ADRA

A LANDSCAPE STUDY OF

Diverse Climatic Zones on Anticipatory Action in Heatwaves

INDIAN COMMUNITY PERSPECTIVES

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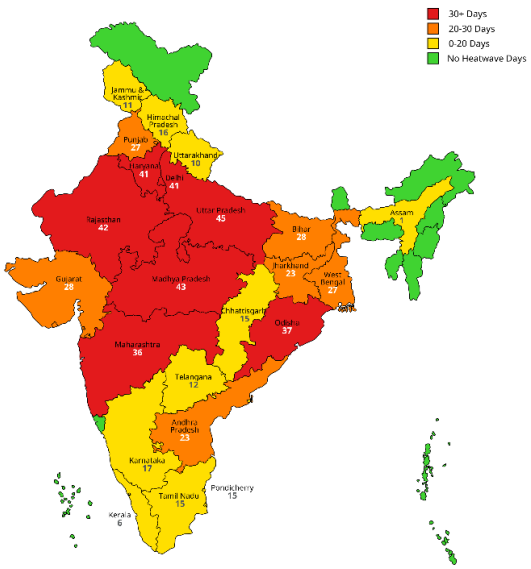
Preface

As India has been experiencing increasingly extreme heatwaves, with the year 2024 being the warmest on record, the urgency for effective heatwave preparedness and response has never been more pressing. In light of the unprecedented challenges posed by these heat events, this report, *"A Landscape Study of Diverse Climatic Zones on Anticipatory Action in Heatwaves: Indian Community Perspectives,"* has been developed as a collaborative effort between the National Disaster Management Authority (NDMA); Integrated Centre for Adaptation to Climate Change, Disaster Risk Reduction and Sustainability (ICARS), Ministry of Science & Technology; and the Adventist Development and Relief Agency (ADRA) India.

No. of Heat Wave Days during March - June 2024 (IMD)



Drawing on the lessons learned from ADRA India's response to the 2024 heatwave, and with the goal of incorporating insights from global efforts in anticipatory action, this study focuses on how anticipatory measures can better prepare communities, especially the most vulnerable, for future heat events. By examining the experiences of small-scale farmers, migrant workers, women, children, daily wage laborers, and other marginalized groups across diverse climatic zones, the study highlights the scope of improvement in the existing systems, including heatwave forecasting, early warnings, and community preparedness.

Through the pilot testing of anticipatory action protocol tools, this report provides a deeper understanding of the patterns, triggers, and impacts of heatwaves, while emphasizing the need for more localized, timely, and effective interventions. The findings aim to inform more robust, evidence-based strategies for mitigating the impacts of heatwaves, building resilience, and strengthening disaster management frameworks.

This document aims to contribute to India's ongoing efforts to enhance its disaster resilience, by aligning national and regional strategies with global best practices for anticipatory action. It also serves as a valuable resource for policymakers, practitioners, and communities in strengthening early warning systems, empowering vulnerable populations, and ensuring long-term climate adaptation in the face of escalating heatwaves.

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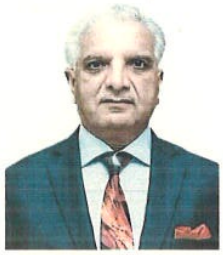

Foreword

It gives me great pleasure to introduce "A Landscape Study of Diverse Climatic Zones on Anticipatory Action in Heatwaves: Indian Community Perspectives," a collaborative effort between the National Disaster Management Authority (NDMA) and the Adventist Development and Relief Agency (ADRA) India. I extend my sincere appreciation to all institutions, organizations, and individuals who have contributed to this vital study.

As India experiences rapid development, integrating disaster risk management into our growth strategies is not just essential—it is urgent. Climate change is intensifying extreme weather events globally, with heatwaves becoming more frequent, prolonged, and severe due to rising global temperatures. India, with its diverse climatic zones, faces unique challenges in managing these heatwaves, particularly as high humidity levels exacerbate their impact.

Heatwaves are not just a meteorological phenomenon; they have serious repercussions for public health, agriculture, water security, and livelihoods. Prolonged exposure can lead to heat stress, heatstroke, and even fatalities, affecting vulnerable populations the most. Additionally, rising temperatures contribute to unpredictable farm yields, extreme weather events, and environmental degradation, threatening India's long-term sustainability.

This study provides valuable insights into how different communities across India's varied climatic zones experience and respond to heatwaves. It highlights best practices, anticipatory action strategies, and community-driven interventions that can enhance preparedness and resilience. The findings will serve as a guiding framework for policy formulation, risk mitigation, and coordinated response mechanisms at local, state, and national levels.

I urge all stakeholders, government agencies, civil society organizations, researchers, and local communities to collaborate in building a proactive, holistic heatwave management strategy. By leveraging community perspectives and scientific data, we can ensure effective anticipatory action, protect vulnerable populations, and build a disaster-resilient India.

Rajendra Singh

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Reference: IITR/DST-ICARS/2025/Doc/ADRA
Date: 09.02 2025

Foreword from ICARS
(Joint CEO of DST-Govt. of India)
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Heat waves are emerging as one of the most pressing climate-induced challenges in India, with increasing frequency, intensity, and duration. Rising global temperatures, compounded by local environmental and socio-economic factors, have made heat waves a critical threat to public health, livelihoods, and sustainable development. Addressing this requires a fundamental shift from reactive crisis management to forward-looking, anticipatory action that enables preparedness, minimizes risks, and strengthens community resilience.

At the ICARS, mandated by the Govt. of India in Department of Science & Technology, we recognize the urgency of developing science-based, data-driven, and locally contextualized strategies to mitigate the impacts of extreme heat. This study, *A Landscape Study of Diverse Climatic Zones on Anticipatory Action in Heat Waves: Indian Community Perspectives*, is an important step toward understanding the diverse vulnerabilities across India's climatic zones and identifying practical measures to enhance preparedness at the grassroots level.

The findings presented here are the result of extensive research, collaborative engagement with key stakeholders, and insights drawn from communities on the frontlines of climate change. By integrating scientific knowledge with indigenous wisdom and participatory approaches, this document offers a roadmap for strengthening early warning systems, improving policy frameworks, and fostering coordination among government agencies, civil society organizations, and local communities.

We extend our sincere appreciation to the National Disaster Management Authority (NDMA), ADRA India, and all contributing agencies and stakeholders for their commitment to advancing anticipatory action in heat wave preparedness. As we continue to witness the far-reaching effects of climate change, it is imperative that we work together to implement proactive solutions that safeguard lives, livelihoods, and ecosystems. Let this study serve as a catalyst for urgent and sustained action, ensuring that India is not only prepared for the heatwaves of today but also resilient to the climate realities of tomorrow.

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Foreword from ADRA India Humanitarian and DRR Team

As the frequency and intensity of heat waves continue to rise across India, the need for proactive and coordinated action has never been more urgent. Heat waves are no longer just a seasonal inconvenience; they have become a critical public health emergency, disproportionately affecting the most vulnerable populations: children, the elderly, daily wage laborers, farmers, and those living in informal settlements. The devastating impacts of extreme heat on health, livelihoods, and economic stability demand a shift from reactive responses to anticipatory actions that can save lives, reduce suffering, and build resilience.

ADRA India, with its decades of experience in humanitarian response and disaster risk reduction, is committed to addressing this growing challenge. Our work in over 20 Indian states (since 1992) has shown us the importance of early warning systems, community preparedness, and multi-stakeholder collaboration in mitigating the effects of climate-induced disasters. This document, A Landscape Study of Diverse Climatic Zones on Anticipatory Action in Heatwaves: Indian Community Perspectives, is a testament to our dedication to empowering communities and institutions to act before disasters strike.

This study is the result of extensive research, pilot testing, and collaboration with key stakeholders, including government agencies, civil society organizations, and vulnerable communities. They provide a comprehensive framework for early action, from identifying triggers and mapping vulnerabilities to implementing response mechanisms and building long-term resilience. By adopting an anticipatory approach, we can not only reduce the immediate impacts of heat waves but also strengthen the capacity of communities to withstand future climate shocks.

We extend our gratitude to the National Disaster Management Authority (NDMA), Integrated Centre for Adaptation to Climate Change, Disaster Risk Reduction and Sustainability (ICARS), Ministry of Science & Technology and our partners in the humanitarian and development sectors for their invaluable contributions to this initiative. Together, we can create a future where no one is left behind in the face of climate change.

Let this document serve as a call to action for all stakeholders, governments, NGOs, communities, and individuals to prioritize heat wave preparedness and invest in anticipatory measures. The time to act is now.

