CDKN

Climate & Development Knowledge Network

Addressing heat-related health risks in urban India: Ahmedabad's Heat Action Plan

Key messages

- Climate change is fuelling more intense and frequent heat waves in India. A new scale of coordinated action is essential to protect communities, especially their most vulnerable members, from the dangerous health effects of extreme heat.

- In Ahmedabad, Western India, strong local government leadership enabled the highly effective implementation of a pilot Heat Action Plan – the first of its kind in South Asia – and its continuation following completion of the pilot project.

- The Plan, which is based on robust scientific research, builds public awareness of the risks of extreme heat, trains medical and community workers to prevent and respond to heat-related illnesses, and coordinates an interagency emergency response effort when heat waves hit.

- Sharing international experiences and best practices helped change the perception among project stakeholders that heat was not a significant health threat. However, further awareness-raising is still necessary to convince the general public.

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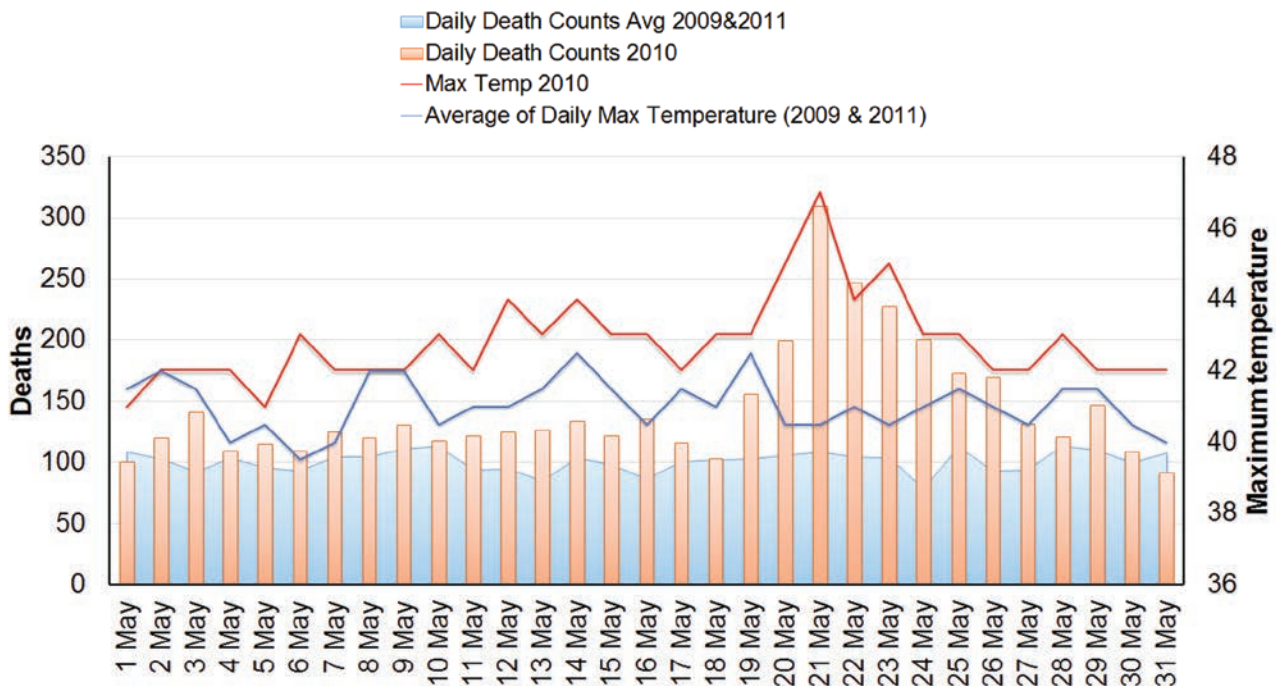**Anjali Jaiswal and Meredith Connolly**, Natural Resources Defense Council

Higher daily peak temperatures and longer, more intense heat waves are becoming increasingly frequent globally due to climate change, and a new scale of coordinated action is essential to prevent the dangerous health effects of heat stress. Led by the Natural Resources Defense Council (NRDC) and the Indian Institute of Public Health (IIPH), a coalition of academic, health and environmental groups partnered to prepare local communities for increasingly extreme heat in the city of Ahmedabad, located in Gujarat state of Western India, through an early warning system and heat preparedness plan. Ahmedabad is the first city in South Asia to comprehensively address the health threats of extreme heat. This model can be adapted for other rapidly urbanising cities to prepare for heat waves, as well as other extreme weather events such as flooding and cyclones.

