heat warnings must reach the last mile in formats that people can understand and use. Information is useful only when women workers, street vendors, farmers, delivery workers, home-based producers and vulnerable households know what action to take and have the means to act.

Second, local communities must be treated as partners, not only as recipients of warnings. The experiences from Dehradun and Nepal show the value of women teachers, community groups and local institutions in translating climate information into everyday action. Storytelling, community learning, local leadership and intergenerational knowledge can make heat preparedness more sustained and locally owned.

Third, heat action must address both **health and livelihoods**. Advising workers to avoid peak heat hours is important, but it can also reduce income. Heat planning therefore needs to include shaded workspaces, cooling and rest facilities, safer housing, water access, flexible work arrangements, social protection and financial support. The experience of women artisans and small businesses in coastal Odisha reinforces the need to understand how heat affects working hours, productivity, illness and household responsibilities together.

Fourth, cities and towns need more practical cooling solutions. Jalgaon's experience with cool roofs and green corridors shows how relatively simple measures can reduce indoor heat exposure and improve neighbourhood environments. Such measures should be linked with urban planning, housing improvement and community participation rather than treated as isolated pilots.

> *"A heat warning becomes meaningful only when it enables the most exposed person to protect health, livelihood, and dignity in time."*

Fifth, local innovation must be connected with wider learning. Regional cooperation can help communities and institutions learn from one another, especially on gender-responsive planning, early warning, risk communication and locally led adaptation. What works in one location may not be copied directly elsewhere, but the principles can travel: participation, inclusion, accessibility, local ownership and timely action.

The way ahead is therefore not only to improve forecasts, but to build **systems that enable people to act before heat becomes a crisis**. Heat resilience will be stronger when science, government systems, local organisations and communities work together.

The future of heat action should be judged by a simple question: **Did the warning help the most exposed person protect health, livelihood and dignity in time?**

If the answer is yes, early warning has become early action. If this happens for everyone, Heat Action Planning for All becomes possible. ■

CONTRIBUTORS

1. **Unshielded in the Thermal Crucible: Centring Women's Frontline Livelihoods in the Era of Global Boiling**
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Take these lessons beyond the page. Use this issue of Southasiadisasters.net to strengthen Heat Action Plans, support locally led solutions, protect vulnerable workers and livelihoods, and turn heat warnings into practical early action at home, in communities, cities, and institutions.

The views expressed in this issue are those of the respective authors of each article. *For Personal and Educational Purposes only.*

Editor: Mihir R. Bhatt, All India Disaster Mitigation Institute, India

Editorial Advisors:

Anoja Seneviratne
Disaster Management Centre of Government of Sri Lanka

Denis Nkala
South-South Cooperation and United Nations Development Programme, USA

G. Padmanabhan
Former Emergency Analyst, UNDP, India

Dr. Ian Davis
Global Leader on Disaster Risk Reduction, UK

Dr. Prabodh Dhar Chakrabarti
Formerly Secretary NDMA and Executive Director NIDM, India

Dr. Satchit Balsari, MD, MPH
Harvard FXB Center for Health and Human Rights, USA

ALL INDIA DISASTER MITIGATION INSTITUTE
411 Sakar Five, Behind Old Natraj Cinema, Ashram Road, Ahmedabad–380 009 India.
Tele/Fax: +91-79-2658 2962
E-mail: bestteam@aidmi.org, Website: http://www.aidmi.org, www.southasiadisasters.net
Follow us on: @AIDMI_ORG AIDMI.ORG aidmi_org All India Disaster Mitigation Institute

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