ADRA Humanitarian and DRR Team - Building Resilience, Saving Lives

Acknowledgements

This document, A Landscape Study of Diverse Climatic Zones on Anticipatory Action in Heatwaves: Indian Community Perspectives, is the result of the collective efforts and contributions of many individuals and organizations dedicated to improving climate resilience and preparedness in India.

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“THE YEAR 2024 WAS THE WARMEST ON RECORD SINCE NATIONWIDE TEMPERATURE RECORDS BEGAN IN 1901, WITH INDIA EXPERIENCING 536 HEATWAVE DAYS—THE HIGHEST IN 14 YEARS.”

THE NUMBER OF MAJOR DISASTERS RECORDED BETWEEN 2000 AND 2019 REACHED

7,348

A SHARP INCREASE FROM 4,212 IN THE PREVIOUS TWO DECADES

Background

Climate Change and Its Impact in India

Climate change, driven largely by human activities such as greenhouse gas emissions, has led to a significant rise in global temperatures, resulting in more frequent and intense extreme weather events worldwide. In 2019, over 100 million (m) people were affected by climate-related disasters (EM-DAT). The number of major disasters recorded between 2000 and 2019 reached 7,348, a sharp increase from 4,212 in the previous two decades (UNDRR, 2020). This trend is not only altering weather patterns but also posing serious health threats, with the WHO estimating that 3.6 billion people live in areas highly vulnerable to climate impacts. Between 2030 and 2050, it is expected that climate change will contribute to additional 0.25m deaths annually due to heat stress, undernutrition, malaria, and diarrheal diseases.[1]

One of the most concerning impacts of climate change is the intensification of heatwaves. These extreme heat events are becoming more prolonged and severe due to the increasing global temperatures, with the El Niño phenomenon playing a significant role. During El Niño years, hot air is trapped near the Earth's surface, exacerbating the heatwave effect and leading to even higher temperatures. This connection highlights the complex interplay between climate change and extreme weather events.[2]

India, one of the most climate-vulnerable regions globally, faces severe impacts from climate change. Over 70% of its population lives in rural areas, where livelihoods are heavily dependent on agriculture, livestock rearing, and fisheries, sectors that are highly sensitive to climate variations. The country is already experiencing reduced water availability, unpredictable rainfall patterns, and rising temperatures, all of which are negatively affecting agricultural productivity. Rural India, where 30.9% of the population lives in poverty, is particularly vulnerable to these challenges.

IT IS EXPECTED THAT CLIMATE CHANGE WILL CONTRIBUTE TO ADDITIONAL 0.25M DEATHS ANNUALLY DUE TO HEAT STRESS, UNDERNUTRITION, MALARIA, AND DIARRHEAL DISEASES

The agricultural sector, which employs a significant portion of the rural workforce, faces disruptions from fluctuating crop yields, changing weather patterns, and extreme weather events. Additionally, the fishing and livestock sectors are being impacted, further undermining food and income security. The reduced availability of non-timber forest products (NTFPs) and wild foods, which many rural communities rely on, adds to the strain. As these conditions worsen, rural communities are increasingly dependent on external aid, putting further pressure on already limited resources available for adaptation.[3].

Marginalized communities, which are most reliant on natural resources, are disproportionately affected by climate change. Studies show that their vulnerability is exacerbated by their limited access to resources and the direct impact of climate variability on their livelihoods. With little control over the environmental changes affecting them, these communities are particularly at risk. Without urgent action to mitigate emissions and support adaptation efforts, rural India, especially its poor and marginalized populations, will continue to face escalating challenges to their survival and well-being in the face of climate change.[4]

1 https://www.ipcc.ch/report/ar6/wg1/
2 https://rmets.onlinelibrary.wiley.com/doi/full/10.1002/met.1594
3 https://www.lemonde.fr/en/environment/article/2024/07/06/it-s-like-living-in-an-oven-pakistan-and-india-crushed-by-deadly-heat-waves_6676839_114.html
4 https://www.icimod.org/

Impact of Heat Waves in India

While heat waves are not a new phenomenon in the country, their intensity and frequency have been steadily rising due to the effects of climate change. The year 2024 was the warmest on record since nationwide temperature records began in 1901, with the annual mean land surface air temperature averaging +0.65°C above the long-term average (1991-2020). This surpassed the previous highest anomaly of +0.54°C, recorded in 2016. Heat wave conditions began as early as March 2024 and continued throughout the year, affecting vast areas across the country. In April, the east coast faced intense heat, while May saw widespread heat across northwest India. By June, most of Northern and Central India also experienced heatwave conditions.

Extreme heat was reported since May 15th in Gujarat and persisted across much of the country, including Haryana, Chandigarh & Delhi, and Rajasthan from May 17th, and Madhya Pradesh and Uttar Pradesh from May 18th. These extreme conditions also impacted isolated pockets of Jammu & Kashmir, Himachal Pradesh, Punjab, and Uttar Pradesh. These persistent extreme temperatures have serious implications for several sectors, such as:

Health

Heat waves are a major cause of heat-related illnesses, including heat stroke, dehydration, and heat exhaustion. Vulnerable populations, such as the elderly, women, children, and those with pre-existing health conditions, are especially at risk.[5]

Agriculture

Heat waves, coupled with reduced rainfall and prolonged droughts, adversely affect agriculture, which is a primary livelihood for millions of people in India. Prolonged heat spells during the growing season can cause crop failures, reduce yields, and damage livestock, particularly in regions where irrigation infrastructure is inadequate.

Water

Rising temperatures cause rapid evaporation of water bodies, leading to storage losses and higher water demand across India, especially in northern, eastern, and western regions, including drylands, rainfall-deficit areas, and deserts. This increases the strain on both drinking water supplies and irrigation systems.[6]

Economy

Extreme heat poses a significant threat to labor productivity, especially in sectors requiring outdoor work. According to ILO, India is projected to lose 5.8% of working hours in 2030 due to heat stress, which is equivalent to the loss of 34 million full-time jobs. [7]

Labour

Extreme heat poses a significant threat to labor productivity, especially in sectors requiring outdoor work. India and Pakistan are predicted to lose over 5% of their national wealth by 2030 due to heat stress on labor productivity.

5 https://www.who.int/news-room/fact-sheets/detail/heat waves
6 https://ncdc.mohfw.gov.in/wp-content/uploads/2024/03/Autopsy-Findings-in-Heat-Related-Deaths_March24_NPCCHH.pdf
7 https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40dgreports/%40dcomm/%40publ/documents/publication/wcms_711919.pdf

Livestock

Extreme heat not only poses serious health risk to the animal, but also tremendously impact the economy of the vulnerable farmers. Heat wave can cause death to animals, reduce milk yield in cattle, reduce egg production in poultry. Due to heat wave, animals reduce feed intact thus resulting in reduced production.

Urban

Heat islands in rapidly urbanizing areas exacerbate heatwaves, especially affecting slum dwellers. In cities like Delhi, Mumbai, and Chennai, high temperatures increase mortality rates and strain infrastructure. Massive electricity cuts during summer, driven by high demand from the wealthy, also leave the poor without basic cooling, such as fans.

HEAT WAVE STATISTICS IN INDIA

Mortality Rates: In 2024, these conditions were particularly severe, with 459 casualties reported across India, as per the Annual Climate Summary report by the Ministry of Earth Sciences (MOES), the Indian Meteorological Department (IMD), and the Climate Research & Services (CRS).[8]

Record Temperature: The highest temperature of the year, recorded on May 28th in Churu, West Rajasthan, reached a scorching 50.5°C, as noted in the IMD's press release.[9]

Frequency of Heat Wave Days: India experienced 536 heat wave days this summer, the highest in 14 years, with the northwestern region recording its warmest June since 1901, said the IMD Director General at a virtual press conference.[10]

8 https://mausam.imd.gov.in/Forecast/marquee_data/Annual%20climate%20summary%202024_e%20book%20-%20final_compressed.pdf
9 https://internal.imd.gov.in/press_release/20240529_pr_3027.pdf
10 https://www.hindustantimes.com/india-news/india-saw-536-heatwave-days-this-summer-warmest-june-for-northwestern-region-since-1901-imd-101719851523617.html

COUNTRIES ACROSS ASIA, INCLUDING NEPAL, BANGLADESH, AND INDIA, HAVE ESTABLISHED ANTICIPATORY ACTION FRAMEWORKS FOR VARIOUS DISASTERS

What is Anticipatory Action?