In May 2010, a deadly heat wave hit Ahmedabad. Peak temperatures of 46.8°C (116°F) caused a spike in reported heat-related illness and death. As part of the body of science developed for this project found, the May 2010 heat wave was associated with significant excess all-cause mortality: 4,462 all-cause deaths occurred, comprising an excess of 1,344 all-cause deaths, an estimated 43.1% increase when compared to the reference period (3,118 deaths).

With climate change creating more frequent and more intense heat waves, the local government recognised the need for a plan to protect local communities from the dangerous health effects of heat stress. Despite the lack of a national policy on extreme heat, the State of Gujarat and the city of Ahmedabad wanted to prepare for this rising threat as part of their broader climate adaptation efforts. Public health, environmental and academic groups, led by the Ahmedabad Municipal Corporation, IIPH-Gandhinagar, the Public Health Foundation of India, and the NRDC, in partnership with Emory University's Rollins School of Public

Legend:
- Daily Death Counts Avg 2009&2011
- Daily Death Counts 2010
- Max Temp 2010
- Average of Daily Max Temperature (2009 & 2011)

Source: Azhar, G.S. et al. (2014)

Health, Icahn School of Medicine at Mount Sinai, Georgia Institute of Technology and Sri Ramachandra University, as well as the Climate Development and Knowledge Network (CDKN) and the Indo-US Science and Technology Forum, formed a coalition to address these heat-induced health threats through an early warning system and heat preparedness plan.

The coalition's expected outcomes focused on improving the climate adaptation capacity of Ahmedabad Municipal Corporation when heat waves hit. The team aimed to improve heat disaster response planning at local and state levels by crafting an interagency heat action plan and related strategies, and by increasing related capacities in local health centres. Another goal was to improve communication within the government and with the public ahead of extreme heat events by issuing advance warnings among agencies and through the media. The team also aimed to increase resilience among vulnerable populations in Ahmedabad through community outreach and education, using training and communication materials developed specifically for slum communities, urban health centres and schools. Finally, the coalition hoped to improve worker safety protocols during heat waves through specific policy recommendations and awareness-raising.

Putting the Heat Action Plan into practice

Creating a strong partnership

Building strong relationships among the city and partners was an essential first step. In researching partners, IIPH and NRDC reached out to several city and state leaders. The Ahmedabad Municipal Corporation was the most eager to take action on heat waves. The Corporation was ready to take action on the growing threat of extreme heat because of the devastating 2010 heat wave that crippled the city and inundated hospital wards. IIPH and NRDC first coordinated with the State of Gujarat, which was also keen to expand its climate adaptation efforts. This unique partnership among city officials, international experts and a well-respected local institution provided strong leadership, a local network and public health resources for implementation on the ground. The group then partnered with international public health and forecasting experts to strengthen the project's scientific foundation and outreach capacity.

The group was able to build trust, confidence and the political will to act on the local level by engaging local medical professionals who underscored to municipal leaders the dangers that

extreme heat posed for Ahmedabad's communities. The team also highlighted how government leadership and action could save lives, at low cost. Engaging multiple levels of government, from the health department to the mayor and commissioner offices, expanded support for action.

Building a foundation of scientific research and outreach

Scientific research on the current effects of extreme heat on local communities also served to create political will to develop the Heat Action Plan. To kick off the project, the coalition held a workshop with medical and government officials to map the city's existing public health infrastructure, both for responding to heat stress and sensitising stakeholders to the health dangers of extreme heat. Extensive research included: compiling temperature and mortality data, conducting heat vulnerability surveys, and creating focus groups with health-care professionals, as well as round tables with international experts. Researchers interviewed hundreds of members of slum communities and outdoor workers about their experience with extreme heat. The coalition of partners worked with public health and policy experts to analyse heat-health response plans around the world. Realising the need to improve intergovernmental communications of weather forecasts, the team also explored longer-term forecasting options to provide earlier warnings.

Of the more than 7 million people living in Ahmedabad, project partners identified children, elderly people, the residents of slum communities, and outdoor workers as particularly at risk to the health effects of heat. Based on this research, the team released four related policy briefs with findings and recommendations for each of these vulnerable groups in a series entitled 'Rising Temperatures, Deadly Threat'. Targeting an audience of decision-makers and key stakeholders, these policy briefs summarised the science of identifying local residents who are vulnerable to extreme heat, and encourage municipal and business groups to take action in response.

Figure 1. An example of a heat warning announcement
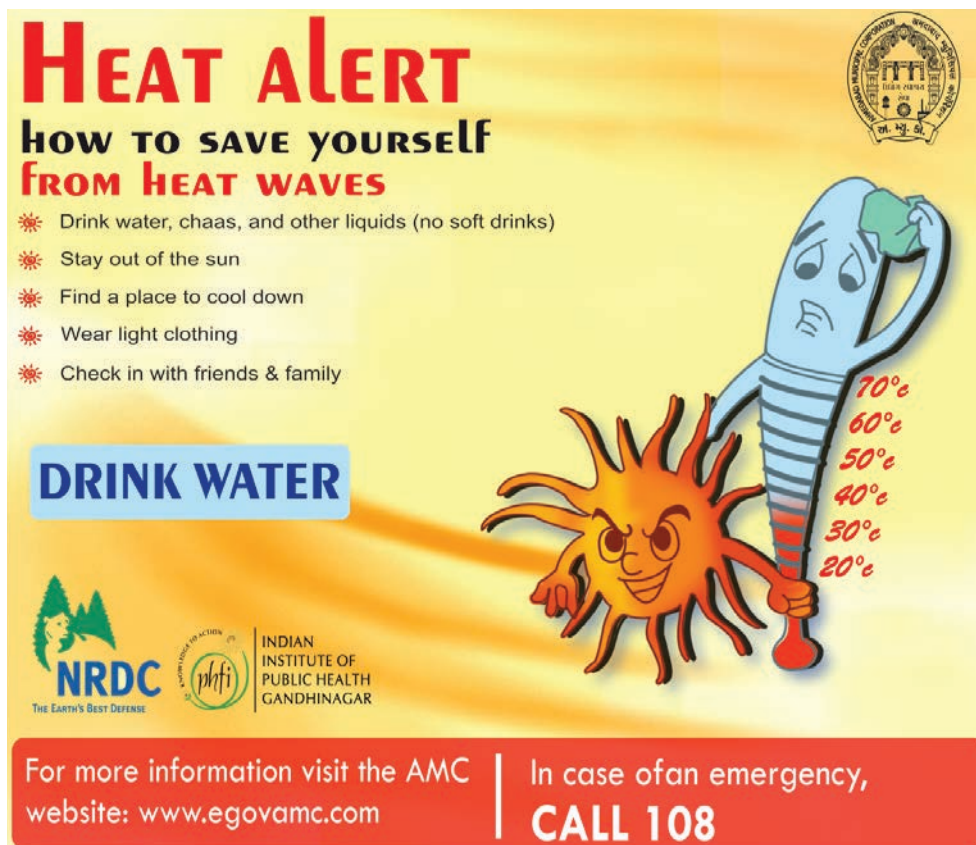
Our first priority is the people of Ahmedabad, and they need to be protected from the impacts of climate change. Our Heat Action Plan provides the roadmap we need to save lives when the next dangerous heat wave hits.

– Shri Guruprasad Mohapatra, Ahmedabad Municipal Corporation Commissioner

To put these recommendations into action, the partners crafted Ahmedabad's Heat Action Plan, which was adopted by the Ahmedabad Municipal Corporation with a dedicated a budget to cover its inaugural actions. The Plan aims to reduce heat-related health impacts on vulnerable populations based on the team's scientific research and international best practices. By outlining strategies for coordinated government agency action, the comprehensive 36-page Plan serves as a master guide to the city government and local community. The Plan was crafted to include immediate and longer-term actions to increase preparedness, information-sharing and coordinate heat wave responses. To enable quick adoption during the first year, the team created a shorter version that strategically focused on three key activities: i) a community outreach campaign on preparedness and prevention regarding heat-related illness; ii) a simple early warning system; and iii) capacity building among health-care professionals.

Implementing Heat Action Plan strategies

To develop the priority early warning interventions for the inaugural launch,

the project team conducted a 'table top exercise' with government agencies to simulate a heat event. Based on feedback from this workshop, the team modified the contemplated agency actions to ensure the first year's activities were realistic and effective.