Anticipatory action refers to proactive measures that are taken before a disaster or extreme event occurs, aimed at reducing the impact and building resilience. Unlike traditional reactive responses, which occur after a disaster strikes, anticipatory actions are based on early warning systems, forecasts, and risk analysis, allowing for interventions that mitigate the adverse effects of climate events. [11]

Several countries have successfully implemented anticipatory action measures for heat waves, which provide valuable lessons for India. Countries across Asia, including Nepal, Bangladesh, and India, have established anticipatory action frameworks for various disasters, such as floods, heat waves, and cyclones. Nepal uses flood forecasting systems and community-based disaster management, while Bangladesh has a robust Cyclone Preparedness Program (CPP). In Europe, France, the UK, Spain, and Italy have developed heat wave plans, incorporating early warnings, cooling centers, and urban resilience strategies. The U.S. and Canada emphasize anticipatory actions for heat waves and hurricanes, with timely warnings from the National Hurricane Center and heat action plans in cities like Phoenix and Los Angeles. In Africa, Kenya and South Africa lead with early warning systems for droughts, heat waves, and floods, while in Latin America, Mexico and Brazil have national systems and cooling measures for heat waves, floods, and hurricanes. Australia and Oceania focus on heat waves, floods, and bushfires, with Australia's National Heat Health Action Plan and New Zealand's integrated flood and heat wave preparedness strategies.[12,13]

11 https://www.undrr.org/syndication/anticipatory-action#:~:text=This%20report%20reviews%20the%20feasibility%2C%20behavioural%20and%20political-economy,discusses%20recommendations%20for%20increasing%20support%20for%20these%20interventions

12 https://cerf.un.org/sites/default/files/resources/CERF_and_Anticipatory%20Action_Update_June_2019.pdf#:~:text=Anticipatory%20action%20takes%20place%20before%20the%20humanitarian%20impact,vulnerable%20people%20against%20these%20impacts%20before%20they%20occur

13 https://www.unocha.org/anticipatory-action

The Need for Anticipatory Action for Heat waves in India

Given the growing threat of heat waves in India, anticipatory action is critical for several reasons:

1. **Reducing Mortality and Health Impact**: With early interventions and preparedness, the number of heat wave-related deaths and health complications can be significantly reduced.
2. **Minimizing Economic Losses**: Anticipatory actions can protect agricultural production, reduce losses in sectors like tourism, and prevent the strain on healthcare infrastructure, saving both lives and resources.
3. **Building Resilience to Climate Change**: Heat waves will become more frequent and intense due to climate change. Anticipatory actions help communities adapt to these changes, ensuring they can withstand future extreme events.
4. **Improving Public Awareness**: Raising awareness about heat risks and prevention measures can empower communities to take necessary steps, even before heat waves occur.

KEY HEAT WAVE THRESHOLDS

Heat wave:

Maximum temperature > 40°C for plains, > 30°C for hilly areas.

Severe Heat wave:

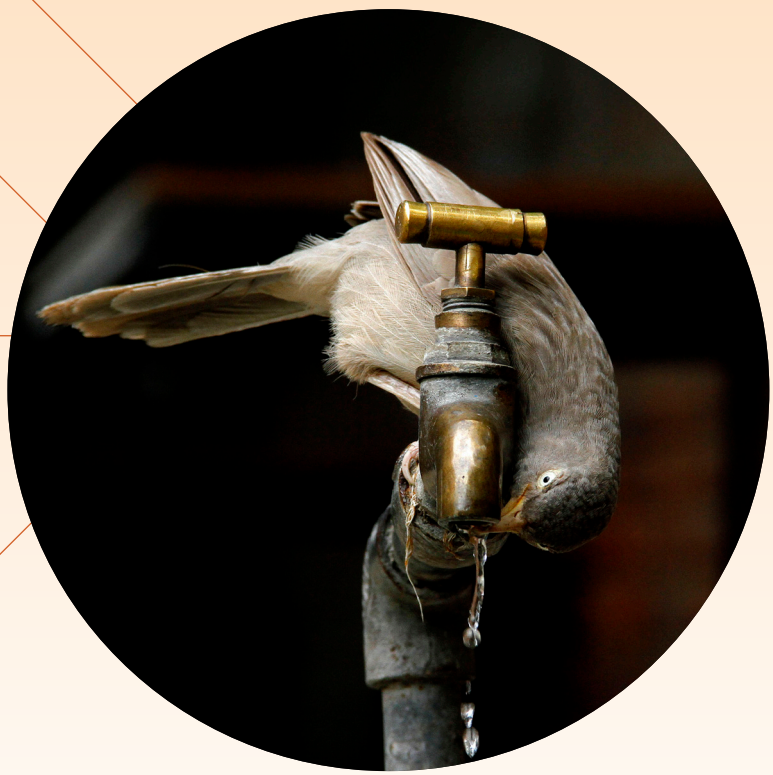
Maximum temperature > 45°C for plains, > 40°C for hilly areas.

Extended Duration:

Heat above these thresholds for 2–3 consecutive days or longer.

Heat Index (feels-like temperature):

> 40–45°C when combined with high humidity.[14]



14 https://ndma.gov.in/Natural-Hazards/Heat-Wave

Perspectives on Heat waves and Anticipatory Action: Insights from Key Stakeholders

NDMA

HW: A Heat Wave is a period of abnormally high temperatures, more than the normal maximum temperature that occurs during the summer season in the North-Western parts of India.

AA: NDMA emphasizes the importance of enhanced preparedness and coordinated efforts to mitigate the adverse effects of extreme heat events, including Heat Action Plans.[15]

IMD

Heat wave is a period of abnormally high temperatures, exceeding the normal maximum temperature during summer season in north-western parts of India. A heat wave is declared when the maximum temperature of a station reaches at least 40°C in plains and 30°C in hilly areas, with a 5°C increase over the normal temperature. A severe heat wave is declared when the temperature exceeds 45°C. While IMD does not officially use the Heat Index in heat wave definitions, it is derived from temperature and humidity to assess heat stress.[16]

IFRC

HW: A heat wave is an extended period of unusually high temperatures and often high humidity. They are expected to become more frequent and more severe in future due to climate change. People affected by heat waves can suffer from shock, become dehydrated and develop serious heat illnesses. Heat waves can also worsen chronic cardiovascular and respiratory diseases.[17]

AA: Early warning and early action, also known as anticipatory action, means taking steps to protect people before a disaster strikes based on early warning or forecasts. To be effective, it must involve meaningful engagement with at-risk communities. [18]

UN

The UN highlights the growing frequency and severity of heatwaves and other climate-related disasters, urging improved early warning systems and community preparedness. Anticipatory action, which involves proactive measures before hazards strike, is increasingly seen as key to saving lives and reducing response costs. As early warning systems evolve, OCHA has worked with partners to promote anticipatory action within the humanitarian sector. The FAO supports this by using risk analysis to trigger timely agricultural interventions, while the WHO stresses the need for precautionary actions during extreme heat events to protect vulnerable populations.[19]

Global Heat Health Information Network

GHHIN recognizes extreme heat as a global health emergency, putting billions at risk. It stresses the need for defining local heat thresholds to trigger interventions and advocates for Heat Action Plans to improve risk communication and strengthen health systems.[20]

ADRA International

ADRA is making a positive impact globally through Anticipatory Action Projects, a proactive approach that responds to potential disasters and climate threats, reducing their impact and protecting lives and livelihoods.[21]

15 https://ndma.gov.in/sites/default/files/PDF/PPTs/TechnicalSession1/01_Kunal_Satyarthi.pdf
16 https://internal.imd.gov.in/section/nhac/dynamic/fdpheatreport2019.pdf
17 https://www.ifrc.org/our-work/disasters-climate-and-crises/what-disaster/heat-waves
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20 https://ghhin.org/
21 https://adraindonesia.org/en/building-resilience-anticipatory-action-project-in-east-nusa-tenggara/#:~:text=Anticipatory%20Action%20is%20a%20proactive%20approach%20that%20focuses,reducing%20their%20impact%20and%20safeguarding%20lives%20and%20livelihoods