The City of Ahmedabad appointed its Health Department as the lead agency with the overarching responsibility to coordinate all municipal activities. This agency monitors daily temperature forecasts, sending heat-health alerts and disseminating public health messages to local government departments, as well as working to increase media awareness regarding preparedness. Appointing a municipal agency that already had procedures in place to coordinate the city's public health efforts helped leverage existing infrastructure and communication channels to adopt the Heat Action Plan ahead of the 2013 heat season.

The coalition hosted separate training workshops with municipal medical officers, health department professionals, the meteorological department, the media and civil society. For community outreach, the team designed hoardings (billboards), which the government displayed across the city, as well as advertisements and pamphlets in English and Gujarati (the primary local language), which the government published and distributed. These simple publications used straightforward text, sometimes coupled with illustrations, listing the symptoms of heat stress and how to protect oneself during extreme heat events (Figure 1). The coalition also engaged with the private sector: the local emergency response group now

You cannot build the well once the fire starts. You need to have already dug the well, bought the pump, and put everything in place beforehand. By planning ahead, we can prepare for heat waves before they hit and save many more lives.

– Dr Dileep Mavalankar, Dean of the Indian Institute of Public Health, Gandhinagar

includes heat warnings internally to its employees. The team is continuing its outreach to local employers of outdoor workers to provide work shifts at non-peak temperature times and better heat stress protection such as water, shade and breaks.

The coalition is currently working with city officials to evaluate and assess the effectiveness of the inaugural Plan and improve its programmes and further analyse the evaluation results once completed. Initial responses from the Ahmedabad Municipal Corporation indicate that heat health awareness has improved among residents, and support for the expansion of the Heat Action Plan remains strong.

Table 1 outlines the activities that were carried out by the coalition in the city of Ahmedabad as a part of implementation of the Heat Action Plan, officially launched by the Municipal Commissioner and Mayor.

Key lessons

Recognise heat as a disaster and growing health threat. Although extreme heat had already caused severe health impacts in Ahmedabad,

Table 1. Inaugural 2013 Ahmedabad Heat Action Plan activities

	Activity	Implementing partner
Prior to hot season	Workshops and meetings of officials of health and other key departments, including a mock heat alert	project team
	Training of urban health centre medical officers	project team
	Sensitisation of hospital superintendents, physicians and '108 Emergency Response Services' to heat-health risks	project team
	Health facility preparedness: air-conditioned wards, supplying ice packs	Ahmedabad Municipal Corporation
	Media engagement including workshops and meetings to raise awareness on extreme heat through television, radio and print outlets • 6,000 pamphlets distributed to school children and other vulnerable populations • large hoardings (billboards) displayed at a dozen locations around Ahmedabad • banners attached to rickshaws • digital visual displays (containing the temperature, information of heat illness symptoms and precautions)	Ahmedabad Municipal Corporation and project team
During hot season	Dissemination of regular heat alerts and information to local agencies and stakeholders through emails and text messages	Ahmedabad Municipal Corporation and project team
	Dissemination of 'red alert' emails to all other departments including traffic and city police, fire fighters and school authorities	Ahmedabad Municipal Corporation
	All city gardens kept open during afternoon hours to provide shaded areas for the general public	Ahmedabad Municipal Corporation
	Continuous monitoring of heat illnesses and daily deaths	Ahmedabad Municipal Corporation
	Press releases of heat alerts disseminated to the public through the media (newspaper, radio and television outlets), and ongoing public outreach campaigns described above	Ahmedabad Municipal Corporation and project team
	Ongoing media engagement to keep press up to date regarding heat season activities	Ahmedabad Municipal Corporation and project team
Post hot season	Analysis of completed activities and data collected during inaugural phases	project team
	Procuring weather gauge instruments for better local monitoring of temperature and other weather change parameters in future	Ahmedabad Municipal Corporation and project team
	Reorientation of all medical and paramedical staff	Ahmedabad Municipal Corporation and project team
	Dissemination of the 'dos and don'ts during a heat wave' through the media ahead of next heat season	Ahmedabad Municipal Corporation and project team

government officials and the public did not consider heat waves as disasters – disasters that will intensify because of climate change and will require high-level preparation like there is monsoons and earthquakes. Sharing heat wave mortality information and preparation plans from Europe, the United States and elsewhere helped change this perception. Specifically, heat adaptation plans initiated in by other cities offered best practices that were adaptable to the Indian context. Awareness-building through education campaigns is still necessary to encourage the general public to take additional preventive steps.