Triggers for Early Action

Region	Temperature Threshold	Heat Index (Feels-like)	Other Triggers	Activation Criteria	Example of Geographies/ Regions
Coastal/Water-Rich	> **36-38°C**	> **40°C**	Humidity > **60%**, weak sea breeze	- **Heat Index** > **40°C** due to high humidity - **Prolonged heat exposure** > 2–3 days - Increased **heat stress**	Goa, Kerala, Tamil Nadu, Andhra Pradesh, Odisha, West Bengal, Andaman & Nicobar Islands, Assam, Meghalaya, Tripura
Subtropical/ Tropical Lowlands	> **40-42°C**	> **45°C**	Dry winds, drought, heat stress conditions	- **Temperatures** > **40°C** for **3–4 consecutive days** - **Heat Index** > **45°C** due to high humidity	Uttar Pradesh, Bihar, Jharkhand, Chhattisgarh, Arunachal Pradesh, Nagaland, Manipur, Mizoram
Plains	> **42-44°C**	> **47°C**	Extended dry conditions, winds from desert	- **Maximum temperature** > **46°C** - **Heat Index** > **50°C** - **Extended heat duration** (> 3-4 days)	Maharashtra, Uttar Pradesh, Haryana, Bihar, Madhya Pradesh, Nagaland, Assam
Desert Areas	> **46-48°C**	> **50°C**	Nighttime temperatures > **30°C**	- **Temperature** > **40°C** for **2+ consecutive days** - **Heat Index** > **45°C** for **long durations** (3-4 days)	Rajasthan, Gujarat
Mountainous/ High Altitude	> **35-37°C**	> **40°C**	Unusually high temperatures in valleys	- **Temperature** > **35-37°C** for **2+ consecutive days** - **Heat Index** > **40°C** - **Extended periods** of high temperatures	Himachal Pradesh, Uttarakhand, Jammu & Kashmir, Western Ghats and North Eastern States
Urban Areas	> **40-42°C**	> **45°C**	Urban heat island, Heat stress conditions, night temperature increase, Scorching heat winds	- **Temperature** > **40°C** in urban areas - **Heat Index** > **40°C** combined with **poor air quality** - **Nighttime temperatures** > **30°C**	Mumbai, Delhi, Bangalore, Hyderabad, Kolkata, Chennai, Pune, Ahmedabad, Surat, Jaipur, Chandigarh, Lucknow, Indore, Kochi, etc.

Vulnerability Mapping and Impact of Various Group

The following table presents a detailed Vulnerability Mapping and Impact assessment of various population groups, highlighting their specific vulnerabilities, potential risks, and the need to address these challenges. This data has been derived from an extensive study conducted and supported by expert consultations, offering valuable insights into the impact of heat waves and extreme temperatures on different groups. It identifies how factors such as physical health, caregiving roles, and environmental conditions contribute to heightened susceptibility to heat-related issues. Based on this analysis, the table outlines targeted interventions and support systems necessary to mitigate the risks faced by these vulnerable populations.

Vulnerable Population	Vulnerability	Potential Risks	Needs
Children & Infants	• Increased body heat due to higher metabolic rate and less efficient thermoregulation	Risk of heat stress, dehydration, and heatstroke	Access to shaded areas, proper hydration, and parental awareness campaigns
Adolescent Boys and Girls	• Increased physical activity leading to higher susceptibility to heat stress	Risk of heat exhaustion, dehydration, and heatstroke	Awareness programs, access to cool spaces, and adequate hydration facilities
Women	• Caregiving responsibilities may limit personal care during heat waves	Increased vulnerability due to caregiving roles	Awareness about hydration and heat management, access to cooling resources
Pregnant Women and Lactating Mothers	• Heat-induced dehydration affecting both mother and fetus Higher metabolic rate and less efficient thermoregulation • Increased risk of dehydration due to fluid loss during breastfeeding	Risk of premature birth, low birth weight, and heat-related complications Risk of reduced breast milk production, dehydration, and heat-related illnesses	Access to healthcare, hydration facilities, and shade Awareness programs
Elderly (Men and Women)	• Dehydration due to higher temperature • Weakened Immune Systems making them less tolerant to heat	Cardiovascular and respiratory complications worsened by heat	Access to cooling facilities, regular health check-ups, and community support
Persons with Disabilities (PWDs)	• Heat Sensitivity due to medication or disability affecting thermoregulation • Limited mobility and access to cooling	Risk of heat stress and exacerbation of existing health issues	Assistance with mobility, access to cooling facilities, and tailored support programs
Daily wage labourers/ Street Vendors/ Hawkers/ Migrant Workers/ Drivers/ Construction workers	• Prolonged exposure to heat and lack of cooling systems • Inadequate housing and poor ventilation • Overcrowded living conditions and exposure to heat during travel	Heat exhaustion, dehydration, and heatstroke lack of access to health services	Shaded rest areas, protective gear, hydration stations, awareness campaigns and food security during peak heat days to compensate for livelihood wage loss.

Vulnerable Population	Vulnerability	Potential Risks	Needs
Homeless Individuals/ Families/ Displaced Populations	• Complete exposure to outdoor heat and lack of shelter. Overcrowded temporary shelters with poor ventilation	Inability to access cooling resources, dehydration, and heatstroke lack of access to healthcare	Improved shelter conditions, access to drinking water, and cooling systems
People with Chronic Illnesses	• Increased vulnerability due to pre-existing health conditions	Exacerbation of illnesses (e.g., cardiovascular, respiratory issues)	Regular monitoring, access to healthcare, and tailored cooling solutions
People Living in Informal Settlements (Slums)	• Poorly ventilated housing and lack of access to cooling systems	Heat stress, dehydration, and health complications	Access to drinking water, improved housing infrastructure, information and awareness campaigns, enrollment in eligible social protection schemes and services, and guidance on accessing emergency services
Farmers and Agricultural Workers	• Prolonged exposure to heat during farm work and reduced crop productivity	Dehydration, heatstroke, and economic losses due to crop failure	Access to shaded areas, drought-resistant crops, and irrigation support
Livestock	• The poorly ventilated shed will increase heat in the shed, lon due to lack of green grass and water, livestock kept in an open area and left out to graze, pure breed livestock like Jersey, Holstein Friesian or Piggery farming	Lack of feed intake results in reduced production, high respiration, and bloating in livestock resulting in increased expense on medication, death of animals in severe cases	Sensitizing farmers on improved well-ventilated shed management, use of silage and feed and fodder during heat waves, storage of water (water harvesting plan to be initiated), provision of tarpaulin, avoid overcrowding,

Response Mechanism

The following actions could be activated based on the trigger thresholds detailed in the above section:

Component	Objective	Actions
Early Warning Systems	To provide timely alerts to authorities and the public.	• Establish heat warning systems based on meteorological data to ensure real-time monitoring and information dissemination. • Issue public notifications via apps, media, social media, messaging, and public announcement systems at the community level. • Implement localized alerts. • Define temperature thresholds for triggering actions.
Health and Safety Guidelines	To protect public health during extreme heat.	• Promote hydration and cooling measures. • Advise wearing light clothing, sun protection, and reducing outdoor exposure. • Monitor vulnerable populations.

Component	Objective	Actions
Public Cooling Centers	To provide safe spaces for people to cool down.	• Establish cooling centers by converting community centers, Panchayat Ghars, Marriage Halls, Shelters for homeless, community halls into public cooling centers. • Cooling Centers should be equipped with - Fans, coolers, Water in earth pots with taps, electrolyte kits etc. • Ensure 24/7 availability during heat waves. - Provide hydration and medical support.
Community Outreach & Awareness	To raise awareness and prepare the public for heat waves.	• Conduct educational campaigns via media and community outreach. • Distribute informational materials on heat safety and first aid. • Deploy health workers to vulnerable populations. • Training of local service providers like ASHA workers, Anganwadi workers, teachers
Health Services & Emergency Response	To respond to heat-related medical emergencies.	• Increase healthcare capacity and monitor emergency room visits. • Mobilize ambulances for heat exhaustion or heatstroke cases.
Urban Heat Island Mitigation	To reduce heat intensity in urban areas.	• Promote urban forests through the Nagar Van Yojana to increase green spaces, reduce temperatures, and enhance biodiversity. • Encourage vertical gardening on buildings to add greenery, lower urban heat, and improve air quality. • Preserve lakes and water bodies to provide natural cooling and mitigate urban heat effects.
Energy Infrastructure Resilience	To ensure continuous power for cooling and essential services.	• Prepare energy grids for high demand. • Ensure backup power for cooling centers and hospitals. • Encourage energy-efficient cooling systems.
Heat-Resilient Infrastructure	To make infrastructure resilient to extreme heat.	• Design heat-resilient buildings with energy-efficient cooling systems. • Maintain water supply systems for continuous access during heat waves.
Social Protection Programs	To support vulnerable groups during heat waves.	• Provide subsidies for low-income households. • Distribute relief items (water, cooling packs) to vulnerable communities. • Ensure disbursement of food supplies before the actual heat wave hits to most vulnerable and marginalized. • Ensure fund disbursement of social protection schemes Widow Pension, Disability Pension, Elderly pension etc. • Ensure schools have sufficient supplies for managing Mid-day meal in schools, • Ensure food and water supplies at shelters for the homeless are stocked in sufficient quantities. • Change of timing for work under MGNREGA and other allied programs to be intensified to support the vulnerable and marginalized sections. • Distribution of electrolytes in vulnerable communities, strengthening PHC, Sub-centers, and ICDS services.

Component	Objective	Actions
Multi-Stakeholder Coordination and Collaboration	To strengthen collective efforts and ensure a coordinated, comprehensive response	• Partner with government, NGOs, CSOs, media, communities, and corporates for outreach and support. • Collaborate with government agencies and civil society organizations for technical support and resource mobilization. • Intensify coordination efforts with participation from local stakeholders, including community groups, media, and inter-agency groups.
Long-Term Adaptation Strategies	To build long-term resilience to heat waves and climate change.	• Integrate heat wave response into climate adaptation plans. • Invest in research for local heat vulnerabilities. • Promote behavioral changes (e.g., heat-resilient crops).
Post-Heat Wave Assessment & Evaluation	To improve future response efforts.	• Monitor heat-related health impacts. • Document lessons learned and update response strategies.

Roles & Responsibilities of Various Stakeholders

National-level (NDMA):	• Provide strategic guidance on policies and plans for a coordinated heat wave response and formulate necessary strategies for implementation; • Provide strategic guidance in updating, refinement, or modification of existing heat wave response protocols under emergency response programmes through systematic review and evaluation; evaluate current strategies and advise concerned authorities. • Review the progress on implementation of government projects or programmes on heat wave response and recovery; • Review, amend and finalize the contingency plans adopted by the primary responding agencies; recommend revision of disaster management frameworks to ensure effective implementation of heat wave reduction, response preparedness and recovery activities; • Develop Heat Wave Action Plans at the National level; • If necessary, recommend creating/increase funds for special projects and adopting special strategies for extraordinary crises in relation to heat waves; • Provide guidance to form a forum with relevant experts on heat wave response; • Integrate Anticipatory Action into existing disaster management/contingency plan and define guidelines, policies and activation procedures.
Overall Immediate Rescue and Response (NDRF/ SDRF):	• Ensure coordination in emergency response, humanitarian assistance and recovery activities at the district level; • Prioritize the needs of goods for humanitarian assistance, funds and vehicles/equipment for their deployment; • Assist in the formation of search & rescue teams, and response teams;
State-level (SDMAs):	• Finalize the plans developed by the City Corporation/Municipality and District Disaster Management Committees; • Develop Heat Wave Action Plans at the State level; • Provide necessary guidance and advice to the concerned authorities and personnel for organizing seminars, workshops, etc. to enhance public awareness of heat wave related issues, activities, directives, programmes, laws and byelaws, rules, policies, etc.;

	• Ensure coordination of disaster preparedness, response, humanitarian assistance and recovery activities by governmental and non-governmental organizations; • Ensure implementation of the activities as directed by the NDMA; • Undertake initiatives to mainstream heat wave risk reduction into all state-level development activities; • Evaluate heat wave mitigation and response programmes and share the findings with NDMA; • Review existing heat wave preparedness and public awareness activities, and provide necessary assistance to enhance capacity; take necessary decisions based on the recommendations produced by NDMA formed by government to review heat wave response; • Advise DDMAs and local-level disaster management committees on the appropriate application of laws, regulations, acts, rules and ordinance on heat waves; • Integrate Anticipatory Action into existing disaster management/contingency plan and define guidelines, policies and activation procedures.
District-level (DDMAs):	• Evaluate activities undertaken to enhance heat wave response preparedness; strengthen education and research activities related to heat wave and emergency response; • Finalize heat wave response and recovery plans at the district-level; assist to arrange mock drills and simulation exercises on safe evacuation, search & rescue in heat waves and training programmes; • Coordination of the heat wave risk management approaches and practices adopted by various agencies and organizations at the district level; ensure proper dissemination of alert/warning messages; • Advice all relevant agencies to formulate and implement short, medium and long-term recovery plans to overcome damage and loss due to heat waves at the district level; • Recommend the SDMA to set up temporary offices (if necessary) by the concerned ministry/division in heat wave-affected areas of the district; recommend the SDMA to increase the allocation for humanitarian assistance and recovery programmes in heat wave-affected areas for special cases; • Recommend preparing a database with mobile phone numbers and e-mail addresses of the responsible persons at academic institutions, offices and business centres, and update them in order to communicate in emergency situations; • Engage with ULBs/PRIs for preparing the local-level Heatwave Action Plans. • Integrate Anticipatory Action into existing disaster management/contingency plan and define guidelines, policies and activation procedures.
Civil Societies (UN/ NGOs/CBOs/IAGs)	• Provide specific recommendations for mainstreaming heat wave risk reduction and emergency response into development programs, disaster risk reduction strategies, policy advocacy, community action plans, and public awareness campaigns; • Advise the NDMA on heat wave risk reduction, preparedness for emergency response and humanitarian assistance activities; • Assist to arrange mock drills and simulation exercises on safe evacuation, search & rescue and training programmes; • Provide advice for enhancement of the capacity of the primary and secondary responding individuals/agencies; • Undertake advocacy programmes to enforce the heat wave protocols; • Assist local-level DDMAs to pursue and expand Community Risk Assessment methods in formulating heat wave risk reduction action plans;

	• Implement activities as directed by the NDMA/SDMAs/DDMAs. • Strength psycho-social support for heat wave-affected people and primary responders involved in emergency response activities; • Undertake necessary skill training to ensure gender and social inclusion in heat wave and emergency response preparedness activities; • To conduct research and generate more evidence and learnings on Impact based forecast and response mechanisms
Private Sector:	• Act as a catalyst for creating an enabling space for dialogue for building consensus on heat wave risk reduction actions; • Provide in-kind or direct grant support to implementing government or civil society organisations for emergency response through CSR programmes; • Linking grant support mechanisms with Anticipatory actions protocols for smooth activation and timely response
Media:	• Raising awareness and educating the public about potential disaster risks, mitigation strategies, and evacuation procedures before a heat wave strikes; • Mobilizing public support during heat waves by highlighting the needs of affected communities to encourage donations, volunteerism, and public support for relief efforts.; • Facilitating communication and acting as a bridge between affected communities, relief organizations, and government agencies, facilitating communication and coordination; • Information dissemination by providing real-time updates on the situation during a heat wave, including damage reports, evacuation routes, shelter locations, and relief efforts.
PRI's/ULBs/ People's Representatives (Community-level):	• Monitor weather reports, issue early warnings, and activate Heat Action Plans in coordination with DDMA and health departments. • Set up cooling centers, shelters, and shaded areas for vulnerable populations during extreme heat. • Equip cooling centers with water, medical supplies, and cooling resources (fans, ice packs). • Establish first aid and hydration stations in high-risk areas like markets and bus stations. • Mobilize healthcare workers and quick-response teams for heat-related emergencies. • Coordinate with civil society and local groups to implement community-level heat wave response and recovery. • Maintain contact databases for emergency communication with academic institutions, offices, and businesses. • Support training and psycho-social support for responders and affected individuals, ensuring inclusion in heat wave preparedness.

Best Practice

Community-Led Heat Wave Response in 2024

Introduction

ADRA India has significant experience in community-led approaches to addressing extreme heat wave events and providing emergency relief to vulnerable populations in India. In 2024, as India grappled with severe heatwave conditions, ADRA India activated a targeted community-led humanitarian response in Barmer, Rajasthan, one of the most affected regions. The response, grounded in community-based approaches and focusing on extensive local partnerships and ownership, not only alleviated immediate impacts but also contributed to long-term resilience-building.

Project Overview: With temperatures reaching up to 50°C, the vulnerability of local communities, especially those in remote and marginalized areas, was amplified by pre-existing socio-economic challenges, including water scarcity and limited healthcare access. The project was implemented over one month (May 20 - June 20), reaching over 12,404 individuals through the following activities:

1. Supported 293 vulnerable households (benefiting 1,406 individuals) with **cash-based interventions** to cater to their food and basic needs during the heatwave. Each household received INR 3,000, providing vital relief for essential supplies, primarily food and water.
2. To alleviate the extreme heat's impact, local community leaders spearheaded the establishment of 11 **cooling centers** by converting community halls into safe resting places and offering clean drinking water, fans, and hydration kits. Over 6,540 individuals accessed these centers, significantly improving their comfort and reducing health risks such as heatstroke and dehydration.
3. Community groups focused on building long-term resilience by educating communities on heatwave preparedness. In collaboration with local groups, **Risk Communication & Community Engagement (RCCE)** activities directly reached 456 individuals in Barmer and an additional 4,002 individuals across eight other project locations in India.

Learnings and Challenges:

- Effective coordination with local authorities was crucial, but faster streamlining of communication could improve future responses.
- Community groups played a vital role in spreading heat safety awareness, but further training for leaders would enhance outreach.
- Immediate relief efforts were effective, but there's a need for long-term solutions like strengthening infrastructure for future heatwaves.
- Access to clean drinking water and hydration kits in cooling shelters reduced immediate health risks, but long-term healthcare infrastructure improvements are necessary.