The city's leaders have taken ownership of the project and are continuing to lead the early warning system since the pilot project's completion. Municipal leaders in Ahmedabad have budgeted for many of the activities outlined above in Table 1, demonstrating an ongoing financial commitment.

Share methods with other cities to create broader impact. The soaring temperatures and resulting deaths propelled the National Disaster Management Authority to recommend that heat waves be considered natural disasters in a letter to the Prime

Minister, who has assigned a group of ministers to discuss the issue in 2013. Leading cities and states across the country have contacted the coalition to develop their own heat action plans. Some aspects of the Heat Action Plan, such as community awareness messaging to keep cool, can simply be adopted by other Indian municipalities given the similarities across cities, while other portions such as temperature thresholds for the early warning system need to be locally developed.

Encourage interagency communication and coordination. At the beginning of the project, communication among municipal agencies regarding heat waves was limited. Weather warnings were not being widely communicated to the local government and hospitals, and the general public was not alerted prior to impending heat waves. It quickly became clear that enhancing communication and providing public warnings were essential elements to successfully preparing local

communities for extreme heat. The team tried to identify existing efforts and protocols to build on, such as appointing a lead officer already within the municipal health department and using established emergency procedures and low-cost media outlets to reach the public (Figure 2). Leveraging existing national, state and local programmes and infrastructure facilitated implementation of the Plan. Improving formal communication channels, developing longer-term

Figure 2. Communications chart for Ahmedabad's Heat Action Plan
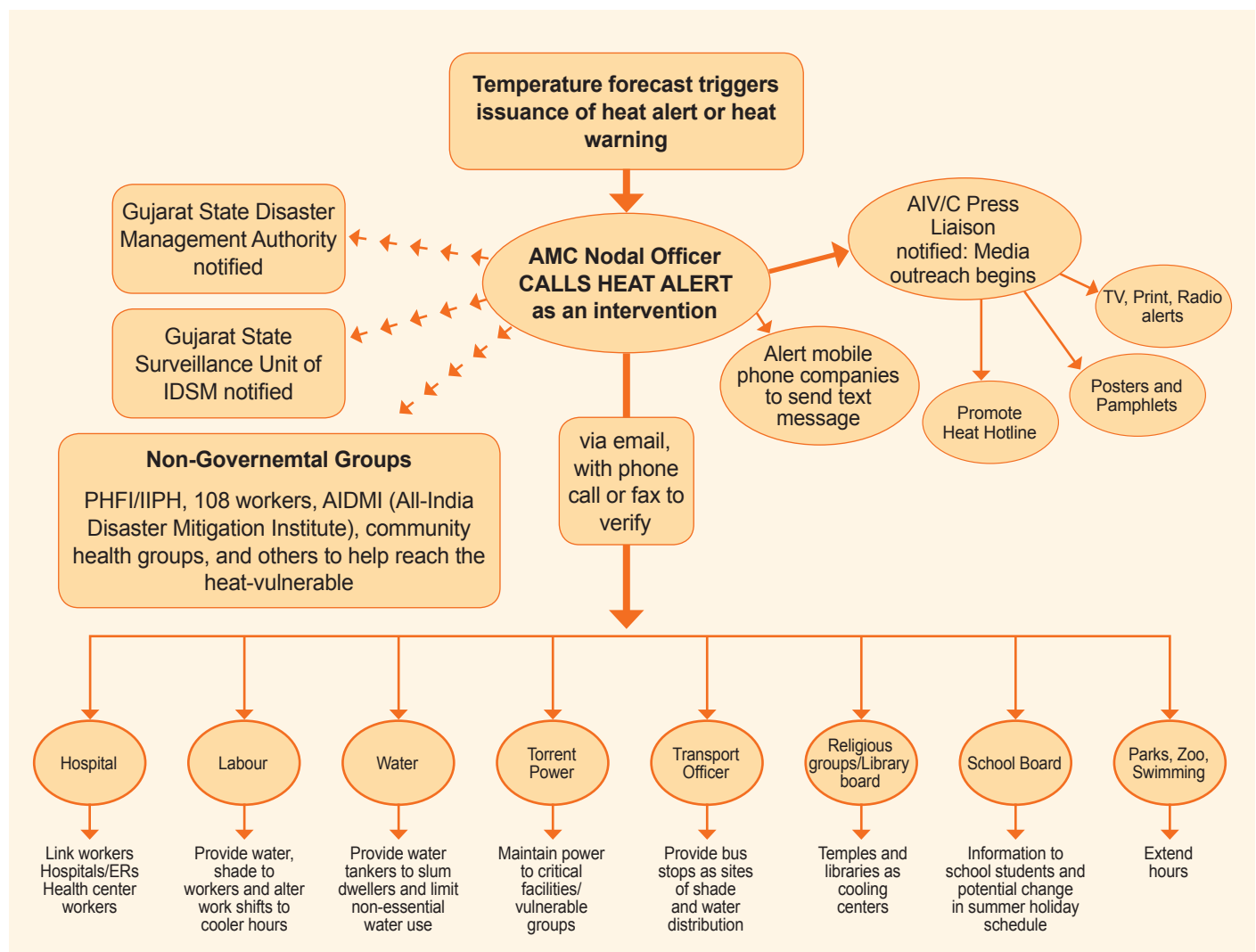
forecasting tools, and designating a lead officer within the city government to direct heat-related efforts became key components of the plan.