Findings from Pilot Testing of Anticipatory Action Protocol Tools

Context and Background

ADRA India piloted the anticipatory action protocol across several regions in India to understand patterns of heat waves, the preparedness of communities, the impacts they face, the triggers they consider, the accuracy and limitations of forecasts or warnings, and the actions they are taking during the early action period. The study focused on vulnerable groups such as small-scale farmers, migrant workers, women, children, the elderly, and daily wage workers while assessing the effectiveness of existing heat wave forecasting and early warning systems. The findings from this study served as the foundation for developing an evidence-based study, aimed at improving preparedness and reducing the impacts of heat waves on vulnerable communities.

Key Findings and Gap Analysis

KEY FINDINGS:

High Vulnerability of Communities: Small-scale farmers, migrant laborers, daily wage workers, and marginalized groups face severe risks due to heat waves. In Barmer, prolonged heat conditions worsen agricultural losses, while in Jahangirpuri, informal settlement dwellers struggle with extreme heat due to poor infrastructure and lack of cooling spaces.

Increasing Frequency of Heat Waves: Communities report a rise in heat wave occurrences, particularly in regions reliant on outdoor labor and agriculture. In Bangalore, migrant laborers in the construction sector and hawkers struggle with prolonged exposure to heat, leading to increased health risks and lost wages.

Moderate Forecast Accuracy & Limited Lead Time: Forecasts have a 60-70% accuracy rate, but short lead times (often <10 days) hinder adequate preparedness. In Una, farmers noted that weather alerts often arrive late, making it difficult to protect crops and livestock from heat stress.

Challenges in Forecast Dissemination: While meteorological departments and disaster management authorities provide forecasts, gaps exist in last-mile communication, especially in remote areas. In Nalagarh, communities rely heavily on informal networks and local panchayat leaders for weather updates, but the information is often delayed or inconsistent.

Key Triggers & Activation Period: Sustained high temperatures (>40°C) and low humidity are primary heat wave triggers. In Barmer, recurring extreme heat has forced communities to modify planting cycles to avoid extreme weather exposure.

Community-Led Response Mechanisms: Existing response strategies include setting up cooling centers, reinforcing shelters, stockpiling essential supplies, and community awareness initiatives. In Jahangirpuri, local volunteers help disseminate information and set up temporary shade structures, but resources are insufficient to meet growing needs.

Funding Constraints: Preparedness efforts rely primarily on government funds, CSOs and private actors, with limited supplementary contributions.

IN BARMER, RECURRING EXTREME HEAT HAS FORCED COMMUNITIES TO MODIFY PLANTING CYCLES TO AVOID EXTREME WEATHER EXPOSURE

GAP ANALYSIS:

Lack of Localized Early Warning Systems: Forecasting does not provide granular, location-specific data, making it difficult to tailor responses for highly vulnerable areas. In Una, farmers expressed frustration over generic forecasts that do not reflect local microclimates affecting their crops.

Limited Real-Time Data and Short Forecast Lead Time: Forecasting systems need improvement in real-time monitoring and longer lead times (ideally 10-20 days). In Barmer, early warnings often arrive too late, preventing proactive water conservation measures in extreme heat prone areas.

Inadequate Infrastructure & Cooling Solutions: Informal settlements and rural areas lack sufficient cooling centers, shaded spaces, and medical facilities. In Jahangirpuri and Khanjawla, migrant workers reported extreme difficulty finding shaded rest areas during peak summer months, increasing the risk of heatstroke.

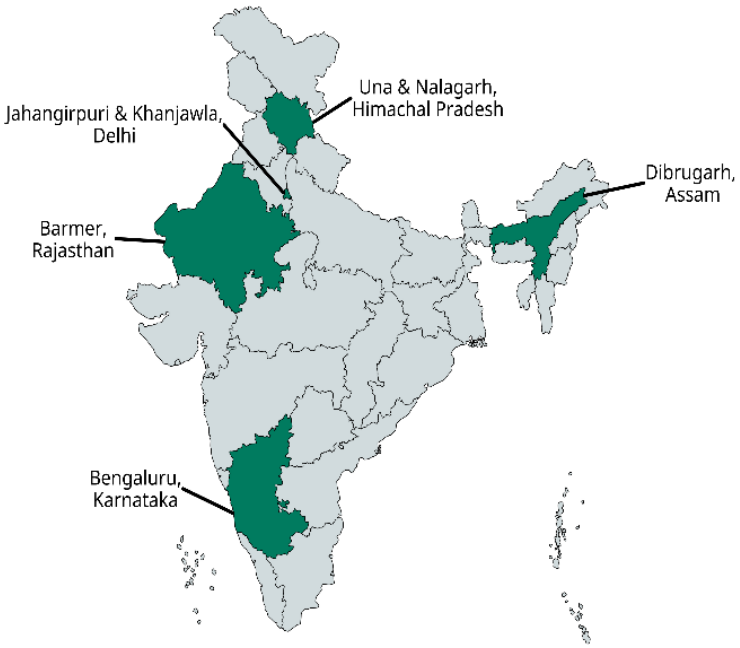
Weak Community Engagement & Awareness: While informal networks help share information, structured training and awareness programs are limited.

Insufficient Financial Safety Nets: Daily wage workers and informal sector employees lack financial support mechanisms. In Bangalore, Barmer and Delhi laborers in the gig economy highlighted the economic hardship caused by lost workdays due to extreme heat, as there is no compensation for missed labor hours.

METHODOLOGY

The study employed a participatory mixed-method approach to capture diverse community experiences and institutional perspectives on heatwave preparedness. To begin with, FGDs were conducted across diverse climatic zones, aiming to explore community perceptions, preparedness measures, and challenges in accessing early warnings. In addition, KIIs with local government officials, meteorological experts, disaster management authorities, and civil society representatives were carried out. These consultations provided valuable insights into the accuracy of forecasts, institutional responses, and recommendations for anticipatory action. The KIIs helped capture institutional gaps and allowed for the identification of opportunities for improvement, particularly in terms of localized forecasts and the accuracy of predictions.

Furthermore, the selection of study regions was strategically designed to represent diverse climatic zones and socio-economic conditions, ensuring a comprehensive understanding of vulnerabilities. Finally, the qualitative data gathered from FGDs and KIIs were thematically analyzed, allowing the study to identify trends, regional variations, and develop actionable recommendations for strengthening the anticipatory action protocol.



GEOGRAPHICAL FOCUS AND STUDY AREAS

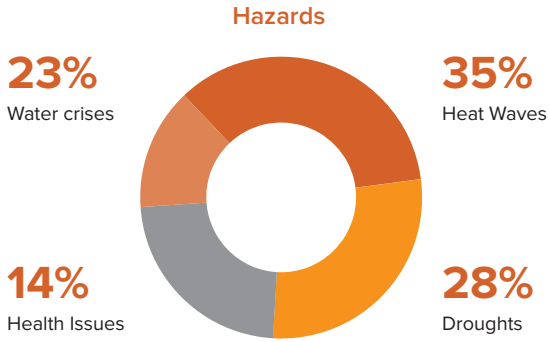
The report covers multiple locations across India, including urban and rural areas highly vulnerable to heat waves, and other climate-related disasters. Key locations include Karnataka (Bangalore), Assam (Dibrugarh), Rajasthan (Barmer), Delhi (Jahangirpuri & Khanjawla), and Himachal Pradesh (Una & Nalagarh)

COMMUNITY VULNERABILITY ASSESSMENT

Based on FGD conducted, most vulnerable groups during heatwaves include children, women, pregnant women, and the elderly, making up 24% of the at-risk population. Scheduled Caste (SC) and Scheduled Tribe (ST) families, along with those in informal settlements, each account for 17% of vulnerability. Migrant laborers and daily wage workers face significant risks at 14%, while inadequate infrastructure and drainage systems contribute another 17% to overall vulnerability. Disabled individuals form 8% of the affected groups, and farmers, due to prolonged exposure, make up 4% of those at high risk.

PRIMARY HAZARDS IDENTIFIED

The discussions revealed that heat waves as the most critical hazard (35%), followed by droughts (28%), water crises (23%), and health issues (14%). Participants emphasized the severe impact of extreme heat on livelihoods, agriculture, and water availability, leading to increased health risks and resource shortages

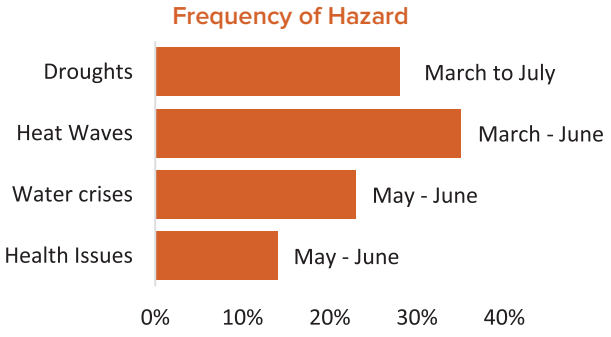


MAGNITUDE/ CATEGORY OF THE HAZARD

It was noted that communities classify heat waves as Category 2 hazards, with moderate to high impacts on health and livelihoods.