Overcome data collection barriers. Collecting temperature and mortality data proved more challenging than expected, in part because hospitals did not monitor heat-related illnesses and deaths. Extreme heat vulnerability was initially not recognised as a public health hazard that could be reduced. Implementation of the Heat Action Plan elevated the visibility of the coalition's efforts and the team's role as a non-governmental third party, which helped researchers develop trust and build relationships. However, although hospitals have begun monitoring heat-related cases, the team was not able to incorporate many tools to monitor health threats and evaluate the effectiveness of interventions during the 2013 heat season, and this will limit tracking of the Plan's impact until a baseline can be developed.

Accommodate time constraints and budgetary concerns. As in many cities, financial resources in Ahmedabad are precious and must be allocated judiciously. Responding to budgetary concerns and timing constraints, project partners worked with the city to identify policies and programmes that would have the biggest impact for the most at-risk groups. The team prioritised short-term and long-term recommendations for vulnerable populations within the policy briefs and the Heat Action Plan to ensure cost-effective and quick adoption of initial measures by the local government ahead of the 2013 heat season. Maintaining flexibility regarding implementation efforts and

leveraging available resources were key to keeping the overall project on track. For example, the team designed the outreach campaign with the city's publicity department to identify free or low-cost media outlets, such as rickshaw ads. The coalition also encouraged graduate students to incorporate scientific research into their theses under the supervision of the team's senior experts. Now that the city of Ahmedabad has rolled out these first-tier programmes, the project team is working with the local government to increase future interventions.

Implications

- Gaining strong government buy-in and support from the beginning enabled this project to communicate through existing agency channels to achieve its goals. In this way, the heat action plan could be enacted more rapidly and effectively, and could also continue after the project's completion. Capitalising on available resources and the community's eagerness to participate also enhanced the project's impact. Ongoing efforts to engage the private sector, including private emergency response groups and employers of outdoor workers, are also an important way to expand efforts locally.

- Establishing a strong scientific foundation through on-the-ground research is key to effectively tailoring a health-focused climate adaptation plan to a specific community and building political will to act. To prioritise outreach within cities with a limited budget and capacity, the project should map vulnerable

communities, noting factors that increase their vulnerability and those that could be used to increase their resilience. It should also identify appropriate communication strategies to formulate concrete recommendations for decision-makers.

- While this detailed research on the current effects of heat on local communities was needed to develop the Ahmedabad pilot plan – the first of its kind in South Asia – leading cities could modify the simple steps of the pilot plan to start protecting communities from extreme heat. The recommendations, such as developing early warning systems or community awareness on preventive measues (drink water, stay in the shade, check on neighbors), are low-cost solutions that save lives.

- Incorporating tools to monitor heat-health threats and evaluate the effectiveness of interventions is important to assessing risk and improving the plan over time.

- As natural disasters devastate more and more communities, awareness of climate change and the importance of adaptation efforts is growing. Harnessing this increasing recognition of the need to prepare may help support on-the-ground implementation of new adaptation projects – and save lives.

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