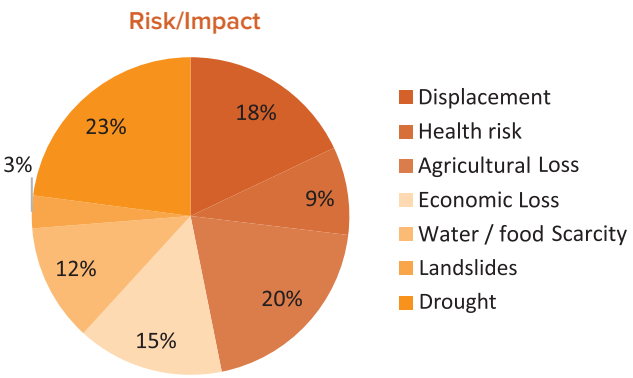
FREQUENCY OF THE HAZARD

According to community feedback, heat waves are a recurring issue, especially during the hotter months in regions with high concentrations of vulnerable workers, such as migrant laborers in urban centers and rural areas heavily dependent on agriculture. The frequency of heat waves is increasing, intensifying the challenges of daily life for outdoor workers, children, elderly individuals, and pregnant women, who are particularly sensitive to heat stress. The timing of these events often overlaps with the agricultural growing season, making it particularly damaging for small-scale farmers and their families.



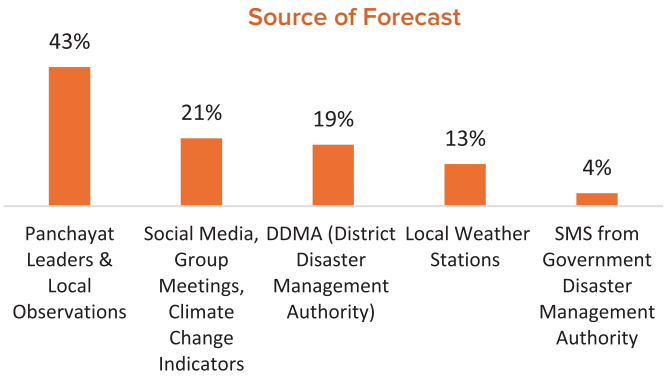
RISK/IMPACT

The findings highlight drought (23%) and agricultural loss (20%) as the most significant risks, severely affecting food security and rural livelihoods. Flooding (18%) and economic loss/displacement (15%) further compound vulnerabilities, especially for low-income communities. Water and food scarcity (12%) is a growing concern, while health risks (9%) underscore the need for better public health preparedness. Landslides (3%), though less frequent, remain a localized threat.



SOURCE OF FORECAST

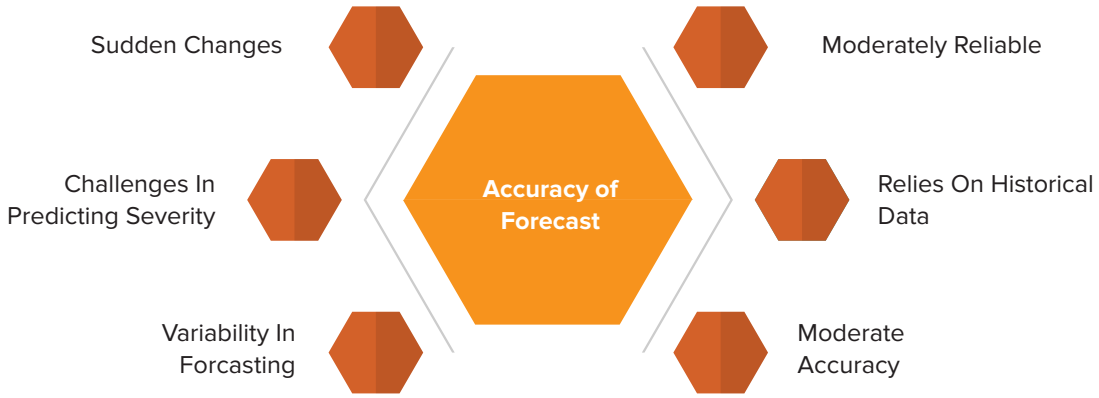
Discussions revealed that IMD and local weather stations (43%) are the primary sources of heatwave forecasts, followed by DDMA (26%) for district-level disaster updates. Panchayat leaders and local observations (13%), along with social media, group meetings, and climate indicators (13%), play a role in community-based awareness. SMS alerts from government disaster authorities (4%) are the least relied upon, indicating a gap in direct digital communication for early warnings.



ACCURACY OF FORECAST

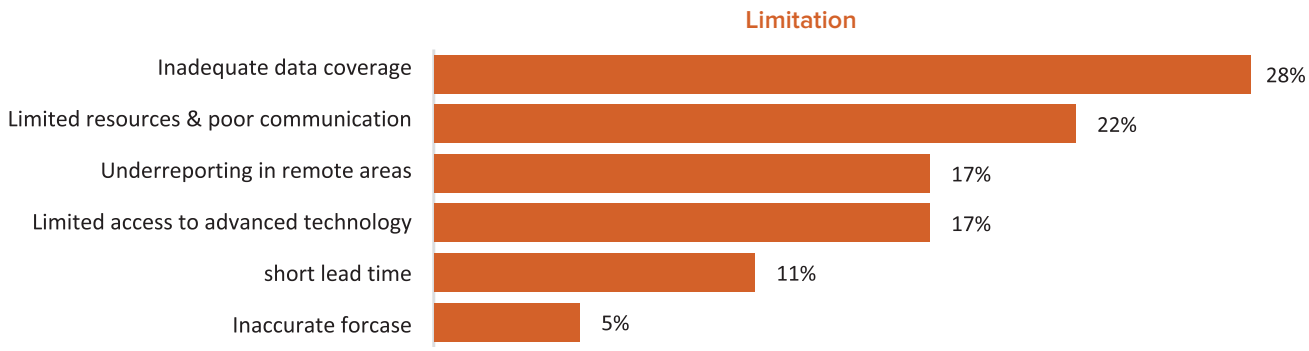
The accuracy of heat wave forecasts is generally **moderate, with a 60-70% accuracy range**. These forecasts rely on historical trends, local knowledge, and past weather patterns, which makes them moderately reliable but not always precise. Some forecasts are moderately to highly accurate, particularly for humidity, but struggles remain in predicting the exact severity, timing, or landslide occurrences. Overall, there is variability, with occasional gaps in forecasting accuracy.

CHALLENGES AND LIMITATIONS OF FORECAST



Heatwave forecasting faces major challenges, including inadequate data coverage (28%), limited resources and poor communication (22%), and restricted access to advanced technology (17%), leading to underreporting in remote areas (17%). Additionally, short lead times (11%) and inaccurate forecasts (5%) hinder preparedness. Misinformation, seasonal variations, and lack of localized data further impact the accuracy and effectiveness of forecasts.

TYPE OF DATA



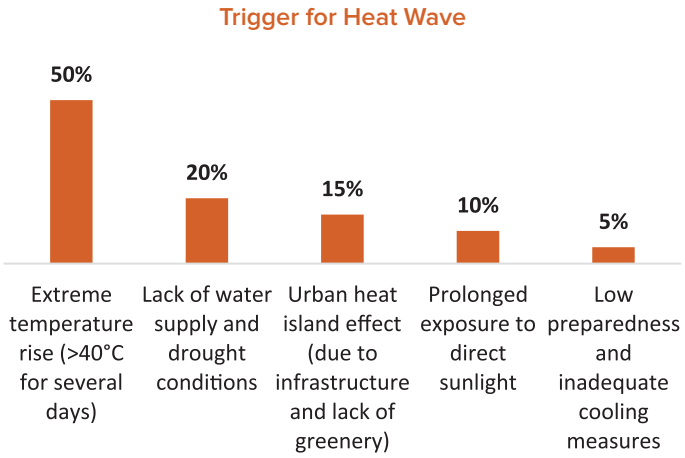
The key data used for Heat wave prediction and preparedness includes SMS alerts, news publications, and local observations like hot sun, rainfall measurements, drainage patterns, and river water levels.

EXPECTED LEAD TIME/TIMELINE OF FORECAST

For heat waves, community feels **an ideal lead time of 10-20 days** is necessary to allow vulnerable groups to prepare. Migrant laborers, hawkers, and other informal workers need sufficient time to adjust their schedules, seek alternative work options, or find shelter during peak heat. The shorter the lead time, the more difficult it is for these groups to take protective measures, which can lead to significant health and economic consequences.

TRIGGER

Heatwaves are primarily triggered by extreme temperature rise (50%), intensified by water shortages and drought conditions (20%). The urban heat island effect (15%), caused by dense infrastructure and lack of greenery, further exacerbates the situation. Prolonged exposure to direct sunlight (10%) increases health risks, while low preparedness and inadequate cooling measures (5%) contribute to the severity of impacts.

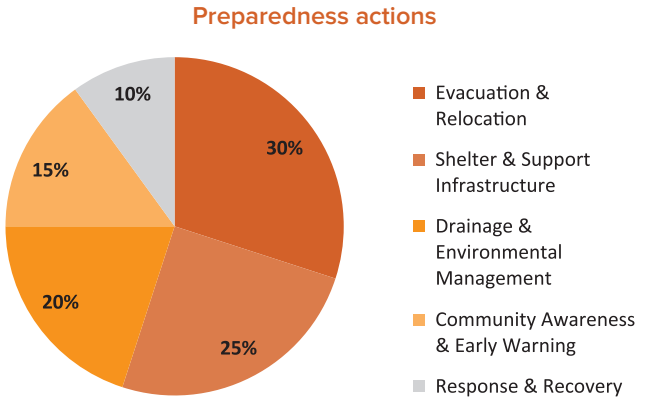


ACTIVATION PERIOD (TIMELINE)

The activation period for heat wave response **typically begins 10-15 days before the onset**, allowing for the early mobilization of resources and the implementation of protective measures. This period is crucial for informing migrant laborers, hawkers, and other informal workers, who can take action to minimize their exposure to extreme heat or reduce its impact on their livelihoods.

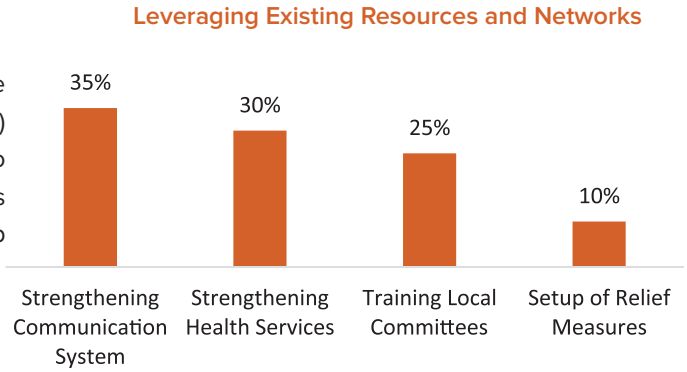
PREPAREDNESS ACTIONS

Based on the discussion with Heatwave preparedness includes evacuation and relocation (30%) for high-risk populations, along with shelter and support infrastructure (25%) to provide cooling and relief. Drainage and environmental management (20%) help mitigate heat effects, while community awareness and early warning systems (15%) enhance preparedness. Finally, response and recovery efforts (10%) ensure timely aid and long-term resilience.



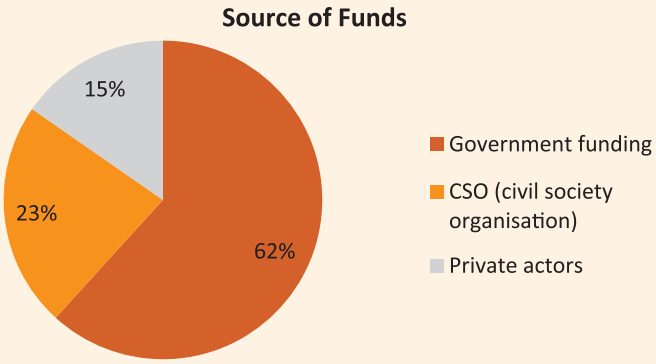
LEVERAGING EXISTING RESOURCES AND NETWORKS

Leveraging existing resources for heatwave response focuses on strengthening communication systems (35%) for timely alerts, enhancing health services (30%) to manage heat-related illnesses, training local committees (25%) for community-led preparedness, and setting up relief measures (10%) to support affected populations.



SOURCES OF FUNDING

For heat wave preparedness and response, Funding primarily comes from Government funding (62%), followed by contributions from civil society organizations (23%), with additional support from private actors (15%).



RECOMMENDED ACTIONS FOR IMPROVED PREPAREDNESS AND RESPONSE

While the community is informed through various channels in response to predicted heat waves, relief teams are mobilized swiftly, focusing on protecting at-risk populations and ensuring access to essential needs. To further strengthen heat wave preparedness and response, the following key recommendations are proposed:

1. **Establish early warning systems** with real-time heat wave forecasts and localized alerts, ensuring timely dissemination through SMS, media, and community channels, and integrate awareness campaigns on heat safety.

2. **Promote health and safety measures**, including hydration, cooling strategies, and heat safety guidelines, with local outreach and training for community health workers to support vulnerable groups.

3. **Set up cooling centers** in community spaces, ensuring continuous access to hydration, cooling resources, and medical support during heat events.

4. **Enhance healthcare capacity** by setting up temporary clinics, mobilizing ambulances, and training health workers to manage heat-related emergencies, especially for at-risk populations.

5. **Implement urban heat mitigation strategies** and promote long-term adaptation through sustainable urban planning, green spaces, and water conservation to reduce heat impacts.

6. **Strengthen energy infrastructure** with backup power systems for cooling centers and critical services, and promote energy-efficient cooling solutions to ensure continuity during heat waves.

7. **Provide social protection and financial support** to vulnerable populations, ensuring relief items, adjusting work schedules, and strengthening safety nets through subsidies, pensions, and other protective programs.

8. **Foster multi-stakeholder collaboration** for resource mobilization, community engagement, and post-heat wave evaluation to improve future responses. Integrate heat wave preparedness into broader climate adaptation plans to build long-term resilience.

Annexures

List of Enumerators:

Delhi	Rajasthan	Assam	Himachal Pradesh	Bangalore (Karnataka)
• Mr. Jeetu • Ms. Hema • Ms. Mariamma PS • Ms. Parvesh • Mr. Vijayababu K	• Mr. Choru Ram Sain • Mr. Mangi Lal • Ms. Mamta • Ms. Dhudi	• Mr. Raktim Konwar • Mr. Debanga Bhusan Bora • Ms. Purabi Borah • Mr. Abhilash Dutta • Ms. Darshana Saikia	• Ms. Shikha Mehta • Mr. Budhi Singh	• Mr. Shankar Naika • Ms. Ashlin Racheal George • Mr. Vasim Pasha

Tools for FGDs and KIIs:

Community Voices:

Mr. Choru Ram Sain,
Barmer, Rajasthan

"During heatwaves, communities often face a lack of work and seek support in the form of food, water, and financial assistance. Last year, ADRA India made a significant impact by assessing community halls for setting up cooling centers and providing necessary supplies"

Mr. Jeetu,
Shiv Vihar, Delhi

"Farmers and daily wage laborers in our area are severely affected during heatwaves. It would be beneficial to arrange water supplies and set up shelters to help protect people during the peak summers."

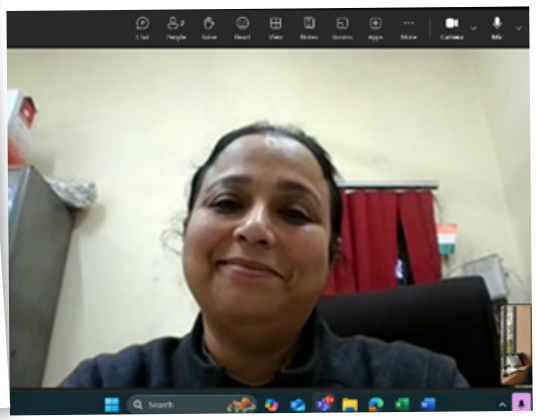
Mr. Lal Chand Thakur,
Nalagarh, Himachal Pradesh

"Heatwaves often lead to illnesses, particularly skin diseases, in our area. Awareness programs and the installation of water coolers, especially for slum dwellers, would be helpful"

Mr. Hirender Kumar,
Una, Himachal Pradesh

"Over the past 2-3 years, heatwaves have become more severe, primarily due to human activities like deforestation, mining, and pollution. The impacts are felt directly on people's health, as well as agriculture and livestock. To address this, we should focus on planting more trees, using fewer vehicles, and creating storage facilities for natural water."

Pictures of FGDs and KIIs



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Compassion
Love

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